From Lab to Market: Creating Companies from University Research

By Harold J. Evans, Esq.

The growth of knowledge-based industries has become the mantra for many governors and chief executives of state economic development agencies in this post-recession economy. These officials are looking more and more to academic institutions to supply the seeds for this growth by encouraging them to foster the creation of start-up companies to commercialize university-based research. Whether these efforts will meet expectations remains to be seen, but colleges and universities are actively pursuing the licensing of their technologies to start-ups. This article will briefly explore the history of university technology transfer and describe the commercialization process most common at academic institutions. Finally, it will examine the hypothetical case study of a professor engaging in research that results in a patentable invention which is subsequently licensed to a start-up company.

Bayh-Dole Act and Technology Transfer

Thirty years ago, Congress passed the Bayh-Dole Act, 35 U.S.C. § 200, et seq., which allowed non-profit institutions that make inventions under federal grants to elect to retain title to those inventions and commercialize them by licensing arrangements. The Bayh-Dole Act led to the creation of technology transfer offices in most major research universities. The Association of University Technology Managers (AUTM) estimates that more than 5,000 new companies have been formed around university research since the enactment of Bayh-Dole. In 2008 alone, 600 new products entered the marketplace based on university technologies. Of course, not all such products came about as a result of licensing to a start-up company but a significant number have been commercialized by companies formed for the specific purpose of taking a product to market.

University Guidelines for Technology Transfer

Although each academic institution has its own specific policies and procedures governing technology transfer, there are elements common among all of them. This article will briefly outline the basic provisions of such policies and procedures and examine how they impact the creation of and the licensing to start-up companies.

Most research institutions have promulgated patent policies which govern the disposition of inventions arising out of university research. These policies generally mandate disclosure to the institution of inventions, require the researchers to assign their rights in the inventions to the university, and allocate among the inventors and the institution the distribution of revenues from the commercialization of the inventions. Some policies address the issue of the treatment

of equity received by the university as part of the consideration for the licensing of university technology to a start-up company. Virtually all such policies delineate the mechanism for evaluation of inventions although there is considerable variance among universities in the structure of the procedures.

Patent committees composed of faculty, university administrators, and, in some cases, outside technical advisors, were once popular among research institutions. These committees were given the task of evaluating invention disclosures and making determinations of patentability and patenting, ownership of inventions, and waiver of university rights to inventions. In recent years, many academic institutions have moved away from this structure and have delegated more of these decisions to technology transfer professionals, such as directors of offices of technology licensing and their licensing managers and officers, some of who have technical expertise in specific scientific fields. These individuals are the ones who have been negotiating directly with established companies and start-ups for the commercialization of university technology. It seems reasonable that they be given greater responsibility for the evaluation and valuation of inventions.

Commercialization Process

The chart below generally represents the process for commercializing university-based inventions at most research universities.

- Research
- Invention Disclosure
- Technology Licensing Office Evaluation
- IP Protection
- Business Development & Marketing
- Licensing
  - Established Company
  - Start-up

Research. University faculty and graduate students are often engaged in substantive research on particularly innovative topics in specifically relevant fields. Such activities represent a core value of academic institutions and support for such research from as many sources as possible is usually welcomed by the researchers and institutions. Indeed, many universities by policy encourage faculty members to participate in research sponsored by outside agencies when such research is consistent with the educational mission of the institution. The sponsors of the research might be for-profit corporations, foundations, or state or federal agencies. Corporate sponsors fund institutional research through agreements that often include an option for the sponsor to license any inventions that result from the research. The terms and conditions of the license are usually negotiated at the time the invention is disclosed to the sponsor. As mentioned earlier, the Bayh-Dole Act allows universities to own the inventions that arise from federally-funded research.

Invention Disclosure. University patent policies require that researchers promptly disclose their inventions to the institution. Reports of inventions must also be submitted to corporate, federal, and other research sponsors. The invention disclosure is a document typically prepared by the researcher who is the inventor and turned in to the university's technology licensing office. It contains a technical description of the invention and may provide some insight into the invention's commercial potential. Some researchers are market savvy and are aware of companies who might be interested in commercializing their technologies. Others are less concerned about such non-scientific matters and offer little assistance to the technology licensing office in the next step of the process.

TLO Evaluation. The technology licensing office (TLO) at a research university evaluates the commercial viability of the invention that is described in the invention disclosure. It also assesses the patentability of the invention and, if the commercial potential is there, pursues marketing and licensing of the technology.

IP Protection. Intellectual property (IP) consists primarily of patents, trademarks, copyrights, trade secrets, and certain tangible items, such as biological materials. The TLO will be most interested in whether an invention can be protected by a patent. Many companies will not license an invention or manufacture a product that does not offer them some kind of exclusivity. A patent is essentially a contract between the government and the inventor that provides the right to exclude others from making, using, selling, offering for sale, and importing the subject invention in the United States. The contract extends for 20 years from the date on which the application for the patent was filed in the United States. A patent provides the potential for a licensee to obtain a significant competitive advantage in the marketplace for a period of time. Without such protection, and the monopoly it offers, companies find little incentive to make the necessary capital investment in the development and marketing of new technologies.

Business Development. Once the TLO has made the decision to patent the invention, efforts are then made to market the technology in the most appropriate manner. A corporate research sponsor often presents a ready-made licensee but if the funding for the research that resulted in the invention originated from another source, the TLO will need to consider other options. Indeed, the university may decide to enter into an option agreement with a third party that wishes to evaluate the technology prior to entering into a complete license agreement.

Licensing. A license agreement is a contract between the university and a third party in which the university's rights to a technology are licensed (without relinquishing ownership) for financial and other benefits. License agreements are used with both start-up businesses and with established companies. University

license agreements usually stipulate that the licensee diligently seeks to bring the invention into commercial use for the public good and provide a reasonable return to the academic institution. Important components of a patent license agreement include the following:

- Exclusive or non-exclusive rights to specific inventions
- Firm commitment to commercialization
- Right to sublicense to third parties
- Reimbursing university for patent costs
- Fair return to university based on technology
- Limiting university liability

Licensing to Start-Ups. Companies formed specifically to commercialize university technologies present their own unique issues. Often a faculty member, student, or staff member is a founder of the spin-out company, and one or more of these individuals and the university may have an ownership or equity interest in the start-up. This raises potential conflict of interest problems that will have to be addressed and managed according to the institution's policies and state and federal law. Also, the university must review and approve a detailed business plan to ensure that the company has a reasonable chance of success in commercializing the institution's technologies. Funding for the start-up is a major concern and the business plan needs to provide some assurances of financing as well as a projection of future revenues. The recruitment of an experienced executive to run the company is crucial and the TLO may be able to assist the start-up in finding the right individual. The spin-out might occupy space operated or controlled by the university, such as a business incubator which may give the company access to technical assistance, students, and certain administrative support. These services supplied to the start-up company by the academic institution are consistent with the university's goal of fostering economic development.

Case Study

A hypothetical example may be useful in illustrating the commercialization process:

Professor Z has been performing research in the fields of petrochemicals and nanotechnology. Her work began as a multi-year study funded by the Department of Energy (DOE). Dr. Z has discovered that certain microbes infused with nanomaterials become voracious consumers of oil. These microbes can be replicated quickly and in large quantities and have shown no adverse environmental impact. Dr. Z has submitted an invention disclosure to IQ University and an Invention Report to DOE.

IQ's TLO staff assessed the commercial potential of the invention. As the result of a few initial inquiries, it was determined that oil companies would have a strong interest in the technology. Good patent protection was possible. However, Dr. Z was able to demonstrate that her invention possesses numerous applications beyond the obvious oil spill clean-up. The state's Energy Office had funds available to support economic development and the creation of knowledge-based companies. The TLO believes that these factors support licensing the technology to a start-up which could broadly commercialize the invention.

OS Company was subsequently formed. Dr. Z was installed as the company's Chief Technical Advisor. A CEO was recruited from a local group of retired experienced executives. The state Energy Office provided OS with a low-interest loan with generous repayment terms. The license agreement between IQ and OS grants the company exclusive rights to the technology in exchange for IQ receiving a small equity interest in OS and royalty payments based on the company's revenues. All other terms and conditions comply with IQ's licensing guidelines. Dr. Z's equity ownership in OS is fully disclosed to the university and managed according to IQ's conflict of interest policy. Success, although not assured, is greatly anticipated by IQ's TLO staff, and products that will benefit the public may eventually reach the marketplace.

Conclusion

Companies formed to commercialize university inventions provide opportunities for the development of a state's economy. Some of these businesses will remain in the state and influence the growth of knowledge-based industries. Therefore, beyond the traditional goal of contributing to the expansion of knowledge, academic research has become the seed for the sprouting of new businesses that tangibly benefit the public welfare.

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