





## CHAPTER ONE

# CONTEXT AND CONSTRAINTS

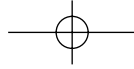
*Robert C. Miller and  
Bernard J. Le Boeuf*



This book is about the transfer of new discoveries and innovation from research conducted at universities to the commercial sector. University-industry relations are the processes between the participants that permit, facilitate, and streamline technology transfer or that make it difficult and cumbersome, as the case may be. The relations involve working out the agreements, licenses, contracts, and conditions for use of the intellectual property that is vital in the path from idea to application.

## BAYH-DOLE AND UNIVERSITY-INDUSTRY RELATIONS

Universities are the principal source of inventions and innovation because this is where most fundamental research takes place. Moreover, because most of this research is federally funded, it follows that restrictions by the government on the research it funds can impede technology transfer. This was the situation before 1980. The federal government owned intellectual property rights on research that it funded but too few patents and inventions found their way into commercial use. Congress dealt with this impasse with a critical piece of legislation in 1980, the Bayh-Dole Act, which gave universities ownership of inventions developed through the use of federal funds for research and created strong incentives for technology transfer. By encouraging

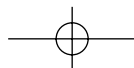


## 2 DEVELOPING UNIVERSITY-INDUSTRY RELATIONS

universities to collaborate with industry on promoting commercialization of inventions, the legislation quickly accelerated the transfer of research to applications by industry. Just ten years after the act was passed, patents to universities had increased six times over their level in the decade before Bayh-Dole. Owing in large part to the Bayh-Dole Act, university research can have a significant impact on local and national economies through university-industry relations.

Nevertheless, there remain problems that universities and industry must deal with such as patent disputes, hostile encounters between public and private ventures, new problems relating to conflict of interest, licensing policy, and royalty distribution. Some question the propriety of commercial relationships for faculty members and university administrators and there is concern over “corporatization” of science. These critics are usually key people who express their concern in newspapers and meetings about commercial interests and conflicts of interest regarding university-industry affairs.

In today’s knowledge-based economy, universities augment their primary mission of creating and disseminating knowledge through research and teaching by working with the for-profit sector. Universities do this by engaging in collaborative research with companies; exchanging personnel, materials, and equipment; and by licensing patented university inventions to industry for commercialization. Universities and faculty constantly accept biomaterials, industry-sponsored research materials, collaborative agreements, nondisclosure agreements, and confidential information. Modern research cannot and does not proceed without transfer of materials or contractual agreements. Faculty, universities, and companies do not exchange valuable materials and information without conditions in agreements that are vitally important for efficient exchange. Ironing out these conditional agreements requires university policies governing scientific integrity, conflict of interest, and intellectual property. Intellectual property (IP) management in universities must be given high priority because it can be a sticking point in technology transfer activities and in the university-industry relation enterprise. IP clauses are often contentious because universities seek open disclosure, discourse, and freedom of deployment regarding research results; companies



seek as much confidentiality and control as possible. As a result, the intellectual property terms in a contract are difficult to negotiate.

## THE CHANGING DYNAMICS OF UNIVERSITY-INDUSTRY RELATIONS

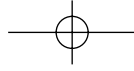
University-industry relations are becoming ever more important as a knowledge-based economy expands. The imperative toward more productive relations between university and industry is driven by the following factors.

Tens of billions of dollars of government-funded research are premised on the value of innovation and basic research in U.S. and Canadian universities. Government recognizes the imperative of a close linkage between universities and the private sector. The university's research mission—to conduct basic research, train new scholars, and create new knowledge—is clearly vital to the government's interest in having companies remain innovative by converting knowledge into useful products and services. In short, the government has ample reason to insist on good university-industry relations.

In recent decades regional economies have increasingly been strengthened by start-up companies derived from university-based discoveries. Fueled by knowledgeable venture capital, start-ups have developed sophisticated systems of assessing early-stage technologies, investment in areas of promise, research and development, new venture mechanics and management, and marketing and sales. These companies not only commercialize products and services from university-based discoveries but provide high-paying jobs for some of the most talented and entrepreneurial university graduates. They also support interesting research in the university.

Many industry-managed research operations have closed or scaled back significantly. Companies now depend more on universities to provide fundamental research results to generate new products and services for an increasingly competitive and innovation-driven market place.

Industry demands graduates that are knowledgeable about research and product development. University-industry cooperative agreements form a sound basis for interesting projects that



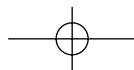
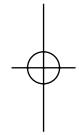
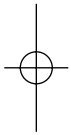
better prepare graduate students for careers in an industrial environment and supply a stream of new employees to the companies.

At present, universities seek and receive considerable financial support from companies. It is critical, therefore, for universities to bring coherence to the management of all forms of company support and for companies to understand the context and limitations of university contributions to their business operations.

## TWO CULTURES

In reality, good relations between universities and companies are continuously strained by the differences between the cultures that dominate the two entities. Often an agreement cannot be consummated either because the university will not incur risk or the company will lose control. These showstoppers derive from the intrinsic differences associated with each culture, as we shall argue. It is vital, therefore, that each party be aware and sensitive to the culture that controls and governs the other.

University culture derives from its mission of teaching, research, and service and is based on the free exchange of ideas and providing the public with access to an impartial source of information. Each of the three components of the mission is viewed broadly. Education embraces undergraduates, graduate students, extension, and outreach into the community and into the professions. This emphasis makes students' interests paramount. The emphasis in the research arena is on fundamental investigation of issues both basic and applied. Academic freedom allows the university researcher to pursue research agendas with open-ended goals, interact with colleagues, and freely publish the results. Professional schools, such as medicine, conduct a full spectrum of research ranging from basic science to technology development and clinical care. Rarely, however, do universities place a priority on product development including the successive stages of technology or product refinement. Faculty progress and reputation are based on publication of fundamental work in prestigious journals administered by peer review. Pushing the frontiers of knowledge is the ultimate objective and motivator.



The focus of industry, however, places a high value on earnings, profit, return on investment, product or service development, and market growth. Companies are concerned with quarterly results that necessitate short-term goals whereas universities have long-term goals consistent with enhancing the reputations that they have established and measured over decades.

Companies build their brands by depending on a wide range of intellectual property protections, including patents, trade secrets, and copyright protections. In contrast, universities traditionally value open communication, sharing of information with colleagues, and rapid publication of new findings.

Company management is based on hierarchical control with a CEO and a set of officers and managers reporting to top management, which in turn reports to a board of directors. Universities are managed in a system of joint governance wherein responsibility for policy and programs is controlled by a complex set of interactions between a board of regents, governors, or trustees, the university's administrators, and a faculty senate. University governance is typically collegial and consultative, with the president appointed as a senior academic who is not viewed as a company CEO by the faculty. Advancement in the two cultures is managed differently. In a company one's career is influenced heavily by senior management. In the universities it is controlled by colleagues. When senior administrators such as deans complete their administrative service, they usually return to the ranks of faculty.

Policies governing teaching and research are designed to protect the cultural values of the university. These policies are established in the context of the faculty senate, a body that represents the richly diverse set of schools and colleges that make up the university. This means that a complex set of values, objectives, and metrics are debated and evaluated on a continuing basis by university regents, administrators, faculty, students, and staff. It demands operation of a vibrant, contentious political process, because governance involves exercise of political power as well as authority. Vote, influence, and control of financial resources matter. Except for specific organized religions, universities are the longest-standing human institutions. Thus, neither is the university system likely to change dramatically, nor should it.

We emphasize that the university's system of governance affects university policies which in turn affect industry agreements. Different academic disciplines can have quite divergent views on the value of various terms such as intellectual property and other deliverables. Clinicians, for example, rarely encounter IP issues during the course of their research. Computer scientists are usually disinclined to think in terms of patenting software. Pulp and paper engineers frequently want a wide deployment of their technology, and therefore do not wish their patents to be licensed to one exclusive licensee. Conversely, pharmaceutical biochemists are keen to develop a blockbuster drug with an exclusive license to maximize its value. Consequently, university policies as determined by a governance system must reflect the differing perspectives on rights and deliverables that are found in a diverse research community.

Different industries can have remarkably disparate views on IP rights developed from university research. By and large, company expectations follow those of the university research disciplines that support particular industries. On the one hand, with the exception of start-up companies, information technology companies want nonexclusive rights to university-developed technologies at low cost. So do manufacturing, agriculture, and other resource industries. Large pharmaceutical companies ("Big Pharma"), on the other hand, usually demand exclusive rights to the research results supported by them.

To sum up, universities and companies operate in two distinct cultures and systems of management, and different industries and academic disciplines have varying needs. The terms "university" and "industry" are overly simplistic. It is inevitable that joining these two cultures creates challenges for the industry and university collaborators, especially in several key areas: rights to intellectual property, confidentiality versus publication, conflict-of-interest issues, and protection of the public interest. The Council on Government Relations addresses these issues in reports posted on their Web site ([www.cogr.edu](http://www.cogr.edu)). Negotiations and relationships need to reflect these differences and IP policies must be tailored to these idiosyncrasies.