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MAKING A GOOD THING EVEN BETTER

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ABSTRACT

Partnerships between universities and companies are historical facts that provide demonstrable benefits to both parties. However, there are contentious areas, most notably intellectual property, technology transfer, and licensing. The successful aspects must be reinforced and the contentious areas must be minimized. This article addresses both the successful and problematic areas of the partnership and discusses the University-Industry Partnership ("Partnership"), a current initiative to improve this relationship.[1] With regard to the Partnership, the comments and observations contained herein represent the personal perspective of the author and not the formal position of the Partnership. The article concludes with discussion and conclusions about the Partnership and the overall relationship between academia and industry.

INTRODUCTION

Since its emergence after World War II, the field of research administration has been in a state of change. While change has been a constant, the past ten years have been particularly dynamic. This fact has forced colleges and universities to adapt quickly to the changing environment in research administration.

The following issues are among the most pressing:

A. Increasing competition for extramural funding.

B. Regulatory compliance by colleges, universities, hospitals and medical centers.

C. Financial cost accounting, compliance, and auditing.

D. The relative decline of federal R&D support coupled with the rise of corporate funding of R&D.

E. University-industry relationships.

This last issue is the subject of this article. Research partnerships between universities and their industrial sponsors are an important and generally productive relationship. Universities receive financial and non-financial support from their corporate sponsors; graduate and undergraduate students receive an excellent educational experience by working in industry, which prepares them for their professional careers. Universities develop better linkages with alumni in industry who will hopefully donate to their alma maters.

Industry also receives benefits from these partnerships. Their work is advanced through the employment of graduate and undergraduate students, they have access to facilities they may not otherwise have, and their own corporate agendas are advanced by completion of project deliverables.[2] It is perhaps quite accurate to say that students (as future employees) are the most consistent and real benefits of these relationships.

These partnerships also directly and/or indirectly benefit local, regional and national economies. Economic growth in the United States is necessarily tied to the growth and effective use of science and technology. The long-term dynamic growth of the American economy, and its place in the international economy, is tied to advances in science and technology. All Americans have a vested interest in this fact.[3]

This essay looks at the current state of university-industry partnerships, outlines a current attempt to improve these partnerships—The University/Industry Partnership ("Partnership")—and draws some conclusions and provides commentary on the Partnership and its potential impact on the overall relationship between academia and industry.[4]

THE CURRENT STATE OF THE PARTNERSHIP

Partnerships between universities and industry have been by and large a successful venture. These relationships often stretch back to the early part of the 20th century. The minutes of The Pennsylvania State University's University Research Council meeting of February 6, 1928 asked the following two quite familiar questions: "To what extent should the college enter into agreements with commercial concerns and under what conditions? What should be the institutional policy in reference to patent and patent rights?"[5]

The National Science Foundation has reported that prior to 1980 industry support of university research was rather constant. After 1980, growth became rather pronounced, rising from about $1 billion in 1989 to approximately $2.3 billion in 2000, and with an overall increase in science and engineering research of 150% between 1988 and 2000.[6]

There has been similar remarkable growth in total gross income for U.S. university and research institute patents as reported by the Association of University Technology Managers, rising from slightly less than $200 million in FY 1991 to $1.25 billion in FY 2000.[7]

Despite this success, the partnership is in a state of constant change and stress. As the first Partnership meeting indicated, the following external forces are having a major impact:

A. The research environment is changing in the United States and abroad. Economic conditions and government funding are forcing universities to look harder for private research funding.

B. Students and workforce supply and demand are central to the research enterprise. Changes in the pattern of this chain or pipeline are raising questions regarding whether the American public understands the importance and its economic effect. Are there enough Americans in science and engineering to "get the job done?"

C. Globalization is both a barrier and an opportunity. Foreign universities are increasingly able to compete with American universities in the R&D arena, even to the point that U.S. companies are doing business with foreign universities because of more favorable intellectual property rights.[8] Foreign students are also considered less expensive and their research leaders are U.S.-trained.

D. Local economic development pressures are forcing universities to become drivers of economic development. Universities are feeling pressure to link research to shorter-term immediate economic welfare and foster "entrepreneurial spirit" on campus and in the community.[9]

E. Stress in university-industry relationships is particularly due to the negotiation of research and intellectual property agreements. Contentious and draining negotiations often are the norm (the "hassle factor"). When the hassle factor becomes too great, trust diminishes, less industrial funding is invested in universities, and the relationship slowly dissipates. Unrealistic expectations often are at the root of this problem (financial gain for universities, work product for industry). Negotiating IP and related clauses remain the most significant bottlenecks to creating and maintaining harmonious partnerships.[10]

F. University and industry missions differ. This divergence leads to natural stress. The information technology sector maintains that universities should put all their IP in the public domain, while the pharmaceutical industry takes an opposing view. Some universities say they might be comfortable putting their IP in the public domain in some instances, but they cannot give away all their intellectual property rights.[11]

Academia and industry are being forced to deal with a variety of internal and external pressures. Pressure to compete for profit, market share, and prestige is coupled with the shifting tectonics of the industrial and university sectors. Globalization is putting pressure upon universities and industry to shake up their traditional ways of doing business. But how far can universities stray from their original missions?

This leads to a significant conclusion: while issues of intellectual property, licensing, and contract negotiation are among the most contentious issues, broader questions of culture, good faith, profit, education, economic policy and social policy are involved. At this point it is useful to point out why academia and industry collaborate.

WHY DO UNIVERSITIES AND INDUSTRY COLLABORATE?

Why academia and industry collaborate is essential to improving these relationships. These reasons include the following:[12]

- Universities provide industry with a *ready pool of graduate and undergraduate students.* Students receive essential workforce training that is not available in the classroom and may become permanent employees.

- *Technical opportunities* in industry exist for faculty and students that may not exist within the academic setting.

- *Materials* are available in industry for research and educational purposes that may not exist at academic institutions.

- Collaborations with industry provide *research funding* for universities. A steady stream of research money within universities is a necessary and, some lament, fact of life. Many universities rely on extramural funding.

- Collaborations with industry often advance the *university service mission*.

- Collaborations contribute to *local, regional and national economic development.*

- Collaborations between university and industry are often *novel to "high" technology* areas, in contrast to "low" technology areas (such as basic manufacturing).

- At some universities, collaboration with industry is part of their *internal reward structure*. Such structures provide a positive financial incentive for faculty, which is often essential for research development and retention of "star" faculty.

- *Universities often have infrastructure desired by industry*. For many companies, it is simply more cost-effective to contract out research to universities that have the research infrastructure rather than building from the ground up or renovating existing facilities.

- *Collaboration is encouraged by the federal government.* Whether through legislation such as the Bayh-Dole Act of 1980, or through specific grant programs such as the NSF-Partnerships for Innovation (PFI) program, the federal government explicitly or implicitly encourages such partnerships.

- *Industry outsourcing to universities*, to reduce the costs of doing business and increase profits.

As this list illustrates, this symbiotic relationship is mutually beneficial.

BARRIERS TO COLLABORATION

What barriers hinder collaboration? What causes these partnerships to be occasionally problematic? A focus group at the 2003 NCURA Annual Meeting identified the following:[13]

- *Communication* (or the lack thereof) is a major barrier to collaboration. Communication skills differ. Needs and expectations are often different and the failure to communicate them compounds the problem. University and industry representatives stereotype each

other. This also includes the lack of communication within organizations, where different offices within each organization must work together to get the partnership cemented.

- *Universities have mixed missions*, particularly when it comes to establishing start-up companies. The establishment of start-up companies with faculty at the center is, in some people's eyes, a significant departure from education, teaching, service and research.

- *Cultural differences* are a major barrier to collaboration. Not only is there the basic legal distinction between both entities, but there are also cultural differences that have nothing to do with this legal difference. Anyone who has spent a significant amount of time in contract negotiation knows this to be a reality of life.

- *Secrecy or public dissemination of knowledge* is a major difference between universities and industry. Universities desire to publish and disseminate the results of their work. Faculty demand and cherish the ability to publish. Companies are often more secretive about the results of research in the search for competitive advantage and ultimately profit.

- *Fear factor*. Both parties, through culture, prior experience, or stereotyping, often fear doing work with the other. Perhaps it is the fear of having to divulge information.

- *Universities overvalue the value of technology or the research they do*. This is often a comment made by industry, which feels that faculty often overvalue the work they do on projects. As with many aspects of this partnership, this varies on a case by case basis.

- *Lack of trust.* This is a significant barrier. This lack of trust occurs within universities and industry and often between these parties. This is particularly evident in areas of legal issues and contract negotiation and can be exacerbated by the departure of key personnel. This area emphasizes the need for personal, trusting relationships.

- *Financial risk for universities*. It is financially riskier for universities to work with industry than with government. The federal government in particular is seen as a stable source of research money. Obviously, however, budget cuts at the state and federal levels during periods of fiscal distress do not mean that government funding is entirely risk-free.

- *Faculty oversell projects*. Whether intentionally or inadvertently, faculty may oversell projects to their universities to secure institutional approval and funding.

- *Universities lack consistency*. By their very nature, universities are fluid organisms. Administration and faculty come and go, making long-term partnerships difficult. Agendas may change even if personnel are stable. Public universities are subject to the fiscal legislative process, and private universities have their own unique issues to a certain extent. Whether intentionally or inadvertently, universities can be inconsistent when it comes to industrial partnerships.

- *Exclusive relationships.* As in personal relationships, it is often the case that one party wants an exclusive relationship and the other does not. Some companies want an exclusive relationship and often universities and their faculty do not, or vice versa.

- *Conflicts of interest* often impede collaboration. At the present time universities are very much concerned with conflicts of interest (financial and otherwise). How can faculty do research if they are not free of potential conflicts? No company or university, no matter how much money is involved, wants to become embroiled in a controversy that will tarnish its reputation.

- *Too much specialization in contract negotiations*. It has been pointed out by industry that there is often too much specialization in contract negotiation, evidenced by a technology transfer office negotiating the intellectual property/licensing clauses and the sponsored program office negotiating the rest of the provisions. This can lead to unnecessary delay in finalizing research contracts. In fairness to universities, however, this sort of problem also exists in companies where different business units are responsible for different parts of a research or intellectual property agreement. This problem is compounded by personnel turnover, poor communication, and a shift in agendas.

These barriers often mix with each other, compounding the problem. It is apparent that barriers to collaboration arise from fundamental differences and are compounded by larger associated economic, political and social issues facing academia and industry. The university-industry relationship is complex indeed!

THE MAIN CONTENTIOUS ISSUES

While many partnerships occur smoothly without complication or conflict, certain contentious issues seem to regularly appear. These issues were significant enough to merit the convening of the Partnership. The most contentious issues are:

1. Communication between universities and industry in the performance of particular projects, including expectations and concerns.

2. Long delays in completing contract negotiations.

3. Negotiation of intellectual property and licensing terms, including ownership, revenue streams, and licensing to third parties.

4. Other legal provisions, particularly publication and international students as a result of immigration changes after September 11, 2001.

THE UNIVERSITY-INDUSTRY PARTNERSHIP

As a result of the aforementioned issues, the Partnership was established by the National Council of University Research Administrators (NCURA), the Government-University-Industry Research Roundtable (GUIRR), and the Industrial Research Institute (IRI). The title of the project is *Re-Engineering Intellectual Property Rights Agreements in Industry-University Collaborations*. Despite the title, and as shown below by the assignments of the project Teams, the scope of the Partnership is beyond IP Agreements.

NCURA, founded in 1959, is an organization of individuals with professional interests in the administration of sponsored programs (research, education, and training), primarily at colleges and universities. With 4,200 members nationally and internationally, NCURA serves its members

and advances the field of research administration through professional development and the sharing of knowledge, and by fostering community among members.

GUIRR is a unit of the non-profit, non-governmental National Academies. GUIRR was created in 1984 in response to the report of the National Commission on Research, which called for an institutionalized forum to facilitate dialog among the top leaders of government and non-government research organizations. The need to reduce growing tension between government and universities over procedures for administering federally sponsored research was a part of the original basis for the creation of GUIRR.[14] GUIRR's formal mission was revised in 1995 to "convene senior-most representatives from government, universities, and industry to define and explore critical issues related to the national and global science and technology agenda that are of shared interest; to frame the next critical question stemming from current debate and analysis; and to incubate activities of on-going value to the stakeholders. This forum will be designed to facilitate candid dialogue among participants, to foster self-implementing activities, and, where appropriate, to carry awareness of consequences to the wider public."[15]

The IRI is the foremost business association of leaders in research and development (R&D) working together to enhance the effectiveness of technological innovation in industry. Founded in 1938 through the National Research Council, the IRI is composed of senior executives from a diverse range of industries whose member companies are investing $70 billion annually in R&D worldwide. The IRI is the only cross-industry organization providing the R&D community with insights, solutions and best practices in innovation management developed through collaborative knowledge creation.

GUIRR and IRI have been involved in a dialog on the issue of university-industry research for 15 years prior to the convening of the Partnership. They have published the following:

A. "Simplified and Standardized Model Agreements for University-Industry Cooperative Research" (1988)[16]

B. "Intellectual Property Rights in Industry-Sponsored University Research: A Guide to Alternatives for Research Agreements" (1993)[17]

C. "Industry-University Research Collaboration: Report of a Workshop" (1995)

D. "Overcoming Barriers to Collaborative Research" (1999)[18]

MISSION OF THE UNIVERSITY-INDUSTRY PARTNERSHIP

The Partnership's mission is to explore current barriers to effective partnerships and seek solutions that will overcome the barriers so that partnerships can succeed. A direct outcome of this endeavor will be the development of, first, a set of principles upon which industry-university collaborations can be built and, second, the development of a nationally accepted array of contractual solutions regarding intellectual property rights.

COMPOSITION OF THE UNIVERSITY-INDUSTRY PARTNERSHIP

The Partnership is composed of leading individuals from academia, government, and industry. In addition to NCURA, GUIRR, and IRI leadership, the Partnership was initially composed of delegates from the following institutions; this list is changing as the needs of the project develop:

University Representatives: Bradley University; California Institute of Technology; Carnegie Mellon University; Georgia Institute of Technology; Massachusetts Institute of Technology; The Pennsylvania State University; Stanford University; University of California at Los Angeles; University of Nebraska-Lincoln; University of Texas at Austin; University of Washington; and the University of Wisconsin-Madison.

Government Representatives: National Institutes of Health; National Science Foundation; Office of the Assistant Secretary of Defense, Homeland Defense, Force Planning and Employment; Office of Science and Technology Policy; and the U.S. Department of Commerce.

Private Sector Representatives: Allon Therapeutics, Inc.; Corning Incorporated; Dow Chemical Company; Extrude Hone, Inc.; Flow International Corporation; Hewlett-Packard Company; IBM Global Services; Monsanto Corporation; National Center for Manufacturing Sciences; Venture Law Group; and II-VI, Inc.

ACTIVITIES OF THE UNIVERSITY-INDUSTRY PARTNERSHIP

The Partnership convened its first meeting in San Francisco on August 19–20, 2003. This first meeting was successful: 34 delegates began discussions on how industry and academia can work more productively together.

For more than a day, the delegates brainstormed through a set of questions that were shared with the entire Partnership. Partnership membership was divided into four working groups ("Teams") to develop a set of issues and barriers in industry/university collaborations and outline strategic principles and actions that may be used to overcome barriers and move to ideal collaborations. Team leaders were appointed to lead their respective teams through continuing conference calls. Since the initial meeting, the following activities have taken place:

- Teams met via conference calls to further develop and add to their principles and action topics, creating prioritized lists. These conference calls periodically continue.

- A focus group was convened at the November 2003 NCURA Annual Conference in Washington, D.C. to continue discussions and solicit feedback.

- February 2–3, 2004––Steering Team and Color Team Leaders meeting, Washington, D.C. A plan was formulated for moving Team strategic principles forward. This included a long-term vision covering a background document for decision and policymakers, a training document for practitioners, the development of best practices/demonstration partnerships to address contentious issues and brick walls, and a matrix of circumstances and options. This also included short-term points and assignments for the Teams to bring to the Second Partnership meeting.

- October 14-15, 2004—Second Partnership meeting to continue development and finalization of recommendations. Teams will present their draft documents/proposals and reform teams around the elements of the long-term strategic plan, which may require new participants and resources. After the meeting, new teams will shape draft documents and proposals into working and training tools that will be delivered at the National Summit, scheduled for fall 2005.

- Fall 2005—A National Summit in Washington, D.C. at the National Academies for national leaders of industry, university and government. This Summit will develop and endorse solutions for IP agreements that will foster the creation and commercialization of new knowledge and new technologies while appropriately protecting the interests of all parties.

TEAM ASSIGNMENTS

Teams have been working on a variety of assignments. These are the current assignments, keeping in mind that modifications may occur:[19]

Blue Team

Develop a continuing forum for demonstrations of solutions to difficult problems (identify the top ten contentious issues; develop a written proposal for a demonstration to address one of these issues; propose an organizational mechanism for the resolution of university-industry collaboration issues through demonstration projects). *Expected Outcome*: Demonstration partnership to address contentious issues/brick walls (an ongoing forum similar to the FDP).

Green Team

Develop portions of a working educational tool for practitioners, Part I of II (catalogue and explain common agreement types (e.g., consortiums, centers, clinical trials involved, federal funding involved) and known issues that come up in each; catalogue and explain issues that cross all agreement types (confidentiality, indemnification, non-disclosure). Red Team is assigned Part II of II. *Expected Outcome*: Educational training tool for practitioners, incorporating "wisdom" on circumstances and options (as opposed to static templates without explanation).

Red Team

Develop portions of a working educational tool for practitioners, Part II of II (develop an explanatory catalogue of well-known best practices; develop menu of solutions to identified issues, alongside explanations of tradeoffs among choices; identify known barriers; articulate matrix of non-issues). Green Team is assigned Part I of II. *Expected Outcome*: Educational training tool for practitioners, incorporating "wisdom" on circumstances and options (as opposed to static templates without explanation).

Black Team

Develop a high-level statement of principles that can serve as a "constitution" for university-industry collaborations generally and intellectual property agreements specifically (define the

respective missions of the two sectors; define the objectives and constraints relative to those missions; define the principles that would be consistent with all missions, objectives, and constraints so listed). This document will be the basis of a "sign on" effort later in project life. *Expected Outcome*: Background document for decision and policy makers (the "constitution").

CONCLUSION

Given that the Partnership has only been in existence for approximately one year, what can be said about it? One thing is clear: the Partnership is the most comprehensive attempt to date addressing the university-industry relationship. The current Team assignments reflect a comprehensive look at the entire relationship. Broad principles will be written and specific recommendations will be made. The project is broad, yet specific. There is much to commend, but much remains to be done. Honest discussion between representatives in a relaxed atmosphere has proven to be a positive benefit. Each has learned something from the other. Most of the past year has been spent talking and discussing, but the time for concrete action is now.

Addressing intellectual property and licensing within the broader context will result in improvement of these partnerships. Negotiations will be less time-consuming and less stressful. After all, research is paramount. The essential question must be asked: Can the parties compromise? Only time will tell.

As a participant in the Partnership from its inception, the author believes that there is no current downside to the project. The downside will come if the parties do not arrive at common broad principles and specific areas of agreement, and make a genuine attempt to correct the most vexing issues of this relationship. Much is at stake: money and prestige are just the tip of the iceberg.

Given the generally productive yet occasionally contentious nature of these partnerships, it should be clear that developing harmonious partnerships requires keeping those attributes that work and improving those that do not while at the same time adjusting for larger social, cultural and economic changes at the domestic and international levels. In such an environment, academia and industry in the United States must build a closer, trusting, working relationship.

This is not to argue, however, that change is going to require academia and industry to dispense with their fundamental attributes. Change can be accomplished within the larger context of stability and development of these partnerships IF both parties want it to occur.

The Partnership appears to be making headway in addressing fundamental problems and potential changes to this relationship, so the odds are good that the Partnership will produce more effective and efficient relationships. Individuals, institutions, and companies will benefit from these improved relationships. In the end, you will see more harmonious partnerships that will benefit all parties while having the ability to adjust to the changing world around them. The next year will be very interesting.

ENDNOTES

1. This article is largely reflective of comments made during a presentation at the 6th Annual Licensing Intellectual Property Seminar at the University of Dayton School of Law, Dayton, OH, March 16, 2004. With respect to the Bradley University NSF-PFI grant discussed herein, this

material is based upon work supported by the National Science Foundation under Grant No. EEC-0332714. Information pertaining to the University-Industry Partnership is the personal perspective of the author and does not represent the formal position of the Partnership. Special thanks are extended to Dr. Merrilea Mayo at GUIRR for reviewing a previous draft of this article. The original name of the University-Industry Partnership was "Industry/University Congress," but this was changed to the current title by the Partnership Steering Committee in June 2004 to better reflect the project.

2. For an excellent series of articles on the science and engineering workforce in the United States, particularly with reference to undergraduate and graduate students, *see Pan-Organizational Summit on the U.S. Science and Engineering Workforce: Meeting Summary* (National Academies Press, Washington, D.C., 2003).

3. See *Harnessing Science and Technology for America's Economic Future* (National Academies Press, Washington, D.C., 1999) for an insightful discussion of how America's economic future is tied to science and technology. For an excellent discussion of recent U.S. industrial performance in a changing world of economics and innovation, *see* National Research Council, Board on Science, Technology and Economic Policy, *Securing America's Industrial Strength* (National Academies Press, Washington, D.C., 1999).

4. For additional articles on the university-industry partnership, *see* Business-Higher Education Forum, "Working Together, Creating Knowledge: The University-Industry Research Collaboration Initiative" (American Council on Education, Washington, D.C., 2001); Berneman, L., "University-Industry Collaborations: Partners in Research Promoting Productivity and Economic Growth," *Research Management Review* 13(2), pp. 28–37 (Summer/Fall 2003); Dyer, B. J., "Can Universities Make Money on Start-Ups?," *Research Management Review* 13(2), pp. 23–27 (Summer/Fall 2003); Garabedian, T. E., "Recent Developments in Intellectual Property Law: Avoiding Traps in the Pursuit of University Research," *Research Management Review* 14(1), pp. 3–15 (Spring 2004); Garabedian, T. E., "Nontraditional Publications and Their Effect on Patentable Inventions," *Nature Biotechnology* 20(401) (April 2002); Government-University-Industry-Research Roundtable/Industrial Research Institute, "Simplified and Standardized Model Agreements for University-Industry Cooperative Research" (National Academies Press, Washington, D.C., 1988); Matsuura, J. H., "An Overview of Intellectual Property and Intangible Asset Valuation Models," *Research Management Review* 14(1), pp. 33–42 (Spring 2004); Severson, J. A., "Tectonics in the University-Industry Research Partnership," *Research Management Review* 13(2), pp. 12–22 (Summer/Fall 2003); Tellefsen, R., "Strategic State Planning for Technological Innovation: The Pennsylvania Ben Franklin Partnership," *Strategic Planning for University Research*, pp. 413–419 (1992); Thompson, T. B., "An Industry Perspective on Intellectual Property from Sponsored Research," *Research Management Review* 13(2), pp. 3–11 (Summer/Fall 2003). The *Research Management Review* is found online at http://www.ncura.edu/rmr/.

5. Killoren, R., and Butts, S., "Industry-University White Paper" (2003). This White Paper was created for the initial work of the Industry/University Congress that met in San Francisco in August 2003.

6. Academic Research and Development Expenditures: Fiscal Year 2000 (NSF 02-380), Table B-1, National Science Foundation (2002).

7. AUTM Licensing Survey: FY 2000, A Survey Summary of Technology Licensing (and Related) Performance for U.S. and Canadian Academic and Nonprofit Institutions, and Patent Management Firms, published by the Association of University Technology Managers (2001).

8. Dr. R. Stanley Williams, HP Fellow, Hewlett-Packard Laboratories, on behalf of the Hewlett-Packard Company, testified before Congress that U.S. companies are turning increasingly to foreign research universities offering more favorable intellectual property rights rather than work with U.S. universities (R. Stanley Williams, Testimony Before the Subcommittee on Science, Technology and Space of the Senate Committee on Commerce, Science, and Transportation, September 17, 2002). This is another form of labor outsourcing. Since the use of undergraduate and graduate students is central to most university-industry collaborations, this has startling implications for education in the U.S. Differences in intellectual property ownership models and litigation over IP ownership complicates and erodes this partnership. *See also* "A Relationship in Crisis: American Research Universities and Large Corporations," a draft document submitted for comment and criticism, authored by Dr. Williams. In this document he raises many of the same points and issues that he mentioned in his Senate testimony.

9. The federal government, through grant programs, encourages local and regional partnerships among universities, industry, and other local profit and nonprofit organizations. An excellent example is the Partnerships for Innovation Program (PFI) sponsored by the National Science Foundation (NSF). Bradley University received a three-year, $600,000 PFI grant to do the following: (1) leverage the region's substantial intellectual capital assets to create and nurture interdisciplinary, inter-institutional R&D partnerships leading to innovation and commercialization; (2) develop the region's substantial and underemployed human capital assets through innovative and aggressive educational and workforce development programs; and (3) develop a model for the management of intellectual property (IP) collaboratively developed within a partnership of diverse entities, and to link a portion of the IP-based revenue stream to Peoria NEXT programmatic initiatives (*Bradley University NSF-PFI proposal, Proposal Summary*). Partners with Bradley University are: Caterpillar, Inc., University of Illinois College of Medicine at Peoria (UICOM-P), U.S. Department of Agriculture National Center for Agricultural Utilization Research (NCAUR), Peoria Public Schools District 150, Illinois Central College, and OSF Saint Francis Hospital. Peoria NEXT is a not-for-profit corporation chartered under the laws of the state of Illinois and is comprised of the major institutional players in the Peoria area, including those mentioned as partners in the NSF-PFI grant. The *mission* of Peoria NEXT is to "create a healthier future for our regional community evidenced by increased economic growth and diversity, improved physical well-being, and the resultant social stability and opportunity" (http://www.peorianext.org/about.php). The *vision* of Peoria NEXT is: "By 2015, we will be the preferred Midwestern region in support of the culture of discovery, the creation of innovation and the implementation of commercialization in the areas of life science, material science, and engineering science" (http://www.peorianext.org/about.php).

10. Patents tend to be the most problematic in research and intellectual property agreements. It is also fair to ask whether the patent system in the United States is still operating optimally for the needs of science, technology and innovation in the 21st century. To this end, the National Academies are in the process of publishing a report that looks at the current status of the patent system, its performance, and how it can continue to reinvent itself. *See A Patent System for the 21st Century* (National Academies Press, Washington, D.C., 2004). The prepublication copy of this report indicates that the patent system is working well, but that stresses to the system threaten its functionability. The report makes the following recommendations for improving the patent

system: (1) preserve an open-ended, unitary, flexible patent system; (2) reinvigorate the non-obviousness standard; (3) institute an open review procedure; (4) strengthen USPTO capabilities; (5) shield some research uses of patented inventions from liability for infringement; (6) modify or remove the subjective elements of litigation; and (7) reduce redundancies and inconsistencies among national patent systems (*Ibid.*, pp. 4–6). For an excellent series of articles on patents in an economy that is based on the explosion of knowledge, *see* National Research Council, *Patents in the Knowledge-Based Economy* (National Academies Press, Washington, D.C., 2003).

11. Summary of First Industry/University Congress, October 2003.

12. NCURA/GUIRR/IRI Industry/University Congress Focus Group, NCURA Annual Meeting, Flip Chart Notes, November 3, 2003.

13. NCURA/GUIRR/IRI Industry/University Congress Focus Group, NCURA Annual Meeting, Flip Chart Notes, November 3, 2003.

14. Government-University-Industry Research Roundtable, *2000 Annual Report*, p. 19. The "Florida Demonstration Project" was initially conceived by GUIRR in 1986 to address streamlining the administration of federally sponsored research. Based upon success in Florida, the project was broadened into the Federal Demonstration Partnership (FDP), which now counts approximately 300 university and federal members, including Bradley University (Government-University-Industry Research Roundtable, *2002 Annual Report)*.

15. Government-University-Industry Research Roundtable, *2002 Annual Report*.

16. In the fall of 1989 GUIRR staff conducted a telephone survey of 70 university and industry users of this publication (known as the "model agreements"). This survey found that the model agreements had become accepted and valuable resources for negotiating university-industry research partnership agreements. The survey also found that intellectual property rights and licensing arrangements are two areas that deserved additional attention. *See Survey to Assess the Usefulness of Two Model Agreements for University-Industry Cooperative Research* (Government-University-Industry Research Roundtable and Industrial Research Institute, Washington, D.C., 1990), p. 12.

17. Nearly 12,000 copies of this report have been distributed with positive feedback. *See* GUIRR *1993 Annual Report*, p. 2. Richard F. Celeste, former Governor of Ohio, was Chair of GUIRR when this report was released.

18. This report was developed pursuant to a workshop held in Irvine, CA, March 23–24, 1998. See *Overcoming Barriers to Collaborative Research: Report of a Workshop* (National Academies Press, Washington, D.C., 1999).

19. See GUIRR/NCURA/IRI, GUIRR Council Meeting Update, February 3–4, 2004.