The Role of Technology Transfer Intermediaries in Commercializing Intellectual Property through Spinouts and Start-ups

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ABSTRACT

Intellectual Property (IP) can be commercialized via free distribution or licensing, or through new companies that develop and exploit it. These new companies are called spinouts, or start-ups. Establishing successful spinouts and start-ups requires a solid business plan, coordinated teams of professionals who share a common vision, a respected managing director, and technology transfer intermediaries. Intermediaries help bridge the cultural divide that often exists between the generators of intellectual property and the new companies.

1. INTRODUCTION

What are the forces that encourage or discourage the commercialization of inventions? Part of the answer to this question can be found in the culture of IP-generating institutions and particularly the cultural barriers between academia and industry. Motivated technology transfer intermediaries can help overcome these barriers to commercialization by mediating between inventors, developers, and marketers. The tactics behind such mediation efforts can be useful also for developing countries as they undertake technology transfer projects.

2. IP GENERATION AND DISCLOSURE

Individual inventors, commercial entities, academic institutions, and charitable foundations all produce commercializable IP. There are several ways for this intellectual property to be commercialized: it can be given away (either to a specific recipient or a more general audience via publication), licensed, developed, or exploited through a new company, so-called spinouts and start-ups. This chapter concentrates on the last option. It is important to remember, however, that spinouts and start-ups are not always the most appropriate IP commercialization option.

Inventors are usually creative, self-motivated, flexible individuals. However, the popular idea of the "mad scientist" who is oblivious to the surroundings and keeps going regardless of failure or discouragement is rather uncommon in real life. In fact, whether or not an inventor ever shows his or her invention to the outside world will depend on two variables: (1) whether or not he or she wants to disclose it and (2) whether the environment in which the inventor operates encourages or discourages disclosure.

Some factors, with respect to the inventor, encourage disclosure:

- passionate about the invention
- confident of the worth of the invention
- possesses self-confidence
- resource rich
- solid education
- contacts encourage him or her to disclose the invention

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Other factors, with respect to the inventor, discourage disclosure:

- not passionate about the invention
- not confident of the worth of the invention
- lacks self-confidence
- receives no encouragement to disclose
- resource poor
- lacks time to consider disclosure
- lacks financial support for disclosure
- no reward for disclosure is likely

Positive factors can sometimes compensate for negative ones. For example, if an inventor's environment promotes creativity and is receptive to invention disclosure, it will not matter as much if an inventor has less self-confidence or is less of a risk-taker. It is a well-established fact that the creation of a more-receptive environment often increases the number of commercial ideas: this transformation occurred in the United Kingdom university system between the change of government in 1997 and the present.[1]

This list of factors does not imply that those that favor disclosure should be pursued to an extreme. The best atmosphere for disclosure requires a balance. If the environment becomes too receptive to invention disclosure, or if the invention process is overstimulated by generous government spending, a glut of noncommercializable inventions may be produced. Such inventions do little except consume resources that might have been better used elsewhere.

3. NEW COMPANIES

New companies—regardless of whether they are spinouts from universities or larger companies, or stand-alone start-ups—are new! This means they have little momentum. Their management teams are still developing. The companies themselves have no established market position, and they have the difficult job of convincing potential investors that they have a favorable future. Furthermore, they are usually understaffed and lack adequate resources. What this all means is that single-minded management direction and maximum efficiency are essential for such a company to even survive its first few years, let alone develop a strong position in its field.

In most cases, commercial success is more likely if the inventor remains enthusiastically engaged with the project. The inventor does not need to be in charge of the process; indeed, inventors are not usually the best people to implement commercial development plans. However, he or she should remain an active partner of the plan: not only can he or she prevent the repetition of unsuccessful experiments ("blind alleys"), but his or her creativity can be used to solve problems that may arise as commercialization proceeds.

The company employees need not be close friends, but they should respect each other. Choosing a respected managing director is especially important, since the director will implement the business plan. This plan must clearly and succinctly describe how the business will make money: What is the company going to sell? Where is it going to get raw materials? Who is it going to sell the finished products to, and how? Implementing the answers to these questions will require both intelligence and leadership, which are obvious essential traits for a managing director.

4. BARRIERS BETWEEN IP GENERATORS AND NEW COMPANIES

In the commercial world, research and development must follow a strict budget and schedule; if one element fails, the whole enterprise fails. However, inventors are usually less interested in the commercial ramifications of their work than the work itself. Furthermore, many inventors are academics. In academic research, changes of direction must be made almost daily: tomorrow's experiment is decided by today's results, and researchers are therefore extremely self-directed. Yet they are very willing to share their successes with their colleagues and competitors so that they can further advance their own research. Moreover, academic excellence is measured by the quantity and quality of publications; academia encourages the free exchange of ideas. Researchers in the private sector, on the other hand, will pursue experiments that are part of a larger corporate

goal driven by market needs. While they may share their work with fellow researchers in the company, their efforts are usually kept secret from the general public because of the potential monetary value of the inventions the researchers generate.

Box 1 compares the forces that drive the two main types of research environment (academic and commercial). There are, of course, numerous counterexamples: some inventors in industry are publication driven and some academics are secretive.

5. BREAKING DOWN THE BARRIERS

To overcome the problems that may arise when inventors must work with businesspeople, consider a parallel situation: two countries with different cultures and languages must work together on a joint plan. Obviously, the most effective method of helping the two countries interact with each other would be to hire bilingual intermediaries who have a deep understanding of both cultures and both vocabularies. Such intermediaries must: (1) understand the value systems of both cultures; (2) be fluent in language of both cultures, so they can translate while retaining all linguistic nuances; and (3) be credible to members of both cultures (there may be a third "culture" involved: that of the financial investors).

Where do we find such intermediaries? How do we fit them into the overall process? And how do we motivate and reward them?

5.1 *Sources of competent intermediaries*

An industrialist can theoretically be taught how universities really work; an academic can theoretically be taught how industry works. Both methods have been tried (probably the latter more often than the former) with limited success. It is difficult for an individual who has spent all of his or her life in one environment to adapt to the culture of another. Experienced industrialists find it difficult to get over their belief that universities are "badly managed factories," and senior academics find it difficult to adapt to industry's need for discipline and conformity, which they see as "inflexibility." Consequently, it makes sense to recruit intermediaries from the middle ranks of academia or industry, rather than from the top.

5.2 *Where competent intermediaries fit*

Intermediaries can be based in a university, its technology transfer company, in professional service companies (banks, accounting firms, law firms), or even in civil service. They may also be investors or employees of investors who are charged with generating investment opportunities (the author of this chapter was engaged in the latter from 1990 to 1997). Ultimately, of course, intermediaries must be based where they will be most

Box 1: Research Activity Compared with Commercial Activity

Research Activity	Commercial Activity
driven by researchers	driven by market needs
today's result defines tomorrow's experiment	tomorrow's experiment is part of an overall plan
unpredictable outcomes	outcomes must be predictable
relies on individual efforts	relies on cooperative activity

effective. If the goal is to maximize the transfer of technology from a university, then it is sensible to locate the intermediary in that university, or in the university's technology transfer company.

5.3 *Motivating intermediaries*

Intermediaries can be rewarded based on their:

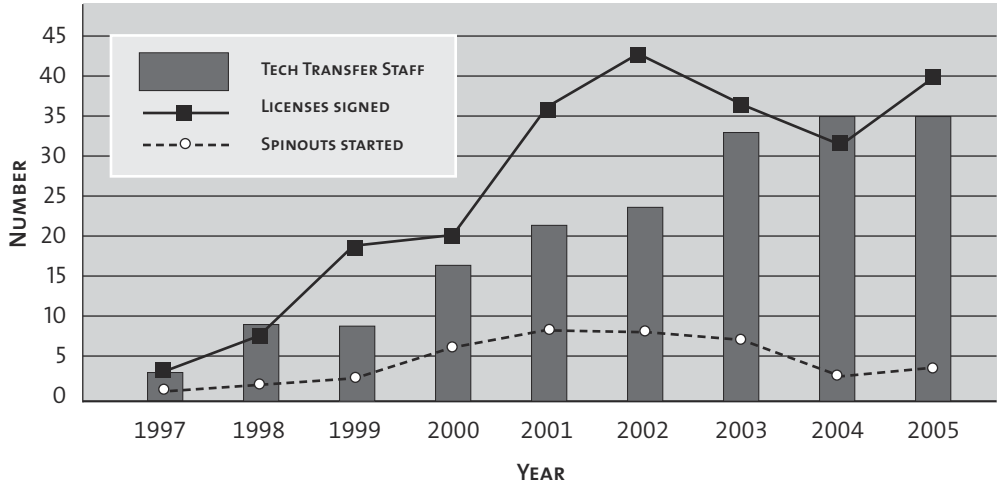
- **financial success.** They may be paid a performance-related salary or be given a financial share in a successful deal.
- **community-building success.** Being part of a team engaged in a worthwhile activity is its own reward.
- **civic or humanitarian contribution.** Contributing to a national or local economy is a satisfying accomplishment .

Of course, the most appropriate basis for reward will vary from situation to situation; in some cases, it will not be appropriate to give any reward at all. There may be limitations on the kinds of rewards that can be given. An intermediary who is also a staff member in a university technology transfer office (TTO) may be forbidden from having any personal interest in technology transfer agreements because of restrictions imposed by university statute or local or national law.

An intermediary, however, who is employed by a technology transfer company that is owned by a university will not have any legal restrictions on his or her personal financial interest in any technology transfer agreements. Still, any bonus that this kind of intermediary receives may negatively affect relationships with university colleagues. For example, at Oxford University, the technology transfer staff (who are not university staff members but are employed by a company owned by the university) work closely with members of the university administration on commercialization projects. If one such project were to produce a large financial gain for the technology transfer staff but not for the university employees, their relationship would be strained.

In addition, the success of one researcher might cause bad blood between the intermediary and her other clients. For example, each technology transfer project manager in Oxford manages about 40 projects at a time: that is, each manager supports at least 40 individual researchers (Figure 1). If one such project were very successful, both the technology transfer manager and the researcher who generated the technology would of course be pleased. However, the other researchers in the manager's portfolio may feel that their own projects had not been given proper attention, and their relationships with the manager might sour.

Figure 1: Oxford University Technology Transfer Staff vs. Growth of Spinout and Licensing Activity



If intermediaries are employed by investors, rather than by a university or a university's technology transfer company, it is quite appropriate for them to receive compensation for their efforts and to apply those efforts where they would be expected to be most lucrative. After all, the job of this kind of intermediary is to help the company or institution realize a profit, and the intermediary is under no obligation to support all researchers from a particular university.

An intermediary who is neither employed by a university nor by investors faces a somewhat murkier situation. In general, the closer to the public sector one works, the less appropriate are technology transfer deals motivated only by financial reasons.

Probably the most powerful motivator for many intermediaries is not financial but intellectual: the pride inherent in associating with creative scientists and collaborating in the creation of new products. It is profoundly rewarding to be the person who brings an invention, whether it is a drug or a software product, from a university researcher's desk to the market. Indeed, it is rewarding to employ one's skills to bring together the academic, financial, and commercial communities and make something new happen. Of course, this sort of intangible motivation only works if the TTO pays its staff well, provides excellent working conditions, and recognizes that job satisfaction can be a powerful motivator.

6. IMPLICATIONS FOR DEVELOPING COUNTRIES

The commercialization of intellectual property (IP) is a potential contributor to economic development. In order to successfully commercialize IP, a country must have a stable economic and institutional environment, sources of investment capital, sources of commercializable IP, a commercial environment that can accept intellectual property and commercialize it, and, as this chapter has suggested, competent technology transfer intermediaries.

Technology transfer of any sort is only likely to succeed if there is sustained commitment at the most senior levels of both government and research institutions. In order for a developing country to create the right conditions, it must make certain commitments:

- general national framework conditions
- a strong commitment to education and training at both the elementary and secondary level
- a commitment to strengthen the conditions that will allow major established firms to develop: the rule of law, labor-market flexibility, infrastructure, financial market efficiency, and management skills[2]

"Business angels" (that is, individual private investors), rather than venture-capital companies, are the initial source of funding for many U.K. university spinouts. They work with fledgling companies, contributing their skills, experience, and contact network. These angel investors have an edge over more traditional venture-capital companies because they are more flexible: they can offer smaller sums of capital and can make decisions more quickly, because they do not rely on the cumbersome analytical machinery of big investment houses. Once a new spinout is established, it becomes more attractive to conventional investors, who want to see a complete management team, a clear business plan, and, ideally, a good track record.

In a developing country, business angels are less common, so new ventures must rely on international investor networks, in which researchers in a developing country team up with researchers in industrialized countries in order to raise money. Such networks may be created through academic links or through personal or industry connections. When a new company grows, it can become too large to depend on the financial resources of private investors; hopefully, by that time, it will be attractive to venture-capital companies. ■

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1 See Wright M, M Binks, A Vohora and A Lockett. 2003.

Annual Survey of Commercialization of University Technology. UNICO/NUBS/AURIL, Nottingham.

2 Acs ZJ. 2004. Overview of the Global Entrepreneurship Monitor. *2004 Executive Report* (Key Findings from the Global Entrepreneurship Monitor Report of 2004). London Business School: London, U.K. www.gemconsortium.org/download/1166438555062/overview%20of%20gem%202004.pdf. For the full report, visit www.gemconsortium.org/download.asp?fid=364.