

Partnering Across the Academic / Industrial Interface

The following pages may be converted to overheads or used as a class handout.

1. Introduction

- 1.1. The results of academic creativity must be transferred to industry, which has the role of converting ideas to products for society's use.
- 1.2. Understanding the industrial perspective will help build long term relations that result in funding.
- 1.3. Problems with the interface. Many cultural differences result in misunderstandings and poor relationships.
- 1.4. Creativity: the generation of new concepts, that is, discovery and invention. (The Laboratory), and Innovation : the transfer to society's use of a new way of doing things. (The Factory and the Marketplace)
- 1.5. Developments in both society and technology have emphasized the role of academic creativity.
- 1.6.. We are dealing with fundamental and long lasting changes changes, the exact nature of which may not be clear for years. Close personal relationships are the best way to function through these changes.

2. What is making the academic world more important?

- 2.1. New high technology products require new expertise which the company may not have.
- 2.2. The economics of commodities do not permit sufficient R&D to maintain improvements in the products.
- 2.3. High technology products and new, environmentally clean, processes need strong creativity.
- 2.4. Corporate downsizing is making companies understaffed technically. The resulting lack of technical expertise will require academic support.
- 2.5. Getting into new high technology businesses requires a broader range of expertise than the company can afford to maintain internally.
- 2.6. Many product areas have reached a plateau of development through Edisonian discovery. Further advances will be based on mechanistic understanding which will have to come from the academic labs.
- 2.7. Financial forces lead American industry to plan within a time frame that is too short to be compatible with scientific discovery.
- 2.8. Environmentally benign syntheses and processes are an opportunity for academic research.
- 2.9. Industry is dropping its earlier support for in-house basic research.
- 2.10. Large and small industries see the world differently.

3. Understanding the interface

- 3.1. The academic world can be the most creative. Industry has the task of commercializing ideas.
- 3.2. Two way flow of information is critical. This point may sound obvious, but it is too often not fully understood, or certainly not fully acted upon.
- 3.3. Converting ideas to reality is a difficult process that requires one-on-one dialog.
- 3.4. Knowledge transfer and technology transfer.
- 3.5. Traditional knowledge transfer via publications does not lead to close interactions with industrial scientists.
- 3.6. Basic research is a fertile field for invention, ensuring the academic patent activity can increase.
- 3.7. Overemphasis on patents can conflict with the educational process.

4. The Process of Commercialization

4.1. The process between concept and product is expensive. The cost hurdle colors industry's interest in new ideas.

4.2. Conception and Lab Demonstration

4.3. Technical Evaluation and Demonstration of Breadth

4.4. Development

4.5. Commercialization

5. Making the Transfer Process Work

- 5.1. Knowledge can be transferred by traditional routes from academia to industry. Personal collaborations are most effective.
- 5.2. Technology transfer is dependent on finding a potential user who has both a corporate need and sufficient funds for development.
- 5.3. The Cost of Commercialization. Understanding the time and expense in developing a discovery through to commercialization is important to the academic partner.
- 5.4. Lack of interest may reflect corporate concerns seemingly far removed from the discovery. Moreover, these concerns are usually confidential, and the academic partner will not hear the critical facts.
- 5.5. Industry wants not the best solution, but the most practical one. Minimal capital investment is important.
- 5.6. Universities are structured to deal only with the most preliminary aspects of development. Considerable work may have to be invested to permit evaluating the worth of a discovery.
- 5.7. The "not Invented Here" factor can be controlling. The industrial scientists want to keep their jobs, too.
- 5.8. A new process represents potential problems for manufacturing. Benefits must outweigh potential disadvantages.
- 5.9. Get around most of these barriers by being familiar with the company's needs.
- 5.10. Limited novelty may be more apparent to the industrial partner who is aware of other ways of doing the job.
- 5.11. Sole Rights and Confidentiality are needed before an industry will invest millions of dollars in development. Premature publication or presentation can destroy commercial value.

6. Cross-culture Problems

- 6.1. The industrial time frame is usually much shorter than the academic. Industry wants a solution "now". Academic researchers are trained to find the best solution.
- 6.2. If the interface is seen as requiring only dialog, it may fail. An understanding of each partner's needs is necessary.
- 6.3. The basic researcher in industry who used to serve as a liaison with the university may no longer be there. University researchers will have to learn to communicate with more applied members of the staff. The industrial phrase "know your customer" applies to the academic partner.
- 6.4. Corporate confidentiality is not there to annoy the university faculty. Recognizing its function can prevent many misunderstandings.
- 6.5. Scientific vs business interest. The most interesting science may not be the basis of the most valuable technology. The latter is dependent on what the marketplace wants.

7. Working with industry.

7.1. The need for a champion. No science or technology will be transferred unless someone within the company has a personal reason to make it happen.

7.2 .Support for research.

7.2.1. Research grants are usually initiated bottom-up. Get to know industrial researchers personally.

7.2.2. Trust and confidence are the basis of long lasting relationships. Understanding, not merely good will, is important.

7.2.3. How your grant money appears on the research manager's budget. Sums "small" compared to the numbers in an annual report may not be small on the development team's budget.