Use of Consultants in Technology Transfer

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Technology Transfer Professionals: Multitasking Gurus

The broad mandate of university technology transfer offices (TTOs) is to evaluate and selectively nurture early-stage technologies through the developmental stages of maturity. In the process of taking ideas to market, the technology transfer professional has to play several roles—friend (or foe), philosopher, investor, board member, and mediator. This is in addition to being a willing graduate student in every discipline in which the university performs research, with the purpose of becoming an expert in the given field of the disclosure in less than a week.

From Concept to Commerce: The Consultant's Role

Consultants as a breed bring their own jargon, baggage, and approach. In addition though, consulting firms pride themselves on having a team of highly motivated, focused, well-trained, and experienced problem-solvers. The daily routine of a consultant involves solving multidimensional problems ranging from technology to market challenges. Often, these challenges are layered within organizational, systemic, and team issues. These solutions are as applicable to a TTO as any corporate entity.

Consulting firms, by virtue of their professional environs, are forced to keep a close ear to the ground and diligently track emerging trends in the technology markets. The value of early-stage technologies in shaping the future can never be underestimated. As a consultant, the value attached to technology innovation is clearly evident across the array of companies of various sizes and stature, irrespective of whether they are year-old startups or corporate behemoths. Market differentiation is a key motivating factor for companies to continuously hunt for novel technologies and develop new products and features to stay ahead in the highly competitive environment.

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There are other factors, such as regulatory pressures, that can greatly impact industry's need for innovation. The clean-tech arena is one such segment. Consultants with in-depth understanding of market and technology dynamics together with a pulse of the technology maturation curve are positioned as key allies of the technology transfer professional. The approach of "build it and they will come" seldom succeeds and has few takers. The understanding of customer need is rated a paramount factor for success by most business consultants. Consultants with this understanding may often provide the required reality check on the technology gap and market opportunity for a given early-stage idea or technology.

Justifying the Cost: TTOs Can Afford to Hire Consultants

Following the lead of many executives in private industry, universities today are not shy about hiring consultants to assist them in reducing redundancy and administrative costs. The question is, How are TTOs justifying to their university senior leadership spending dwindling resources on consultants who perform commercial and patent assessments for new or existing invention disclosures?

Investment in Initial Evaluation May Prevent Unnecessary Patent Costs

In today's environment where patent fees on provisional patent applications can top the $10,000 mark, spending a fraction of that amount to have a consultant look into whether or not there is even a market for the subject of the invention disclosure appears to be reasonable path to take. This may be particularly true if the TTO is a one-person shop and/or has a nominal number of disclosures in a certain discipline/industry submitted each year. But what about larger technology transfer offices? Say for example, technology transfer offices that have multiple full-time employees and 50-plus invention disclosures submitted each year. In that case, it could be argued that engaging a consultant to perform a commercial or patent assessment on every case may become cost-prohibitive. These larger offices may first want to consider engaging a consultant to perform an initial, overall triage of these inventions to rank them using agreed-upon criterion.

Another example of when consultants are useful is when a TTO is sitting on a large backlog of cases (which have accumulated over many years and have not been patented) or a large portfolio of patent applications and patents that are not licensed. Engaging a consultant to prune these cases in a relative short period of time can not only help reduce costs but also avoid the perception that the technology transfer office is the perennial black hole.

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Early-Stage Technology Commercialization: Call for Help to Understand Licensee's Perspective

Knowledge of technology markets is essential to understand the relative position of an early-stage technology in the given industry landscape. The knowledge of technology markets is important but not sufficient for successful technology commercialization. Developing an understanding of customer needs and challenges is paramount to any successful business, including the business of technology transfer. For any TTO it is critical to understand the forces shaping and motivating potential licensees in the corporate research and development (R&D) environment. The knowledge of technology markets when viewed in the context of challenges being faced by potential licensees presents a clear and realistic picture. TTOs may have limited access to this knowledge and must pay to acquire this experience.

Consultants fact gather in many ways, often having access to information a TTO does not. Leading consulting firms advise an array of clients ranging from small startups to Fortune 100 companies. Consultants often help and troubleshoot or help to develop and implement corporate strategy. Thus, consultants have an insider's view of how things function or, more importantly, where the challenges arise.

For many businesses in diverse verticals, technology development and innovation are crucial to keep up with customer demand, competition, and, more importantly, achieve overall growth objectives. As a standalone perspective, technology is important, but in conjunction with six other perspectives—customer, economic, global, integrated industry, competitive, and best practices—it provides a critical focal point for technology-driven or technology-based companies. In good economic times or bad, technology innovation fuels growth and sustainability of organizations. Companies that continue to invest in development of innovative products, services, and solutions tend to do better than those that cut back on R&D programs.

The key for any organization is to identify the most potent projects and take them through a systematic process of development and go/no-go decision milestones. Whether the projects are homegrown or externally sourced via in licensing or an open innovation platform, they eventually enter the new product development platform and are governed by the same forces and parameters.

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In this regard, it is critical to view some of the external and internal challenges that are typically faced by any R&D organization. The organization's technology and R&D executive team is faced with numerous internal and external challenges. Internal organizational challenges include issues related to company vision, executive sponsorship, team-building, and maintaining funding for R&D projects, while external challenges are related to factors impacting adoption and commercialization of new technologies and realizing return on investment (ROI) on product development efforts. Consulting firms undergo years of learning dealing with a variety of circumstances and industry segments. Thus, consulting firms are well-placed to provide a 360-degree understanding of these challenges. The table provides a list of external and internal R&D challenges commonly faced by organizations.

Table 1: External and Internal Research and Development Challenges

Key Internal Challenges	Key External Challenges
Evaluating open innovation for co-development: Reviewing the available open innovation options to optimize innovation strategy in pursuit of efficient product development.	Negotiating the intellectual property (IP) jungle: It is critical to map the IP landscape to identify whitespace and IP-dense areas to guide the innovation strategy and ensure freedom to practice.
Implementing customer-driven innovation management: Integrating customer feedback to guide the innovation process for product development.	Matching innovations to applications (unmet needs): Focused and purposeful innovation based on a rigorous process of evaluating existing and future applications.
Aligning ideation with the strategic vision (including interdepartmental communication): Ideation must include mechanisms to channel inputs from multiple functional groups within the organization to align innovation with the strategic vision.	Mining the whitespace to inform innovation strategies: It is imperative to scan the technology/application whitespace to identify novel target opportunities.
Defining innovation timeframes: The process of demarcating stages of innovation based on time to market.	Tracking the competitive technology landscape: Real-time monitoring of technologies and applications targeted by incumbent and potential competitors.
Build vs. buy for innovation: Balancing internal technology innovation with external sourcing.	Monetizing innovation: The ultimate objective of innovation success is to productize innovation to maximize profitability and sustainability.

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Addressing Your Internal and External Stakeholders

One of the most difficult tasks at hand for a technology transfer professional is managing expectations, both at the internal and external levels. Dealing with external expectations involves understanding the needs of the market and potential licensees, managing the relationship with venture capitalists and angel investors, engaging with law firms and accounting firms, and dealing with the patent office amongst others.

Internally, the challenge can be much bigger. The key internal constituents of a TTO include faculty inventors, student inventors, student interns, deans and administration officials, the grants management and contracts offices, as well as the senior-most offices in the university focused on economic development.

A diverse list of external and internal constituents, each with its own agenda, presents a complex maze to navigate. The sponsors of a TTO are internal and, hence, the first part of this discussion will be internally focused. Interacting with inventors, encouraging and motivating them to file disclosures before publishing, preventing public disclosure at conferences before appropriate safeguards, or dealing with unrealistic expectations are all key components of the internal challenge matrix. There is a constant struggle to manage a portfolio of very early-stage technologies that need in-depth assessment from multiple viewpoints. Often, inventors are more amenable to an unbiased external opinion as opposed to what is perceived as biased internal positions or narrower field of expertise.

Perceived Expert

Consultants can bring a great deal to the table given the direct, strong, and long-term established understanding and relationships with the industry. The TTO can gain high regard and credibility with its internal constituents by leveraging the contacts of the consulting firms for pursuing avenues in sponsored research, technology marketing, brand creation, and projection of capabilities to a large pool of potential licensees. This value proposition when conveyed in the appropriate context can potentially generate a great deal of good will for the TTO.

Process Efficiencies

Consultants also focus on process efficiency, whether it is a supply chain or a disclosure analysis and management system. Cleaning up the processes can generate substantial

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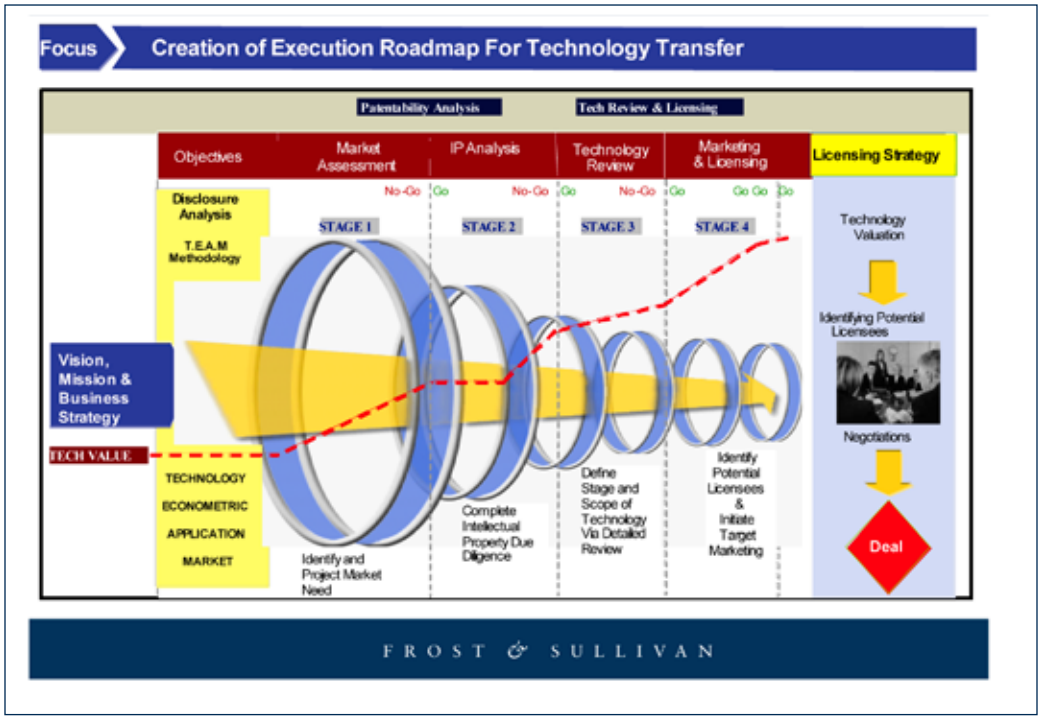
time and cost savings. In addition, gaining valuable firsthand market feedback on an inventor's technology can provide that added level of confidence, for which, the inventors often look. The answer could be negative, and an external unbiased opinion can make it easier to digest and perhaps a little more palatable.

Similarly, an encouraging response from the market can go a long way in boosting the morale of the inventor and the entire research team. Leveraging their relationships with consulting firms, TTOs can help brand their faculty inventors, position their cutting-edge technologies in the market, and help get the required attention to the game-changing research that goes on in the labs. TTOs can demonstrate in several ways the value of developing a close relationship with a consulting firm. The consulting firms, on their part, have to look at this as a relationship-building and partnership-building endeavor and not merely as a route to near-term profits as illustrated in Figure1.

Figure 1: The Technology Transfer Roadmap: Where Can a Consultant Add Value?



At each step of due diligence indicated in Figure 1, a consulting firm can bring in a very market-based approach focused on commercializing an early-stage technology. This can range from obtaining market feedback on early-stage ideas through primary research,

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identifying target licensees, and facilitating early discussions, as well as providing necessary support during negotiations when needed. The negotiations could involve potential investors or licensees, sponsored research agreements, or the more frequent discussions with faculty inventors to help fine-tune their inventions or convey a market reality that may not be the most desirable outcome for faculty.

The integrated approach of intellectual property (IP), technology, and market due diligence together with inputs from primary research can be invaluable in uncovering the future potential of an early-stage idea or technology. The TTO should stay in contact with the consulting firm during the due-diligence process to track the direction of the project to ensure the best results.

Garnering Investor and Venture Capital Support

TTOs can engage consulting firms to present the value proposition of a notable technology to potential investors. Angels and venture capitalists (VCs) alike recognize the name-brand consulting firms and will likely see as favorable any data or analysis that is supported or presented by leading global consulting firms. This attitude stems from the fact that often, the VC firms themselves rely on some limited external due diligence and opinions. One such source of external opinion would be a consulting firm that has in-depth technology expertise in the given area.

Selecting a Good Consulting Firm

Considering the myriad consulting firms available to a technology transfer professional, what features should the technology transfer professional or TTO look for in a prospective firm?

One of the most critical features is flexibility of turnaround time. Under the U.S. IP-process flowchart, commercial/patent assessment occurs before filing a provisional patent application. That means to ensure that overseas patent rights are not compromised due to premature publication, the faculty member/inventor must delay publishing of research results until a patent application is filed. This can become a problem if the assessment takes months instead of weeks.

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Another feature that is important when seeking to engage a consulting firm is the nature of the data being gathered by the consultant firm for the assessment. In many instances, the consultant in effect gathers publically available data, for example, market data characterizing yearly sales for a specific industry. The value added is it takes the consultant much less time to identity and collect this publically available data compared to the technology transfer professional attempting to do this internally.

However, there are some instances where it is necessary for the assessment to drill deeper and seek out very specific nonpublished data, for example, to determine the market share of a potential licensee in a particular industry. Although all consulting firms have access to the published data via the Internet, only select, generally larger firms (with many clients willing to provide this data in an unidentifiable manner) have the capability to produce this type of market data.

Last, but not least, flexibility in pricing is critical to any technology transfer professional. Having a variety of offerings, including low-cost options, is essential for consulting firms looking to be engaged by TTOs in today's economy. Many TTOs are under tremendous pressure by senior university management. This is particularly true for state universities struggling to maintain or increase services in an environment of reduced funding. Many consulting firms may lose the ability to break into the university arena. Some of this flexibility may take the form of discounts of fees, but more desirable (from a technology transfer perspective) is a tiered, stage-gate approach.

The Disclosure Number Game: Too Little or Too Much?

TTOs globally typically have either of two problems with regards to disclosure throughput: too little or too much. There could be a problem of receiving too few disclosures and hence motivating their faculty inventors to engage in frequently presenting their potentially patentable ideas to the TTO. Alternatively, for some TTOs, there is a problem of plenty.

The TTOs that receive a deluge of invention disclosures often can have a large backlog spanning several years. In both instances, consulting firms can be engaged to provide much-needed support. Where there is a need to motivate faculty, consulting firms can be engaged to demonstrate the cutting-edge commercial applications that are being brought

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to market globally in the field of the concerned faculty inventor's research focus area. This will serve to motivate the faculty member and provide an impetus for higher disclosures. In addition, a consulting firm may be engaged to structure workshops that can increase faculty participation in the technology transfer and commercialization process.

The problem of plenty is a relative one and depends on the prevalent throughput of disclosure review in an individual TTO. For example, for a technology transfer office having only one full-time employee (FTE), plenty could range from 35 to 55 invention disclosures. Whereas for a technology transfer office having five or ten times as many FTEs, plenty could take the form of hundreds of invention disclosures.

Regardless, for those TTOs that have a problem of plenty, it is well-worth considering engaging with a consulting firm that can deliver on large-scale projects consisting of hundreds of cases in a span of months. This kind of throughput is achievable only if the consulting firm has the necessary bandwidth in terms of a large number of highly qualified subject specialists or technology, market, and IP analysts in addition to extremely efficient processes in place.

The consulting firms that are routinely engaged by industry to perform such a function would perhaps be best-positioned for such types of projects owing to their well-established protocols and years of experience dealing with these projects. It is critical for TTOs to ensure that the backlog is cleared quickly so as to enable the licensing managers to devote time to the newer disclosures coming in that can have a potentially higher value.

It is also important to consider that technology waits for no one and, hence, some of the older cases may be made obsolete just due to the passage of time for the lack of finding a licensee or for the mere lack of a revisit to the backlog. This problem is compounded by the fact that patent maintenance costs can be alarmingly high and could pose a huge drain on resources. Hence, both for process efficiency reasons and for resource considerations, it is imperative that this problem be addressed sooner, rather than later. The problem does not go away with time, and the pain only gets more severe.

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Successful TTO-Consultant Relationships: Case Studies

A unique partnership model was developed between the University of South Alabama and Frost & Sullivan. Here, a large number of disclosures were presented to the consulting firm via established confidential mechanisms for a preliminary review. After completion of this review within the timeframe of a few weeks, the consulting firm sent in its recommendations on cases that were deemed fit for a thorough analysis. The TTO evaluated these recommendations and, in approximately 85 percent of the cases, was in good agreement with the consulting firm.

Once the scope of the analysis and selected cases had been well-defined, the consulting firm then undertook complete due diligence including a detailed technology review, technology-market fit analysis, as well as an IP landscape assessment. The final recommendations were made to the university TTO based on all of the above criteria.

Figure 2: Partnering Schematic

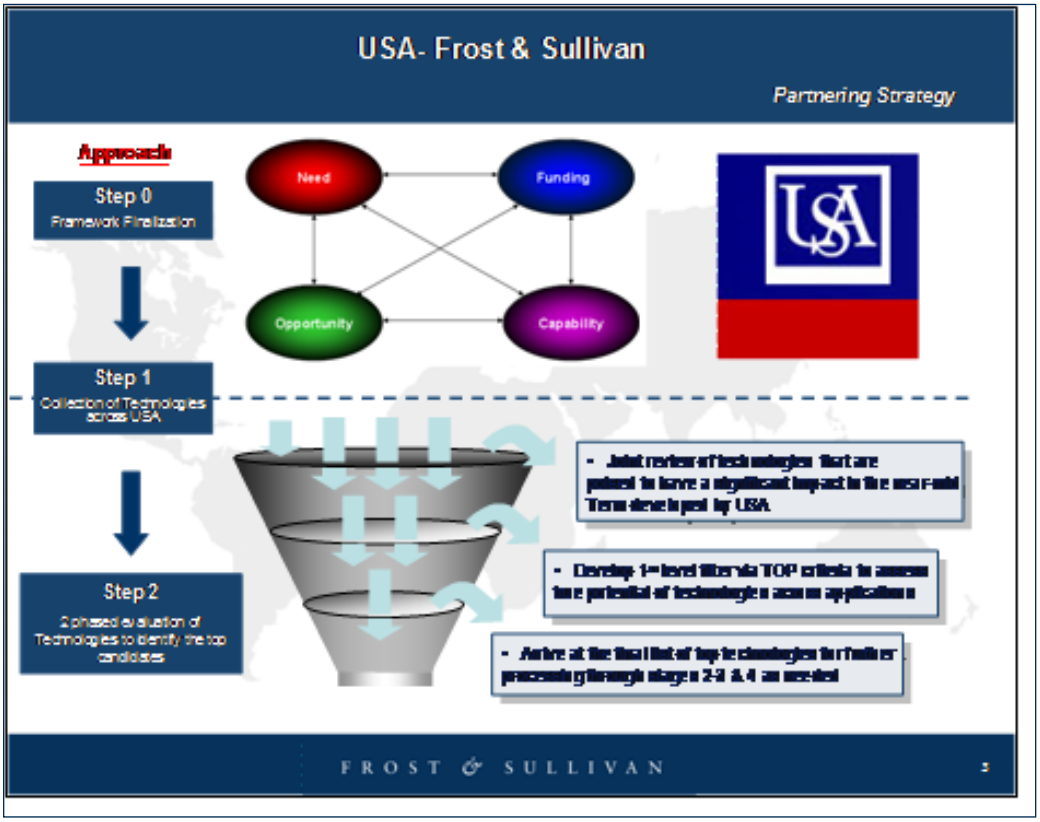

Figure 2 shows a model that allows for a second opinion from a well-established consulting firm, while maximizing the return on investment for the TTO by investing in due diligence for only those cases that have been preselected through a funnel process.

The preceding case study was based on a real-life scenario. But to illustrate the point further, the following examples provide two hypothetical case studies.

Case Study No. 1

James Rockstar, a serial inventor working at the University of FlorBama (UFB), has a successful record of working with UFB's Office of Technology Transfer (OTT) to license the first stage of a cutting-edge, platform technology to the aerospace industry. As a result, Rockstar's reputation in the industry soars. Under these licenses, the licensees must reimburse OTT for worldwide patent expenses relating to this first-stage technology. The total reimbursement amounts to more than $250,000.

Based on the successful track record of the first-stage technology and Rockstar's worldwide reputation as a leader in his field, OTT makes the decision to file Rockstar's second-stage technology around the world with the hope that licensees will be forthcoming and the patent fees will be reimbursed. Three years go by, at an average worldwide patent prosecution average cost of $40,000 per year, and still no licenses. Should UFB's OTT office pull the plug on these second-stage patents/applications and risk alienating Rockstar?

UFB's OTT decides to first engage a consulting firm to get a better handle on the market parameters for this second-stage technology. The firm concludes that, unlike the first-stage technology, this second-stage technology has fewer benefits for the industry segment, is highly likely to be impacted by regulatory constraints, slow growth rates, and, as result, has very limited market potential, if any. UFB's OTT shares these results of this commercial assessment with Rockstar. They both agree to pull the plug on this technology, thereby resulting in a savings of more than $40,000 per year. The consultant charges were less than 20 percent of the annual expenditure on the average yearly maintenance costs.

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Case Study No. 2

John Newhire, a new, industry-savvy professor of engineering at the University of National Football Championship (UNFC), submits a new invention disclosure relating to an electronic device for use in the telecommunication industry. Since Newhire spent ten years working for an electronics manufacturer, the commercial assessment performed by a consulting firm (hired by UNFC's OTT) was extremely positive, indicating a large market potential for the invented device. Newhire is so confident that his device is a game-changer, he builds a prototype in short order and presents the working prototype to UNFC's OTT with the request that OTT pay to have the device patented. OTT decides to hire the same consulting firm to perform a patent assessment on the invention.

In the process of conducting this patent assessment, the consultant's technical expert confirms that the invention may be too broad in view of the fact that there are many patents issued in this area and, therefore, the prior art is very tight. As the interview continues, Newhire becomes very agitated and defensive about his device. He insists that his device must be patentable because it is not commercially available in the industry. The consulting firm finishes the interview and produces a patent assessment for UNFC's OTT.

After discussing the patent assessment with Newhire, it becomes clear that not only is the patent prior art saturated, but one patent in particular, identified by the consultant firm, discloses Newhire's invention exactly. As a result, UNFC's OTT decides not to file a patent application on Newhire's invention disclosure. Newhire is relieved that he did not have to spend his time and effort working on a patent application for a device disclosed in the prior art that was very likely to be rejected by the patent office.

Conclusion

In view of the case studies discussed above, it is clear that there are likely to be specific circumstances under which consulting firms can provide value to TTOs through their due diligence. The models described in this analysis present select examples and are meant only to serve as guidelines for TTO-consultant relationships. TTOs may further explore the best strategy that suits their relevant contexts, budgets, and specific requirements. It is also advisable for consultants to develop a deep understanding of the workings and

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challenges faced by university TTOs to better serve their clients. In the larger scheme of things, it would serve both the TTO and the consulting firm well to keep the big picture in mind: that of taking innovation to market to serve unmet needs in an efficient manner.

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