

Impediments to Successful University-Industry Research Relationships

by Donald R. Fowler

Universities need industrial funding, and industry needs to keep in touch with advances in science and technology. Caltech's General Counsel reports here on his survey designed to identify the barriers that keep these groups apart.

A PORTION of the research for my recently completed doctoral dissertation consisted of a questionnaire directed to 80 vice presidents (or directors) of research in industry and 78 people occupying as similar a role as I could find at the campuses of the 48 United States members of the Association of American Universities. The questionnaire set forth a list of 15 assorted impediments to university-industry research relationships synthesized from an earlier historical review. I asked the respondents to rate each of the impediments as to how significant they perceived that factor to be in obstructing university-industry relationships, and to list and rate the significance of any they felt I had omitted. I also asked them to respond to a number of "yes/no/no opinion" questions designed to elicit their thoughts on, first, where we ought to go from here and what we ought to do about some of these impediments; second, what effect certain relatively recent developments may have had on the ease or difficulty of entering into research agreements; and, third, how relationships were currently faring between universities and industries. In several cases I asked them to state reasons for their yes or no answers.

Out of all this I hoped to verify a list of genuinely significant impediments and, more importantly, to find out which were most significant

and, if there were any, those that were truly controlling. I also wanted to compare the responses of industry with those from the university community to see where there were areas of both agreement and disagreement.

The overall response was both amazing and gratifying — 75 percent, in almost equal proportions from industry and the universities. I want now to discuss some of these results, emphasizing, first, that none of the data given here represent the attitude of any one individual, industry or university; and, second, that since not all of the respondents answered or commented on all of the questions, any percentages explicitly stated here refer only to the percentage of those responding to the question.

I found, first, that there were no overwhelmingly important individual impediments that seem to control or dominate university-industry research relationships. In fact, given the necessary incentive (on the part of both parties) to enter into a particular relationship and given the proper attention to resolving any specific problems, the desired relationships are usually attainable. The variety of such recently announced new arrangements would tend to validate this conclusion. It also tends to be supported by the overwhelmingly yes answer to two of my questions: (1) whether "there has been a significant improvement or increase in university-industry research relationships since 1977" and (2) if so, whether they expected it "to continue during the next five years." Over three-fourths of the university people expressing an opinion said yes to both questions, as did almost two-thirds of the industry respondents.

AREAS OF DISAGREEMENT

One of the reported impediments where the universities and industry did not see eye to eye was the university's need to protect the right to

publish as opposed to industry's need to protect patents and other proprietary information. This was clearly the university's greatest concern. Industry placed it sixth on its list. Ironically, however, it may also be the impediment nearest to a generally workable solution. The survey showed 82 percent of those from the universities saying yes to a question as to whether universities should agree to withhold research results from publication during the time necessary for the university or industry to obtain patent protection. On the other hand, 55 percent of the industry people joined with 87 percent of those from universities in saying no to the proposition that universities should agree to withhold publication for reasons other than patents.

This pair of responses would seem to point the way to a resolution built around whether the requested delay in publication is for a reasonable time to protect patents or is proposed for another purpose. The details of some of the more recently announced arrangements suggest that this approach is being widely adopted.

Another of the impediments where there was a wide diversity in perception was the asserted fact that industry possesses its own in-house research capabilities and will tend to use them in cases where there is no clear-cut cost advantage or unique capability on the part of the university. This was the "most significant" impediment according to the industry respondents. Whether the industrial capability is real or is merely perceived by industry as existing, it can serve as a very real barrier to university-industry research relationships. Hence, it becomes more important than ever to look for opportunities for research relationships where the university's capability is not perceived as being duplicated in industry. And, to nobody's surprise, this probably turns out to be far more likely in the case of basic or fundamental research.

This preference for basic research as the primary area of focus for university-industry relationships was reflected in our survey. For example, only 45 percent of those from the universities and 34 percent of those from industry thought that universities should strive to perform significantly more work oriented toward industry, while 50 percent of those in industry joined with 87 percent of those from universities in responding that significantly more basic research should be contracted out to the universities where there is no cost differential in favor of in-house performance.

The third area where the two groups did not see eye to eye had to do with what causes the most problems with regard to inventions and patents

arising under proposed research agreements. Industry patent policies were relatively high (third place) on the university list of "most significant" impediments, and federal laws governing innovations and patents arising out of government-sponsored work was on industry's list of "most significant" impediments (although only in fifth place). Interestingly, industry's perception of university patent policies is that they are only a marginal problem. As the continuing string of new arrangements attest, perhaps the most important consideration is that when an attractive new opportunity presents itself, the parties seem to be able to work out the patent considerations.

ADDITIONAL IMPEDIMENTS

Among the added impediments making the "most significant" list were some listed by one group but not the other. In the case of industry, this was the inability of academia to effectively perform industrially sponsored directed research, a factor easily viewed as a variation on at least two others listed in the original impediments supplied by me. The fact, however, that so many industry respondents took the time and effort to rephrase and restate the problem was, I thought, quite significant.

In the case of the universities, the most often added impediment had to do with industry's reluctance to fund the university's total cost of research, indicating a reluctance or refusal on the part of industry to pay a full, allocable share of the university's indirect costs. This additional listing came as a surprise because I had not personally encountered this problem and because I would have expected industry, of all the various kinds of sponsors, to be the one most likely to recognize the concept of the "cost of doing business." Subsequent discussion with knowledgeable people on this subject suggests that this type of problem will usually occur, if it does, where there is industry funding of basic or fundamental research on a gift or grant basis, as opposed to cases where industry has contracted for research with a specific objective in mind. It is important for the universities to recognize the basic difference between these two types of funding in interpreting industry's attitude toward paying indirect costs or overhead. But our study was not conclusive on this subject, and it deserves further attention.

AREAS OF AGREEMENT

Of the impediments or problems concerning which both industry and the universities were of a similar mind, the first had to do with industry's primary orientation toward short-term profits and product improvements. Quite interestingly, this

factor was rated "most significant" of all when the responses were considered together, without regard to whether they came from industry or from the universities. Unquestionably, in the recent past this factor has had a serious, depressing effect on the funding of basic research and long-term research and development by American industry. It may well be among the most serious national problems we have, and it affects far more than just university-industry relationships.

The respondents from both groups were also overwhelmingly in favor of industry funding more basic research in relation to its total R&D budget (without regard to whether the research is to be performed in-house or at universities). This, of course, was to be expected from our particular survey, since the respondents from industry tended, because of the positions they hold, to have a vested interest in more unrestricted research funding.

Most interesting, however, was the recognition by both groups that a significant positive correlation and cause-and-effect relationship exists between the amount of money spent on basic technological research and future technological productivity. Of the university people, 98 percent said they believed that such a correlation and relationship existed, and 89 percent of those in industry agreed. Thus, it would appear that it is not a lack of recognition of this vital connection that produces industry's pronounced orientation toward short-term profits and product improvement. Rather, such short-sightedness probably must be laid at the door of the overwhelming and overriding pressure created by next quarter's or next year's "bottom line."

Another area of agreement was the impediment created by attitudinal factors generating a culture gap or lack of understanding that makes new or improved relationships difficult, if not impossible. The comments largely consisted of fingers of blame being pointed to a whole host of attitudes that could cause problems as, for example, "differences in objective, philosophy, and reward system," lack of "trust," "antagonistic" and "arrogant" attitudes on the part of university faculty, mutually "unwarranted suspicion of motives," and so on. I was never able to determine, however, whether these attitudinal factors are themselves root causes or merely symptomatic reflections or magnifiers of other, more basic, impediments.

CONFLICTS OF INTEREST

Of great interest were the respondents' reactions to the conflict of interest factors, particularly the one where the university or the researcher

has an equity or other financial interest in the industrial sponsor. It was third on both lists of "most significant" factors.

Three other conflict of interest factors were also listed: (1) inappropriate influence by industry over programs being sponsored by them; (2) inappropriate influence by industry over the choice by the university of future programs; and (3) inappropriate increased secrecy among the academic community induced by industry research relationships. These three other factors were all found to be from "occasionally significant" to "significant" by both groups, industry as often as not showing as much or more concern than the university people. None of these three situations seemed, however, to measure up to the same level of importance as the one involving equities or other financial interests. I find this interesting because it is apparent from others' observations that secrecy and inappropriate influence by industry over scholarly endeavors can indeed cause serious problems and can damage the often fragile academic infrastructure (which includes the faculty-graduate student relationship). One explanation for the apparent inconsistency between this fact and the results of my study is that the problems of secrecy and inappropriate influence by industry appear to be particularly acute in the context of a situation involving equity or other financial interest in the industrial sponsor. Thus, these factors may not even be in competition with one another. Instead, one factor may describe the environment most likely to spawn problems; the others may describe the problems most likely to occur in the environment.

In any event, these conflict of interest situations have been the subject of much debate over the past year or two at many universities, and some in the university community continue to regard financial connections between university researchers and their sponsors as an anathema to be avoided at almost any cost. Others see nothing intrinsically wrong with such arrangements, provided there is enough visibility and that properly oriented people are involved. As a result, the policies and practices that have been, or are being, developed tend to vary considerably from campus to campus. And they continue to evolve and change.

These then were some of the major conclusions I was able to draw from my study. It is by no means a complete list, but it may indicate what two roughly similar groups of people from two widely divergent home bases perceived in the spring of 1982 to be the most significant impediments to improving their joint research relationships. □