

TECHNOLOGY TRANSFER IN A PUBLIC UNIVERSITY

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INTRODUCTION

Technology transfer, as it will be used in this article, refers to the transformation of research information into marketable products and services. Although it occurs most frequently within a corporate context—within and among corporations—increasingly it occurs between university research groups and commercial entities. It is the latter context that is of concern here.

The principal purpose of this discussion is to share some experience and a perspective on technology transfer. As we move further into the digital era, more products and services will be developed to assist and support users across all disciplines. Since the bulk of the experience with the transfer of information technologies has occurred within the sciences, more will have to be done to share that experience as faculty and researchers in the humanities and the arts become involved. Perhaps our experience in the Digital Library Initiative (DLI) will assist in that development.

ORIGINS OF A TECHNOLOGY TRANSFER EFFORT

From the inception of the Digital Library Initiative project at the University of Illinois (UIUC), there was a commitment to continue the testbed of scientific information beyond the life of the project. Prospects for handling scientific journal articles in a digital environment is of fundamental and continuing interest to research libraries. Conversations involving the principal investigator and the university librarian focused on several prospects for financing the continuation of the testbed, including subsequent research grants, special funding from the university, and support from industrial sponsors.

Toward the end of the second year of the four-year research grant, it was clear that there was considerable interest in transferring to the scientific communications industry the experience and knowledge gained in building electronic repositories. We were aware that even the largest of the scientific journal publishers were struggling to develop such repositories. It is a problem of both financial resources and technical expertise (Elsevier finally contracted with Microsoft). We also had reason to believe that our project sponsors (NSF, NASA, and DARPA) would look favorably upon a successful technology transfer component to the DLJ. It was with this motivation that I, as university librarian, took the lead in consultation with the principal investigator to define and initiate a technology transfer project.

THE DIGITAL LIBRARY INITIATIVE EXPERIENCE

The operating assumption was that since the DLI project was such a highly specialized area with only modest prospects for commercialization, it would not be of major interest to an established corporation. We then became aware of a small group of potential investors who had some experience with biotech startups and who were interested in related opportunities.

On a parallel track, we initiated conversations with the university office responsible for technology transfer in order to cultivate their interest and to get advice on how to proceed. We organized a meeting of the potential investors and the relevant university officer, which resulted in plans to investigate the potential for a startup company while exploring prospects for a licensing agreement with the university. After six months of efforts to define the technologies to be licensed and to develop a business plan for a startup company, it became apparent that the process was ill-advised. Through a miscommunication, several steps required by the university had not been taken (better to say "had been omitted?") and the process had to be redefined.

Although, by this time, a startup company had been formed and incorporated in Delaware, two things had to occur before the university would be willing to proceed. First, there had to be an independent review of the technologies involved including a determination of their potential value as well as the advisability of choosing a startup company as the strategy for transferring the technologies to industry.

Second, a conflict of interest (COI) review had to be completed and a conflict management plan, if necessary, had to be approved. Although a COI review had been anticipated, there was some confusion within the university as to who initiates the process since clearly the parties in potential conflict do not perform the review themselves. Approximately eighteen months after the initial conversations between the investors and the

university, the two required steps were completed successfully. The potential licensing agreement is still in negotiation. As a result of this experience what had we learned?

TECHNOLOGY TRANSFER: A CONTACT SPORT

The literature focusing on technology transfer identifies five sequential steps that form the framework for successful technological transfer:

1. shared understanding of what can be;
2. trust among principals established and maintained;
3. distinct and complementary roles;
4. willingness to share knowledge; and
5. mutual benefits defined and maintained.

Shared Understanding

The lack of a shared understanding among the concerned parties—the research group, the university, and the investors—as to the importance and urgency of the project and how it could affect the scientific communication industry, inhibited a reasonable pace in the process. More formal as well as informal meetings among the parties would have been helpful.

Building Trust

Protracted delays and changes in key university personnel, causing fits and starts in the process, hampered the building of trust among the parties. The natural uneasiness within the academic culture about commercial ventures, especially in a public university, stimulated some confusion within the investor group as to what the university wanted and caused suspicion within the research group as to whether their interests were being protected adequately.

Role Definition

Unplanned developments within the investor group resulted in the university librarian becoming the President *pro tem* of the company and led to some confusion of roles within the university that inhibited communications (Is it the President or the University Librarian?). Although this was understood to be a temporary arrangement in order to facilitate development of the business plan, emphasizing its temporary nature tended to undermine confidence in the new venture, while understating it raised additional conflict of interest issues.

Willingness to Transfer Information

There was a willingness to share information for a technology transfer project among the researchers. However, the process of assigning

responsibility for the creation of certain prototype features became such a formal and legalistic process that it tended to interfere with the normal workflow within the group and may have created a more competitive atmosphere by stimulating a search for patentable technologies.

WHO BENEFITS?

The lack of a strong market demand for a product or service for which there is little precedent made it difficult to project the benefits to all parties involved.

CONCLUSION

What seems clearer in hindsight is that neither policies, nor processes, nor technological understandings, nor legal and contractual matters, nor economic incentives are at the heart of technology transfer. It is relationships.

Carefully drafted documents do not build trust. In fact, the early introduction of formal legalistic discussions inhibits the building of trust as individuals instinctively become more cautious about what they discuss openly.

Academics do not naturally accept relationships with commercial ventures. Even though the greater proportion of the university budget in public universities increasingly comes from non-public sources, there is limited experience with commercial ventures other than grants and contracts. As the prospect for technology spreads across more disciplines, what appears to be needed is an articulated effort to build a better understanding of such ventures and allay fears of faculty that their research objectives might be distorted.

University Technology Web Sites

In order to get a sense of how major public universities were focusing on technology transfer, I toured a number of technology office Web sites linked to Rice University (www.crpc.rice.edu/university). The questions that were of primary interest were:

- Which sites display intellectual property policies?
- Which sites list research areas available for licensing?
- Which sites give directions for startup companies?
- Which sites display conflict of interest policies?
- Which sites explicitly encourage technology transfer?

Among the CIC universities, all but two prominently display intellectual property policies. Eight of the thirteen CIC campuses list primary research areas that are available for licensing. Six of the CIC campuses

give directions for how to proceed in developing startup companies with their institutions. Six of the CIC campuses display conflict of interest policies. Eight of the CIC campuses explicitly encourage technology transfer. Two of the campuses did not have technology center Web sites.

What this brief look does not indicate is how difficult it is to get access to this information if you begin at the university's general Web site. The significance of the intellectual property and conflict of interest policies is that many questions can be answered readily by access to such documents. Directions for startup companies is an indication that there has been systematic thought given to how a university wishes to guide such ventures and avoids having to negotiate each new venture from a clean slate. Limited personnel in both legal and technical areas of technology transfer would suggest that an articulated body of information that serves both the experienced researcher and the novice will be necessary to constrain the growth of personnel for technology transfer counseling and advisory services. More importantly, it is an explicit demonstration of the importance of technology to the institution and how far it is willing to go to encourage it.