

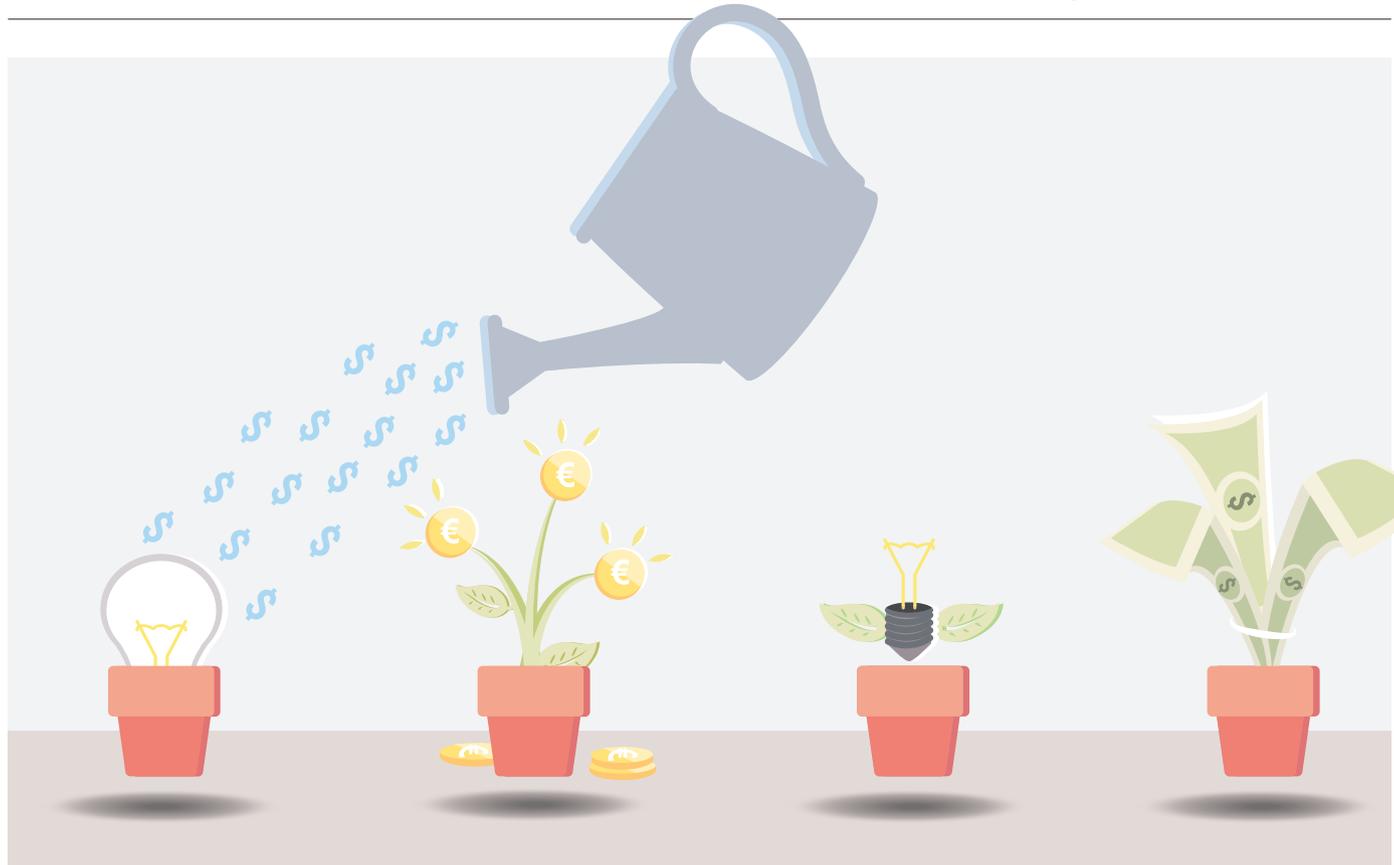
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COLUMN

A guide for the innovator

Researchers with product-worthy ideas can follow various, often under-appreciated, paths towards commercialization, says **Peter Fiske**.

Scientists often conduct research to advance innovations that they hope will improve lives. Indeed, for many it is a chief attraction of the scientific career.

But most are still unsure of how to recognize the commercial potential of their discoveries, and how to translate that into products or services. To the inexperienced or uninitiated, successful commercialization, when it happens, may seem to be a matter of chance — but that is not so. Although university technology-transfer offices often play a crucial part in helping to license inventions, many scientists do not realize the importance of their role in establishing early commercial validation for a new technology.

Historically, scientists have made their discoveries — and any commercial potential — known to the larger world mostly through scholarly publications. But academic literature, which is often behind paywalls and pricey to access, is aimed mainly at other academics. It is rarely consulted by industry. And even the most significant technological advance can become obscured by the detailed, turgid exposition that is the hallmark of the typical research article.

Researchers who think that their discoveries have commercial potential need to communicate this information through channels that industry accesses regularly. When publishing a

scholarly article in a peer-reviewed journal, for example, it makes sense to notify the editors of the work's potential commercial impact. The journal might have some way of highlighting this facet of the work — be it through an editorial, an analysis or some other means. A number of journals now circulate brief synopses of their articles to a broader audience. Journal policies and approaches will vary, but scientists with entrepreneurial ambitions should not assume that the commercial aspects of their research will be noted unless specifically pointed out to editors.

There are other ways to promote a discovery's commercial potential. Some industry trade ▶

► magazines welcome short, less-academic articles describing the innovation and its potential for industry. And many research institutions and universities have public-affairs departments that specialize in broadcasting newsworthy scientific discoveries, particularly ones with business potential. A scientist with an interesting invention can also reach out to specific industry communities that cluster around science blogs and other social-media outlets. LinkedIn, for example, has groups for ‘oncology research’, ‘advanced biofuels’ and many others.

Alternatively, researchers themselves can strike out as entrepreneurs. Creating, or ‘spinning out’, for-profit companies that are based on technologies developed in academic institutions is an increasingly crucial step in successful commercialization. Although the process of licensing remains alive and well at leading institutions, many tech-transfer professionals recognize that licensing alone is typically not enough to carry a new technology across the ‘valley of death’ — that difficult development stage in which research becomes more applied and costs escalate — and into commercial adoption. Furthermore, licensing to an outside party leads to a separation of the inventor from the invention, which can slow the development of a technology. After all, the researcher who first made the breakthrough often has the best insight into how to further develop the invention and resolve the remaining barriers to its commercial viability.

Academic start-ups seem to follow several paths (see go.nature.com/rqv7mc). Some researchers first explicitly market the innovation through their tech-transfer office to industry and the investment community. Many of the leading university tech-transfer offices maintain a network of industry contacts, ranging from Exxon to Genentech. An investor then comes forward, expressing interest in funding the company.

Some academic entrepreneurs have been able to capture, in essence, the best of both worlds by cultivating industry sponsorship for their product while the technology (and the research team) remains with the academic institution. In other words, they need not ‘hand off’ their discovery to the entrepreneurial sector. In some cases, industry partners specifically fund academic projects with the intent of developing a core set of technologies (and technologists) for later ingestion into the business. In many cases, the graduate students and postdocs who work on the projects are the first to be offered jobs with the industry partner. Investigators should, of course, tread carefully when

accepting such money, acknowledging and understanding any conditions of its acceptance (see *Nature* **453**, 1138–1139; 2008).

Sometimes, research projects can turn into commercial ventures with little outside assistance. In the course of their work, researchers or members of their team may produce a prototype of some sort — a new chemical, say, or a biological reagent. Investigators in academia or industry hear about that reagent and start to request it. The investigator starts charging a fee. The ‘customers’ get good results, demand the reagent in increasing quantities, perhaps become willing to pay a bit more and, voila, a business is up and running.

“Some institutions fund ‘entrepreneur-in-residence’ positions to specifically facilitate the creation of ventures based on scientific research.”

And then there is the explicit activity of entrepreneurs within the institute.

Universities with business schools often have a cadre of students who trawl for technologies that have commercial potential in their institution’s laboratories. These ‘intrapreneurs’ have an advantage because they are the first to learn the details of a discovery or innovation. Some institutions (such as the Lawrence Berkeley National Laboratory in California and the Massachusetts Institute of Technology in Cambridge) fund ‘entrepreneur-in-residence’ positions to specifically facilitate the creation of ventures that are based on scientific research. Getting to know your intrapreneurs can provide valuable insight not only into the process of technology commercialization but also into steering early-stage research in a commercial direction.

Academic and research institutions will continue to develop and refine the paths towards commercializing technological innovations. But the core of any successful effort is the researchers themselves. By understanding the

pathways that can connect their discoveries to successful technological spin-offs, young scientists can maximize the chances that their research will have commercial value and impact.

Big breakthroughs with commercial applications cannot necessarily be anticipated, but as the chemist Louis Pasteur noted, “fortune favours the prepared mind”. ■



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