Avant-Garde Technology Transfer at a Midsize, Private University

Michael Batalia, PhD

Michael Batalia, PhD, is director of the Office of Technology Asset Management at Wake Forest University Health Sciences in Winston-Salem, North Carolina.

When there is overt public acceptance of what is still only an idea in the mind of leadership, it means truthfulness has hit its mark.[1]

Over the last twenty years, interest in academic technology transfer has grown dramatically. The financial returns, jobs, and product success stories have attracted the attention of government, business, and academia. Many metrics are collected, but it is safe to say that no two technology transfer programs are alike. It's probably even safe to say that no two technology transfer programs are close to similar, even though many of the underlying policies, standard agreements, and operating philosophies are shared.

The reasons for these discrepancies are no mystery. Like any other department in a university or a company, the organization and regional stakeholders have a lot to say about which needs come first. In cases where venture investments are made in university technology, the venture interests may dictate where resources are focused and which efforts take precedent. In addition, staff requirements and administration turnover result in different dynamics within the community. All these factors result in unique offices that are changing to meet the demands of the moment.

The budgetary requirements of an office are unique to the individual programs—whether the office exists within a public or a private university. Even though a university may derive large sums from royalties and other financial considerations, the budgets of the technology transfer programs typically are set year by year. Most programs don't get to capitalize on the windfalls and reinvest funds into future technology.

With this in mind, let's spend a moment on the classic models of technology transfer most institutions draw upon in the course of doing business as an office. Each institution chooses a technology transfer strategy predicated in whole or in part on the following models of technology transfer: the service model, the revenue model, and the economic development model.[2] I will briefly review these models before reflecting on the unique patois that currently is the office at Wake Forest University Health Sciences.

Service Model

In the service model, the technology transfer office exists to disseminate knowledge and serve internal clients who are members of the university community. Universities generate knowledge from raw information. Long before the Bayh-Dole Act was passed, technology transfer was embodied in the publication of scholarly works, the graduation of students, and community outreach. In fact, these are still extremely important technology transfer functions, and ones that most technology transfer professionals strive to support and keep intact.

To accomplish these functions, the university has to maintain several key departments, including a research office with pre- and post-award responsibilities, an institutional review board (if research involves human subjects), a conflict-of-interest committee, and numerous other key administrative staff. At some universities, the technology transfer function is exclusively wrapped into this support mission. The technology transfer office is charged with managing the institution's intellectual property in a manner that maximizes the distribution of knowledge and the satisfaction of faculty clients.

Measures of success for a service model technology transfer office include number of published patents, exposure to new research funding, and recruitment and retention of faculty. Less emphasis is placed on license revenue, equity, startup formation, or local job creation.

Revenue Model

In the revenue model, emphasis is placed on profitability. The technology transfer office is given the latitude to make savvy investment decisions from the time of invention disclosure. Office personnel spend time with select faculty members and develop intellectual

property investment strategies to generate licensing and startup opportunities. The focus stays on how to maximize the financial return to the institution. *Investment* is the operative word. There may or may not be an expectation for a particular return on investment. Senior administration will support the office's decision not to invest in a faculty member's technology—even if the faculty member has strong external funding and political sway within the institution. Investments take the form not only of patent applications, but also prototype development, proof-of-concept studies, business-plan development, outside consultants, and other resources.

Although most technology transfer offices strive to become profit centers within the university, the unpredictable nature of licensing revenue and equity investment makes it difficult to project profit or loss; hence it is hard to achieve steady growth. This model of technology transfer is predicated on a diversified portfolio of intellectual property developments. If an office is reliant upon a single home run, the institution is susceptible to cash-flow problems, because large revenue streams may be threatened by charges of infringement, inappropriate patent award, license renegotiation, and market volatility. This is a field of high risk and high reward.

Measures of success for a revenue model technology transfer office include gross revenue, net revenue (minus patent expenditures), equity grants, equity cashout, new industry-sponsored research partnerships, and percent legal expenses reimbursed.

Economic Development Model

In the economic development model, the emphasis is on improving the local economy. *Local* may mean the immediate municipality or, for larger public institutions, the entire state. The office looks for platform technologies that can become the basis of a startup company or for technologies that dovetail with local companies. For universities located in economically depressed areas, this model may take on special importance. The technology transfer office may work closely with regional, state, and/or local economic developers to achieve common goals.

The development of a mixed-use government-academia-industry campus often accompanies the economic development model. The space available is beyond the bread-and-butter

business incubator, often there is high-tech laboratory space, shared instrumentation, access to students, common administrative support, and other services appropriate to that setting. Companies that locate on these campuses are usually required to have a connection to the university, and the preferred connection is either as the sponsor of research or as the licensee of university-owned technologies.

A measure of success is the creation of local jobs and the retention of graduated students in those jobs. Tax revenue generated, office and/or laboratory space occupied, and community growth are also tabulated.

No office works purely from a service model, a revenue model, or an economic development model. Most programs dynamically blend these models to address the current needs of their campuses and regions.

Technology Transfer vs. Technology Development

There is a continuum of value that technology transfer offices can add to their disclosures depending upon their size, resources, and predominant model style.

This section will outline the difference between technology transfer programs that follow the premise of patent, option, out-license, receive consideration at one end of the spectrum vs. programs that start for-profit companies, develop the value of their intellectual property internally, and exploit technology derived from university research in unique partnership arrangements at the other end. Most offices can claim some combination of the classic models described above, but each will be composed of a unique and dynamic blend. Wake Forest University Health Sciences represents such blend.

Wake Forest University Health Sciences Office of Technology Asset Management

Wake Forest University Health Sciences operates under the umbrella of the Wake Forest University. WFUHS Office of Technology Asset Management (OTAM) is responsible for managing technology development and commercialization activities for all campuses in the Wake Forest University organization. OTAM currently operates under a hybrid model

that focuses its efforts on the development of the value proposition of each technology disclosed. At WFUHS, *value proposition* is defined as a clear, concise series of factual statements on tangible results related to product-like derivatives of the related invention disclosures.

By this definition, value-proposition development not only includes filing patent applications and bringing patents to issue, but also surveying the marketplace, identifying market opportunities, funding product-like prototypes and proof-of-concept efforts, and competitive testing of product-like derivatives against products already in the marketplace.

The name of the office is atypical—although *intellectual asset management* became part of the corporate world's lingo in the mid-1990s, most universities eschew names that call attention to assets, probably in deference to public perception of their not-for-profit status and their history of free dissemination of knowledge. Wake Forest University has recognized that universities have many assets—land, buildings, endowments, art collections—and that intellectual assets ought to be actively managed just like any other asset.

OTAM is also somewhat unusual because the office reports to the financial administration of the university and not to the research administration. To my knowledge, this is a rare reporting structure for a technology transfer program. This is not to say that OTAM doesn't have an active relationship with the Office of Research and the Office of Sponsored Programs, but this is a dotted-line relationship where each office works with the others to achieve separate but aligned goals.

OTAM has the liberty to act only on the invention disclosures where the office can add value at the time. Caseloads are kept very small and average about ten new cases per licensing professional per year. This lighter load allows the licensing staff to drill down to the details, perform careful due diligence, and give each technology significant support. In some cases, OTAM performs the heavy lifting needed to secure funding for a new startup company, manage prototype development and proof-of-concept studies, as well as work to file patent applications and market technologies. In this mode, OTAM functions more like a "Skunkworks" than a traditional out-licensing program.

Seed Stage Associates

OTAM recognized the need to spend even more time on some projects that might otherwise get caught in the technology transfer chasm—when the technology needs further development outside the realm of university research, but is not yet able to attract capital. To fill this need, Wake Forest University launched Seed Stages Associates LLC in 2003.

Seed Stages Associates is a wholly owned, for-profit subsidiary of WFUHS. The employees of OTAM are "loaned" to SSA—they spend up to 20 percent of their time on SSA projects. In addition, consultants are brought in to address project needs on a retained or ad-hoc basis. SSA performs several missions.

SSA in-licenses technologies, from WFUHS or from outside organizations, that can benefit from added development and heavy lifting and that need business development expertise more than they need a heavy infusion of capital. Currently, SSA has only selected technologies from the WFUHS portfolio of internal development projects. The criteria for technology in-licensing to SSA have been established on a case-by-case basis, but the general scheme is that the technology must be embodied in a product-like prototype that can benefit from early customer partnerships that build on the value proposition.

SSA licensed its first technology from WFUHS in the fall of 2003. The Predictive Assessment of Reading (PAR) was developed in the WFUHS department of neuropsychology; PAR stems from a decade of federally funded research. The result is a reading assessment tool that can determine the present level of a person's reading ability and prescribe specific remediation for that individual in approximately fifteen minutes. PAR was field-tested nationally, and several big publishers initially became very interested in the program. Although separate negotiations progressed with two well-known publishers, a deal wasn't consummated because the research-based ideals of the program were in jeopardy of being scrapped in lieu of publisher objectives.

As a result, the office decided to take the next step of development through SSA doing business as Child'sMind Publishing. For a modest investment—relative to typical patent expenses—of approximately $25,000, an online scoring engine was developed and a train-

ing CD-ROM was published to support early adopters who paid for large pilot studies. Since in-licensing PAR, SSA has licensed the use of PAR to schools around the nation and has developed relationships with numerous partners who offer PAR. Under the license agreement, SSA pays royalties to WFUHS that are substantially larger than the standard 10 percent authorship agreements offered by the publishing industry. The goal has been to understand and build the value proposition.

Going forward, WFUHS/SSA can spin out Child'sMind Publishing into a separate for-profit company that can raise additional capital or it can pull together the entire package of intellectual property collected under Child'sMind Publishing and either sell or out-license these assets for a reasonable multiple. Regardless of the exit, OTAM rescued a technology off the shelf and was able to develop it through a modest investment of dollars and sweat equity to a point where national partnerships have been created. But the real story is not about the money; it's about how many people, mostly children, will learn to read when otherwise they may have been lost. Both realistic financial returns and public good can flow from these types of activities.

In addition to technology in-licensing and development, SSA offers technology transfer consulting services. For two years, SSA has held a contract with the University of North Carolina Office of the President to provide technology transfer support to about half of the UNC-system schools. With one exception, these schools are located in the central and western part of the state. Some are entirely new to technology transfer, and others have well-established programs.

SSA provides highly customized services, depending on what each campus needs. While formal presentations, workshops, and educational seminars are sometimes provided, SSA does not specialize in these areas. Rather, the emphasis is on real-world, situation-specific advice. SSA provides invention-disclosure triage, including technology assessments and patentability surveys, preparation of nonconfidential marketing summaries, marketing phone calls, and license-negotiation assistance. SSA advises on faculty conflicts, university investment/equity opportunities, patent and copyright policies, confidentiality agreements, material transfer agreements, copyright assignment, trademark and servicemark registration, and student involvement in IP-generating projects.

Milestone-Based Developments

Over the years and through the experience of this unique partnership of OTAM and SSA, a more flexible interpretation of venture investment has evolved. Instead of following an investment pattern where large sums of money are dedicated to a company or a technology, small investments are committed to the advancement of individual projects and future investments are predicated on milestone assessments. This can be illustrated by a technology OTAM has been developing.

A unique high-flow catheter was disclosed to the office several years ago. Patent applications were filed and patents issued, but the initial marketing efforts fell on deaf ears. The biggest critique was the lack of evidence that the novel design was any better than what was in the marketplace. The faculty inventor crafted an initial prototype, but the tubing was not of the proper characteristics and it failed. OTAM and the faculty created a milestone-driven investment plan to build the value proposition of the high-flow catheter.

The first milestone was to hire a consulting firm with expertise to fabricate a second-generation prototype out of commercially acceptable materials. The second milestone was to test the second-generation prototype against known competitors in the marketplace. The third milestone was to initiate directed marketing efforts and establish a partnership to move to FDA approval. Each of these milestones received only the requisite finances necessary to move forward. At the milestone, a go/no-go decision was made. In this case, the technology moved through all three milestones, but, at any level, if the outcome didn't meet the milestone, the financial input would have stopped. Crafting a limited strategic plan and sticking to it can minimize losses.

From the university perspective, certain types of technology developments are better-suited to this investment model: medical devices, software, and materials. Therapeutics may seem out of reach due to the length of time and money to develop advances, but even therapeutic development can be serviced with one or two well-designed proof-of-concept studies.

Conclusions

"It's not about the money" is the mantra heard throughout the technology transfer community, and rightly so. Yet as technology transfer continues to grow, the industry faces constantly changing pressures from surrounding communities to do more—create jobs and companies, generate income, service the needs of the faculty, and so on. As venture capitalists, industry, and entrepreneurs are looking for low-risk opportunities, bringing technologies forward quickly is going to be a challenge. In addition, the United States Patent and Trademark Office has tightened its examination process, and what was once broadly covered is now subject to much more specific claims. These and other factors taken together suggest that the chasm between leading-edge technology disclosed to the technology transfer office and the transition to the commercial sector is getting a bit wider. Academia and industry each will have to do more, in innovative ways, to bridge the gap. Therefore, technology transfer is going to have to spend more resources building value in intellectual capital and longer times in development before partnering or licensing technologies.

But as much as we continue to search for new metrics to track avant-garde technology transfer, there is one that is constant and immeasurable: the number of people our technologies touch. In this way, it doesn't matter if the technology is a billion-dollar therapeutic or a vaccine for developing nations. Getting the ideas out of the lab and into the public good is the real measure of success.

Notes

1. Thomas Cleary, *The Book of Leadership and Strategy: Lessons of the Chinese Masters* (Shambhala Publications Inc., 1990).
2. Association of University Technology Managers, *AUTM Directors' Kit* (Northbrook, IL: Association of University Technology Managers, 1999).