UNIVERSITY CONTROLLED OR OWNED TECHNOLOGY: THE STATE OF COMMERCIALIZATION AND RECOMMENDATIONS

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University technology transfer is the process by which a university commercializes inventions and innovations developed by university faculty and researchers. Technology transfer takes many forms, from patent licensing to forming start-up ventures on campus. University technology transfer programs are growing exponentially. Universities have long reflected upon, studied, and implemented transfer and commercialization programs. Due to current economic and legal realities, however, an intense, if not completely new, era has emerged. Universities are increasing their commitment to, and support of, commercialization programs. Policies and missions have been revisited and reshaped. Campus research is exploding with applied innovation. Faculty and students are being recruited by the strength and virtue of commercialization programs. Economic pressures and competition are intense. Opportunities, as well as pitfalls, abound in this complex field. Universities that proceed with the proper balance of aggressiveness, creativity, and prudence will realize the many benefits of university technology transfer.

I. HISTORY—THE OPENING OF THE ERA

University technology transfer did not gain real momentum in the United States until the early 1980s.[1] Several forces have coalesced to raise the prominence and expansion of university technology transfer, not the least of which are the Bayh-

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1. This is not to say that university technology transfer was previously non-existent. *See* Kenneth Sutherlin Dueker, *Biobusiness on Campus: Commercialization of University-Developed Biomedical Technologies*, 52 FOOD & DRUG L.J. 453, 454–61 (1997) (briefly discussing the history of university technology transfer prior to 1980). *See also* Ned T. Himmelrich & Jonathan M. Holda, *Technology Transfer Agreements: Don't Be an Amateuer*, 34 MD. BAR J. 30, 31 (Nov.–Dec. 2001).

Dole Act,[2] the changing economy of the United States, and financial pressures on universities coupled with the potential for pay-offs from transfer programs.

A. The Numbers

The statistics clearly illustrate the explosive growth of university technology transfer activities over the past few decades.[3] In 1980, universities generated about $1 million in licensing revenue.[4] According to the most recent Association of University Technology Managers ("AUTM") survey for the year 2002,[5] licensing revenue for survey respondents was $1.267 billion.[6] In 1985, 589 new patents were awarded to academia.[7] AUTM survey respondents filed 7,741 new patent applications and were issued 3,673 new patents in 2002.[8] During the ten-year period from 1974 through 1984, universities granted about one thousand licenses total.[9] In 2002 alone, AUTM survey respondents reported the execution of 4,673 licenses and options.[10] From 1980 through 1993, AUTM survey respondents were involved in the formation of a total of 1,169 start-up companies.[11] In 2002 alone,

2. Pub. L. No. 96-517, 94 Stat. 3015 (1980) (codified as amended at 35 U.S.C.A. §§ 200–212 (2001 & West Supp. 2003)).

3. In 1972, fewer than thirty universities had technology transfer programs. Dueker, *supra* note 1, at 476. In contrast, "[t]oday nearly every research university in the country has a technology-licensing office." Eyal Press & Jennifer Washburn, *The Kept University*, ATLANTIC MONTHLY, Mar. 2000, at part 3, *available at* http://www.theatlantic.com/issues/2000/03/press.htm.

4. AUTM, LICENSING SURVEY: FY 1994 SURVEY SUMMARY AND SELECTED DATA FY 1991–FY 1994, at 27 (1995). The AUTM began conducting in-depth surveys of university technology transfer activities in 1991.

5. AUTM, LICENSING SURVEY, FY 2002: A SURVEY SUMMARY OF TECHNOLOGY LICENSING (AND RELATED) PERFORMANCE FOR U.S. AND CANADIAN ACADEMIC NONPROFIT INSTITUTIONS AND PATENT MANAGEMENT FIRMS, *available at* http://www.autm.net/surveys/01/01summarypublicversion.pdf [hereinafter 2002 AUTM SURVEY]. Respondents to the 2002 AUTM survey included 130 U.S. universities, 26 U.S. hospitals and research institutes, 26 Canadian institutions, and 1 third-party patent management firm. *Id*. at 5. Although the survey results did not cover all universities involved in technology transfer, or only universities, it is nonetheless the most comprehensive study of technology transfer activities by universities available to date and clearly illustrates the increase in university technology transfer activities. The survey respondents included ninety-two of the top one hundred universities according to amount of money spent on research activities annually. *Id*. at 6.

6. *Id.* at 2. In 1995, AUTM survey respondents earned $424 million in licensing income. *Id.* at 18. In 1997, AUTM survey respondents earned $611 million in licensing income. *Id.*

7. NATIONAL SCIENCE BOARD, SCIENCE AND ENGINEERING INDICATORS ch. 6 (2000), *available at* http://www.nsf.gov/sbe/srs/seind00/pdf/c6/c06.pdf.

8. 2002 AUTM SURVEY, *supra* note 5, at 11. AUTM survey respondents filed 2,872 new patent applications in 1995 and 4,267 new patent applications in 1997. *Id*. at 7. AUTM survey respondents were issued 1,833 patents in 1995 and 2,645 in 1997. *Id*. at 11.

9. GENERAL ACCOUNTING OFFICE, PATENT POLICY: UNIVERSITIES' RESEARCH EFFORTS UNDER PUBLIC LAW 96-517, at 2 (1986).

10. 2002 AUTM SURVEY, *supra* note 5, at 15. In 1995, AUTM survey respondents executed 2,616 licenses and options. *Id*. In 1997, AUTM survey respondents executed 3,328 licenses and options. *Id.*

11. *Id.* at 21.

survey respondents formed 450 start-up companies.[12]

B. The Bayh-Dole Act

The Bayh-Dole Act[13] (the "Act") governs the commercialization of inventions and innovations resulting from research funded by the federal government. The Act was signed into law on December 12, 1980, and became effective in July 1981. It was a response to an increase in global competition in technology-related fields, and was also seen as a way for taxpayers to enjoy the benefits of the investment they made in university-based research.[14] Prior to the passage of the Act, governmental policies regarding ownership of inventions and innovations developed by entities with federal government funding lacked uniformity. Different federal agencies applied different rules.[15] One common element of all of these government agencies' policies was that title to the inventions and innovations funded by the government was presumed to rest with the government.[16] This presumption proved difficult and costly to overcome, meaning that universities rarely retained ownership of inventions and innovations developed by their

12. *Id*. AUTM survey respondents formed 223 start-ups in 1995 and 333 start-ups in 1997. *Id.*

13. 35 U.S.C.A. §§ 200–212 (2001 & West Supp. 2003). The Department of Commerce developed regulations for the Act, which are codified in the Code of Federal Regulations. *See* Rights To Inventions Made By Nonprofit Organizations And Small Business Firms Under Government Grants, Contracts, And Cooperative Agreements, 37 C.F.R. §§ 401.1–401.16 (2003).

14. Senator Birch Bayh observed:

> Simply put, American efforts at innovation, in which we were once the undisputed world leader, were stagnating and falling behind those of other nations. There were a number of theories on the various causes of these problems, but clearly the United States needed to develop a more effective overall technology transfer policy. Senator Dole and I agreed that there was an opportunity in one particular area where we could begin the process of providing a comprehensive technology transfer policy for the United States. This was in the area of federally funded research conducted by universities and small businesses . . . . The taxpayers were getting almost no return on their investment. We came to the realization that this failure to move from abstract research into useful commercial innovation was largely a result of the government's patent policy and we sought to draft legislation which would change this policy in a way to quickly and directly stimulate the development and commercialization of inventions.

Patent Issues in Federally Funded Research: Hearings on the Bayh-Dole Act Before the Judiciary Subcommittee on Patents, Copyrights and Trademarks, House Committee on the Judiciary, 103d Cong. (1994) (statement of Sen. Birch Bayh), *available at* 1994 WL 14185684.

15. *See* AUTM, LICENSING SURVEY, FY 1991–FY 1995: A FIVE-YEAR SUMMARY OF TECHNOLOGY LICENSING (AND RELATED) PERFORMANCE FOR U.S. AND CANADIAN ACADEMIC AND NONPROFIT INSTITUTIONS, AND PATENT MANAGEMENT FIRMS (1997) [hereinafter 1997 AUTM SURVEY]. *See also* Dueker, *supra* note 1, at 460 (noting that different regulations regarding ownership of inventions and innovations created with federal money were released by twenty-six separate federal agencies).

16. *See* Dueker, *supra* note 1, at 460. If a university wished to retain rights in an invention or innovation that resulted from research funded by a federal agency, the university would have to negotiate an arrangement with the funding agency. *See* 35 U.S.C.A. § 202 (2001 & West Supp. 2003).

researchers with federal government money.[17]

In passing the Act, Congress stated that it wanted to promote the commercialization and public availability of federally-funded inventions and innovations.[18] In order to meet this objective, the Act, in most cases, allows recipients of federal funding to retain title to inventions developed with federal funding.[19] Thus, universities that develop inventions and innovations with federal government funding may license them to third parties and keep the proceeds.[20] However, the university is required to grant the government a nonexclusive, irrevocable, paid-up license to utilize the invention throughout the world.[21] The government is also given "march-in rights" to help ensure that the public receives the benefit of the invention. This right allows the government to revoke a university's title to any invention or innovation if the federal agency that funded the research determines that the university's commercialization efforts have been inadequate.[22]

The Bayh-Dole Act is essential to universities' ability to commercialize inventions and innovations developed by their researchers because the majority of university research was, and is, funded by the federal government. AUTM survey respondents reported that 68.2% of their research expenditures for 2002 came from the federal government.[23] Thus, without the Act, universities would have substantial difficulties reaping the financial benefits of a great deal of their research. Likewise, the public did not receive the full benefit of this research prior

17. *See* Dueker, *supra* note 1, at 460. A few universities, such as the University of Wisconsin-Madison, were able to structure patent agreements with various federal agencies that allowed them to retain rights in their inventions and innovations that resulted from research funded by those agencies, but the transaction costs and red tape involved in coming to such an arrangement were too much for most universities to overcome. *Id*.

18. 35 U.S.C.A. § 200 (2001).

19. *Id*. § 202(a). In limited circumstances, the funding agreement may provide that the funding recipient may not elect to retain title. *Id*.

20. A university must meet certain requirements in order to enjoy the benefits of the Act. For instance, the university must disclose any invention to the federal agency within a reasonable time after its development, must elect whether or not to retain title to the invention within two years of disclosure and must file a patent for the invention within the statutory period. *Id*. § 202(c)(1)–(3).

21. 35 U.S.C.A. § 202(c)(4) (2001 & West Supp. 2003).

22. *Id*. § 203. In 1997, a private company, CellPro, Inc., attempted to invoke the march-in provision. CellPro sought to obtain a license for a stem-cell separation technology that was developed by a researcher at The Johns Hopkins University under a grant from the National Institutes of Health ("NIH"). Harold Varmus, M.D., National Institutes of Health, Office of the Director, *Determination in the Case of Petition of CellPro, Inc*., *available at* http://www.nih.gov /news/pr/aug97/nihb-01.htm (Aug. 1, 1997). CellPro wrote to the Secretary of the Department of Health and Human Services and argued that march-in was warranted because Johns Hopkins and its licensee, Baxter Healthcare, had failed to take reasonable steps to commercialize the technology and that government action was needed in order to alleviate health or safety needs that were not being met by Baxter. *Id*. NIH declined to initiate march-in proceedings, although it left open the possibility of march-in if new facts arose. *Id*. *See also* Johns Hopkins Univ. v. CellPro, Inc., 978 F. Supp. 184 (D. Del. 1997), *aff'd*, 152 F.3d 1342 (Fed. Cir. 1998).

23. 2002 AUTM SURVEY, *supra* note 5, at 1.

to passage of the Act, because much of it was not made commercially available.[24] The Bayh-Dole Act opened the door to a new era in which both universities and the general public are able to enjoy the fruits of research funded by the federal government.

C. The Changing U.S. Economy

For much of the twentieth century, the United States had an industrial economy based on large-scale production and manufacturing, such as automobile manufacturing. In 1960, manufacturing output was 27% of U.S. GDP and manufacturing jobs accounted for 31% of total employment in the United States.[25] As the twentieth century came to a close, however, some manufacturing activity had moved overseas and the manufacturing firms that remain in this country have become increasingly dependent on technology to increase productivity and remain competitive. By 1997, manufacturing output was 17% of GDP and, in 1998, manufacturing jobs accounted for 14.9% of total employment.[26] A new type of American economy has emerged. The industries that have remained in the United State are more reliant and focused on scientific and technological innovation in fields such as biomedical and computer technology.[27] With this shift, the type of scientific and technology-related research conducted at universities has become more directly relevant and important to the U.S. economy. The passage of the Bayh-Dole Act represented (among other things) recognition of this shift. Private industry also recognized this trend and has significantly increased its financial support of university research.[28] Many universities have responded by embracing technology transfer and pushing for the commercialization of university-developed inventions and innovations.

24. While it was possible for a company to license technology from the federal government, the process to do so often proved too costly and cumbersome. "The bureaucratic red tape that accompanied any attempt at innovation was simply too great a disincentive to any company seeking to license directly from the government." Howard W. Bremer, *Testimony on the Effectiveness of the Bayh-Dole Act*, 5 J. ASS'N U. TECH. MANAGERS (Oct. 25, 1993), *available at* http://www.autm.net/pubs/journal/93/testimony93.html. Thus, much important technology remained unused on the shelf, under the ownership of the federal government.

25. Michael Knetter, *Trade Deficits and the U.S. Economy Part II* (Spring 2000), *available at* http://mba.tuck.dartmouth.edu/paradigm/spring2000/articles/knetter-economy2.html.

26. *Id*.

27. *See* Robert D. Atkinson & Randolph H. Court, *The New Economy Index: Understanding America's Economic Transformation* (Nov. 1998), *available at* http://www.neweconomyindex.org/index_nei.html.

28. In 1980, private industry funding accounted for 4% of university research expenditures. General Accounting Office, *Patent Policy: Universities' Research Efforts Under Public Law 96-517*, at 3 (1986). AUTM survey respondents reported that 8% of their 2002 research expenditures came from private industry. 2002 AUTM SURVEY, *supra* note 5, at 9. In 1997, U.S. companies spent $1.7 billion on science and engineering research at universities, an increase of five-fold over 1977 numbers. David Shenk, *Money Science = Ethics Problems on Campus*, THE NATION, Mar. 4, 1999, *available at* http://www.thenation.com/doc.mhtml?i=19990322&s=shenk.

D. Economic Pay-offs/Economic Pressures

University technology transfer is "hot." Most universities are involved, and some generate a great deal of revenue from it.[29] This fact, combined with the reality of budget cuts and economic pressures faced by many universities,[30] has made success in technology transfer very important to many universities. Clearly, the pay-off for such success is potentially very significant. This potential has proven attractive to many universities.

The reasons for the growth of university technology transfer, whether it be the Bayh-Dole Act, the changing economy of the United States, economic realities at universities, or a combination of these factors, may be debatable,[31] but it is hard to deny that university technology transfer has grown at an amazing rate over the past two decades. A question remains passionately debated: Is this a good thing?

II. TENSION OF TECHNOLOGY TRANSFER WITH MISSION

Traditionally, it has been understood that universities have a two-fold mission. First, universities are charged with educating their students, and second, universities are expected to conduct research for the benefit of the public.[32] Some argue that these missions can be, and in some cases are, compromised when private interests become involved in the research process and commercialization becomes the goal of research endeavors.[33] Both universities and researchers stand to profit from the successful commercialization of inventions and innovations. Is the traditional mission of universities and their faculty members compromised by this fact?

A. Compromised Faculty?

Prior to the explosion in university technology transfer, it was generally

29. For instance, in 1993 alone, Stanford University earned $23.5 million from its patent on recombinant DNA. Victoria Slind-Flor, *The Trouble With Techno Transfers*, THE NAT'L L.J., Oct. 3, 1994, at A1, A27. The University of Florida generates millions of dollars each year from Gatorade. David Villano, *Big Money on Campus*, FLA. TREND, Dec. 1, 1995, at 66, *available at* 1995 WL 8683002. The University of California earned over $57 million in royalties in 1995 from 548 revenue-generating licenses. 1997 AUTM SURVEY, *supra* note 15, at 44. Michigan State University brought in over $15 million from forty-two licenses in that same year. *Id*.

30. *See* Elizabeth Zeman, *Budget Cuts Hit Public Universities*, DAILY ILLINI, Jan. 16, 2002, at 1, *available at* http://www.uwire.com/content/topnews011602001.html (briefly discussing universities that are facing budget cuts and other financial problems).

31. *See, e.g.*, Tamsen Valoir, *Government Funded Inventions: The Bayh-Dole Act and the* Hopkins v. CellPro *March-In Rights Controversy*, 8 TEX. INTELL. PROP. L.J. 211, 234–37 (2000) (questioning whether the Bayh-Dole Act has played an important role in the growth of university technology transfer).

32. *See* Hans Wiesendanger, Office of Technology Licensing, *A History of OTL Overview*, *at* http://otl.stanford.edu/about/resources/history.html (last visited Mar. 2, 2004).

33. *See, e.g.*, Shenk, *supra* note 28; Press & Washburn, *supra* note 3 (discussing many problems inherent to industry support of academic research). *But see, e.g.*, Dueker, *supra* note 1, at 470–71 (suggesting that industry does not necessarily have a corrupting influence on academics).

presumed that university researchers toiled for the welfare of the general public, without regard to the commercial potential of their discoveries. More recently, however, it has become clear that this is not always the case. A consequence of increased university commercialization is that the professor/entrepreneur is becoming more and more common, and for good reason. Responsible faculty members now usually receive a portion of any revenue generated by their inventions or innovations.[34] The Bayh-Dole Act requires that the inventors receive some share, albeit an indeterminate one, of the revenue generated from their invention or innovation developed with federal funding.[35] A study from 2000 found that 28% of life sciences faculty at universities received private sponsor funding, 15% held equity in the private sponsor, 33% were engaged in paid consulting arrangements, and 32% held board positions.[36] University researchers often have a direct financial stake in the outcome of their research. Some critics argue that this fact creates conflicts of interest that can compromise their research.[37] Some critics even argue that university researchers sometimes choose their research topics based on the short-term commercial potential of the subject and that, because of this, important areas of research with less commercial appeal are often ignored.[38] On the other hand, a study by Professor David Blumenthal suggests that, instead of having a corrupting influence on faculty members, university commercialization actually has a positive impact.[39] The study concluded that biomedical faculty who were involved in technology commercialization taught no less, published more, produced more patented discoveries, and served in more

34. *See* Peter D. Blumberg, *From "Publish or Perish" to "Profit or Perish": Revenues from University Technology Transfer and the 501(c)(3) Tax Exemption*, 145 U. PA. L. REV. 89, 101 (1996). For example, inventors at Stanford University receive 33% of the net royalties received on their licensed inventions, Wiesendanger, *supra* note 32, while inventors at the University of Notre Dame receive 50% of royalty revenues after university borne expenses are covered, University of Notre Dame Office of Research, Frequently Asked Questions in Technology Transfer, *at* http://www.nd.edu/~research/TechTransfer/TTfaq.html (last visited Mar. 2, 2004). Such arrangements, which were rare in the past, are now common at universities with technology transfer programs.

35. *See* 35 U.S.C.A. § 202(c)(7)(B) (2001 & West Supp. 2003). "[The university shall] share royalties with the inventor." *Id*.

36. Elizabeth A. Boyd & Lisa A. Bero, *Assessing Faculty Financial Relationships With Industry: A Case Study*, 284 JAMA 2209, 2209–10 (2000).

37. *See, e.g.*, Shenk, *supra* note 28 (discussing examples of academic research being tainted, and researchers being pressured to change research results, by companies that sponsor the research).

38. *See id*. ("Scientists sometimes may not pursue drugs or tests that lack obvious short-term markets."). *See also* Press & Washburn, *supra* note 3, at part 3. Some critics also contend that the drive toward commercialization has skewed academic research away from basic research to applied research. *See* Richard Florida, *The Role of the University: Leveraging Talent, Not Technology*, ISSUES IN SCI. & TECH., Summer 1999, *available at* http://www.nap.edu /issues/15.4/florida.htm. National Science Foundation statistics, however, show that this argument is weak. The composition of academic research has remained consistent since 1980 with about 66% of research being basic science, although this percentage is down from 77% in the early 1970s. *Id*.

39. David Blumenthal et al., *University-Industry Research Relationships in Biotechnology: Implications for the University*, 232 SCI. 1361 (1986).

administrative capacities than faculty not involved in technology transfer activities.[40]

Another matter of concern commonly raised by critics of university technology transfer is that the free flow of ideas in the academic world is stifled by the focus on commercialization of inventions and innovations. Many in the academic community insist that it is imperative that discoveries are published immediately and that information is shared openly.[41] Companies that work with university researchers, on the other hand, often demand delays in the publication and sharing of discoveries and ideas.[42] In order to protect the value of proprietary information, it is often necessary to avoid publication, or other forms of sharing of information and data, until proper intellectual property protection is in place. In the United States, a patent cannot be issued for an invention or innovation if it has been described in a printed publication more than one year before a patent application is filed with the Patent and Trademark Office.[43] This one-year grace period is not even available in some foreign countries, meaning that any sort of publication can lead to the loss of intellectual property rights if steps are not taken to protect them.[44] Likewise, any ownership or rights in trade secrets, or "know-how," can be lost if not properly protected before the information is shared with other parties.[45] The National Institute of Health has developed guidelines suggesting that universities not allow companies to delay publication for more than two months,[46] but lengthier delays are not uncommon.[47]

Many universities, along with their faculty members, have reacted to these concerns by adopting conflict-of-interest policies. These policies attempt to avoid conflicts of interest as much as possible, and to ensure that those conflicts that do arise do not taint research outcomes.[48]

B. Compromised Universities?

While university-industry partnerships have become quite common,[49] some

40. *Id.*

41. *See, e.g.*, Press & Washburn, *supra* note 3, at part 2. ("One of the most basic tenets of science is that we share information in an open way. . . . As biotech and pharmaceutical companies have become more involved in funding research, there's been a shift toward confidentiality that is severely inhibiting the interchange of information.").

42. *See id.*

43. 35 U.S.C.A. § 102(b) (2001).

44. *See* Dueker, *supra* note 1, at 473.

45. *See id*. This type of protection, unlike patent protection, which lasts twenty years from when the patent application is filed, may last indefinitely. *See* 100 ILL. COMP. STAT. 305/1 (2002) (noting that, under Illinois law, a contractual duty to maintain trade secret protection shall not be deemed void or unenforceable for lack of durational limitation).

46. *See* Shenk, *supra* note 28.

47. *See* Press & Washburn, *supra* note 3, at part 2. *See also* Shenk, *supra* note 28.

48. *See generally* Peter J. Harrington, *Faculty Conflicts of Interest in an Age of Academic Entrepreneurialism: An Analysis of the Problem, the Law and Selected University Policies*, 27 J.C. & U.L. 775 (2001) (discussing the faculty conflict-of-interest policies of several universities).

49. *See id*. at 778–79 (giving examples of university-industry agreements).

believe that a serious conflict in mission arises when universities and companies partner for the purposes of research.[50] Critics have suggested that one negative impact of this phenomenon has been a reduction in funding at some universities for departments that do not produce revenue-generating inventions and innovations, such as humanities departments.[51] At the same time, some of these same universities have increased funding for science and technology departments.[52] Critics suggest that this type of resource allocation, where profit is seemingly put ahead of educational opportunities and offerings, conflicts with the mission of the university to educate students and conduct research for the benefit of the public.[53] Conversely, supporters of university technology transfer often point out the benefits of these activities, which can include upgraded facilities and increased funding for all academic departments.[54] Universities with exceptional technology transfer programs are also able to attract top professors and offer unique learning opportunities in technology, business, and entrepreneurism, leading to a better overall academic environment and more educational opportunities for students at those universities.[55]

Whether one is a proponent or opponent of university technology transfer programs, it appears that such programs are here to stay. Those that continue to fight this phenomenon are likely engaged in a losing battle, although some universities have reacted to the criticism by implementing stronger conflict-of-interest policies.[56] It should be noted, however, that these policies are not foolproof. Conflicts will exist and no policy will completely guard against them. This is a risk that universities must take or, alternatively, should avoid by not involving themselves in technology transfer. Universities that are aggressively pursuing technology transfer opportunities are fighting a battle of their own: attempting to succeed in a highly competitive environment.

III. DISTINCTIVE TECHNOLOGY TRANSFER MODELS

University technology transfer takes many different forms. There is no single optimal structure or mode of operation for a university technology transfer program. Universities have developed numerous models and procedures for their technology transfer programs. Some have flourished, while others have not.

50. *See, e.g.*, Shenk, *supra* note 28 ("Universities exist to do research and research exists to benefit mankind. . . . Companies have an additional and different agenda—making profit." (quoting Drummond Rennie, West Coast deputy editor of the *Journal of the American Medical Association*)).

51. *See, e.g.*, Press & Washburn, *supra* note 3, parts 1 & 4.

52. *Id*. at part 1.

53. *Id.*

54. *See, e.g.*, Wiesendanger, *supra* note 32.

55. *See* LORI PRESSMAN, M.I.T. SYSTEM OF TECHNOLOGY TRANSFER (Feb. 4, 2000), *available at* http://web.mit.edu/tlo/www/MITsystemtechtrans.pdf.

56. *See* Harrington, *supra* note 48, at 812.

A. University of Wisconsin-Madison

The University of Wisconsin-Madison was a pioneer in university technology transfer. The Wisconsin Alumni Research Foundation ("WARF") was established in 1925 when nine University of Wisconsin alumni each donated $100 as capital.[57] WARF granted its first license, for an artificial Vitamin D supplement, to the Quaker Oats Company in 1927.[58] Currently, WARF has about forty employees, as well as a board of eighteen volunteer trustees.[59] In 2002, WARF claimed to have become the first university technology transfer program to open a satellite office when it opened a branch in San Diego.[60]

Revenue generated by WARF is distributed to the University of Wisconsin-Madison Graduate School, the inventors, and the department of the inventors.[61] WARF contributes over $30 million each year to the University[62] and has generated about $600 million for the University during its history.[63] WARF received 279 invention disclosures in fiscal year 2002.[64] The University of Wisconsin-Madison has been involved in the development of ninety-eight technology-based companies in Wisconsin since 1995.[65]

WARF sets up a licensing team for each invention that it accepts.[66] The team consists of the inventor(s), an intellectual property manager, one or more licensing managers, WARF's in-house counsel, marketing specialists, and various support staff. Outside counsel is used for patent prosecution.[67] WARF uses several different methods for marketing its inventions, including the listing of available technologies on the WARF web site, direct contact with potential licensees by WARF licensing managers, direct mailings, technical presentations made by the researchers, and participation in technology trade shows.[68]

The Office of University-Industry Relations was established in the early 1960s to facilitate interactions, and develop relationships, between University of

57. Wisconsin Alumni Research Foundation, History of WARF, *at* http://www.warf.org/aboutus/index.jsp?catid=39 (last visited Mar. 2, 2004) [hereinafter History of WARF].

58. *Id*.

59. *Id*.

60. Wisconsin Alumni Research Foundation, *WARF West Coast Office Opens for Business*, *at* http://warf.ws/news/newsletters-article.jsp?articleid=87&printable=1 (Oct. 21, 2002).

61. Wisconsin Alumni Research Foundation, About Us, *at* http://www.warf.ws/aboutus/index.jsp?printable=1 (last visited Mar. 2, 2004).

62. *Id*.

63. History of WARF, *supra* note 57.

64. Wisconsin Alumni Research Foundation, *2002 Invention Disclosures by UW-Madison School and College* (Oct. 7, 2002), *available at* http://www.warf.ws/news/newsletters-article.jsp?articleid= 81&printable=1 [hereinafter 2002 UW Invention Disclosures].

65. Press Release, Wisconsin Alumni Research Foundation, *Report Puts UW-Madison at Head of Economic Class* (Apr. 10, 2002), *available at* http://www.news.wisc.edu/releases/print.msql?id=7333.

66. Wisconsin Alumni Research Foundation, For Researchers: Bringing Your Invention to WARF, *at* http://www.warf.org/forresearchers/index.jsp?catid=3&subcatid=5&printable=1 (last visited Mar. 2, 2004) [hereinafter Bringing Your Invention to WARF].

67. *Id*.

68. *Id*.

Wisconsin research and the business and industrial community.[69] The University Research Park is home to nearly 100 companies.[70] The mission of the Research Park is to encourage partnerships between businesses and university researchers.[71] A subsidiary of WARF, the WiCell Research Institute, was created to support research on human embryonic stem cells.[72] A University of Wisconsin-Madison researcher, in 1998, was the first person to isolate human embryonic stem cells.[73]

B. Stanford University

Stanford University has an established and very successful technology transfer program through its Office of Technology Licensing (the "OTL"), which was established in 1970.[74] In fact, the program is so highly regarded that it is able to charge between $1000 and $2000 per hour for private tours of its technology transfer facilities.[75] For fiscal year 2001–02, the OTL received 315 invention disclosures, executed 112 new licenses, generated $52.7 million in total royalties, had 42 different technologies that each generated over $100,000 in royalties for the year, and generated $405,000 from liquidated equity.[76] Some of the more prominent inventions and innovations that have come through the Stanford OTL are injectable collagen for plastic and cosmetic surgery, optimization software used in the design of yachts for the Americas Cup, the recombinant DNA "gene splicing" techniques that have given rise to the biotechnology industry, and improved FM sound systems for electronic music devices and systems.[77]

The Stanford OTL licensing process focuses on marketing the inventions and innovations under its control.[78] So-called "Licensing Associates," who generally have degrees in science or engineering, experience in marketing, and prior licensing experience, staff the OTL.[79] These associates are given complete responsibility for evaluating, marketing, licensing, protecting, and monitoring the progress of specific technologies.[80] When intellectual property protection is necessary, the OTL seeks and selects outside counsel on a case-by-case basis based

69. 2002 UW Invention Disclosures, *supra* note 64.

70. *Id*.

71. Wisconsin Alumni Research Foundation, For Industry: Industry Resources, *at* http://www.warf.ws/forindustry/index.jsp?catid=13&printable=1 (last visited Mar. 2, 2004).

72. Wisconsin Alumni Research Foundation, News & Information: FAQs, *at* http://www.warf.ws/news/index.jsp?catid=18&printable=1 (last visited Mar. 2, 2004).

73. History of WARF, *supra* note 57.

74. Wiesendanger, *supra* note 32.

75. Office of Technology Licensing, Visitor Policy, *at* http://otl.stanford.edu/about/index.html (last visited Mar. 2, 2004). The OTL does provide free weekly tours at scheduled times. *Id*.

76. OFFICE OF TECHNOLOGY LICENSING, FINDING THE RIGHT MATCH: TURNING SCIENTIFIC PROGRESS INTO TANGIBLE PRODUCTS 1 (2001–02), *available at* http://otl.stanford.edu/about/resources/otlar02.pdf.

77. Wiesendanger, *supra* note 32.

78. *Id*.

79. *Id*.

80. *Id*.

on their qualifications for the particular technology.[81] The OTL works with Stanford's Industrial Contracts Offices when negotiating contracts with outside parties.[82] The Research Incentive Fund has been established by the OTL to help turn faculty discoveries into commercially viable products.[83]

The OTL aggressively markets the services that it provides to the university community, which include intellectual property protection, marketing, licensing, and assistance with forming start-up companies.[84] Likewise, the OTL aggressively markets the technologies under its control to potential licensees and other prospective partners.[85] The OTL works closely with private industry in the surrounding Silicon Valley community and with companies from outside the area.[86] It publishes a newsletter entitled *Brainstorm*, which is intended for audiences both inside and outside the Stanford community.[87] *Brainstorm* touts the OTL's services and also announces recent faculty inventions and innovations.[88] The OTL web site includes a comprehensive list of University technologies available for licensing.[89]

C. University of Illinois

The University of Illinois has a broad and assertive technology transfer program. In fiscal year 2002, the University had 220 invention disclosures, filed for 143 patents, was issued 42 new patents, executed 74 licenses, and generated more than $9 million in licensing revenue.[90] In addition, in the period from 2001–2002, University of Illinois faculty launched eighteen start-up companies.[91]

The Board of Trustees created the position of Vice President for Economic Development and Corporate Relations ("VPEDCR") to oversee and facilitate all aspects of technology commercialization for the University.[92] Under the VPEDCR

81. *Id*.

82. Stanford University, Industrial Contracts Office Web Site, *at* http://www.stanford.edu/group/ICO/ (last visited Mar. 2, 2004).

83. Ann Arvin, Associate Dean of Research, Stanford University Office of Technology Licensing, Request for Proposals for OTL Research Incentive Awards (Jan. 10, 2004), *available at* http://otl.stanford.edu/inventors/resources/research_inc_fund.html.

84. Wiesendanger, *supra* note 32.

85. *Id.*

86. *Id*.

87. Stanford University, Office of Technology Licensing, Stanford Technology Brainstorm—Summer 2003, *at* http://otl.stanford.edu/about/brainstorm/index.html (last visited Mar. 2, 2004) [hereinafter Stanford Technology Brainstorm].

88. *Id.*

89. Stanford University, Office of Technology, Licensing, Docket Search Page, *at* http://stanfordtech.stanford.edu/technology (last visited Mar. 2, 2004).

90. UNIVERSITY OF ILLINOIS, ANNUAL REPORT 2001/2002, TECHNOLOGY COMMERCIALIZATION ACTIVITIES 5–6, *available at* http://www.vpted.uillinois.edu /%7Epdf_ files/Annual_Report.pdf (last visited Apr. 8, 2004).

91. *Id*. at 6.

92. UNIVERSITY OF ILLINOIS, OFFICE OF THE VICE PRESIDENT FOR ECONOMIC DEVELOPMENT AND CORPORATE RELATIONS, TECHNOLOGY COMMERCIALIZATION AT THE UNIVERSITY OF ILLINOIS: GROWING THE ILLINOIS HIGH TECHNOLOGY ECONOMY 1 (Apr. 2002),

are two Offices of Technology Management ("OTM") at the Urbana-Champaign and Chicago campuses.[93] The OTMs protect, market, and license University-developed technology and intellectual property, and coordinate their efforts through the VPEDCR.[94] The staff at the OTM at the Urbana-Champaign campus includes a director, an associate director, several technology managers and attorneys, paralegals, a patent coordinator, and various support staff.[95] IllinoisVENTURES, LLC was formed under the direction of the Board of Trustees to facilitate the formation of start-up companies based on University technology.[96] In addition, University of Illinois Research Park, LLC was formed to manage operations of research parks and business incubators run by the University.[97]

In order to market its technologies, the University holds events called "i emerging" every six months.[98] These events showcase its technology and start-up companies and attract venture capitalists, angel investors, researchers, and representatives from industry.[99] Additionally, the OTMs sponsor technology briefings, where industry representatives are invited to hear presentations on a particular new technology.[100] The web sites for the OTMs provide a comprehensive database of University technology that is available for licensing.[101] All of the above-mentioned organizations work closely together, and with private industry, in an attempt to bring University of Illinois technologies to market.[102]

D. University of Notre Dame

The University of Notre Dame's technology transfer program is somewhat less aggressive and structured than some of the more established programs. The Division of Technology Transfer, or ND Tech Transfer, was formed in June 1998[103] under the University Office of Research.[104] ND Tech Transfer has one

available at http://www.vpted.uillinois.edu/~pdf_files/UI%20HR308%204-1-02%20FINAL.pdf [hereinafter APRIL 2002 REPORT].

93. *See* University of Illinois at Urbana-Champaign, Office of Technology Management, *at* http://www.otm.uiuc.edu (last visited Mar. 2, 2004). *See* University of Illinois at Chicago, Office of Technology Management, *at* http://www.uic.edu/depts/ovcr/otm/ (last visited Mar. 2, 2004).

94. APRIL 2002 REPORT, *supra* note 92, at 1.

95. University of Illinois at Urbana-Champaign, Office of Technology Management, *at* http://www.otm.uiuc.edu/about/staff (last visited Mar. 2, 2004).

96. *See* APRIL 2002 REPORT, *supra* note 92, at 1.

97. *Id.*

98. *See* Nicole Nair, Marketing Communications Specialist, Office of the Vice President for Economic Development and Corporate Relations, *i emerging Showcases University Technologies* (Oct. 15, 2002), *available at* http://www.vped.uillinois.edu/news/news2.asp.

99. *Id.*

100. *See, e.g.*, Barry Dempsey, Interlayer Stress-Absorbing Composite (ISAC) Technology for Road Repair, *available at* http://www.otm.uiuc.edu/downloads/ISAC-technology/ISAC-tech-briefing.pdf (last visited Apr. 8, 2004).

101. *See* University of Illinois at Urbana-Champaign, Office of Technology Management, Available Technologies Database, *at* http://www.otm.uiuc.edu/techs/available/ (last visited Mar. 2, 2004) [hereinafter Illinois Available Technologies].

102. *See* APRIL 2002 REPORT, *supra* note 92, at 1.

103. E-mail Interview with Michael Edwards, Assistant Director for Research Development

full-time employee and is charged with negotiating or assisting with license agreements, new company formation, confidentiality agreements, inter-institutional agreements, collaborative research agreements, material transfer agreements, and conflict of interest matters.[105] ND Tech Transfer employs outside counsel for intellectual property protection matters.[106]

ND Tech Transfer is small, but growing. For fiscal year 1999, its royalty revenue was $250.[107] This number grew to $209,000 last year and has already been surpassed in the current fiscal year.[108] In a typical year, ND Tech Transfer receives thirty invention disclosures, files twenty new patent applications, and executes between ten and twenty new license agreements.[109]

Notre Dame has no established formal mechanism for marketing its technologies. ND Tech Transfer gathers marketing leads from various sources, including outside companies that approach the University and the inventors themselves, which are pursued by ND Tech Transfer.[110] To publicize its technologies, ND Tech Transfer also works with some venture capital firms and Notre Dame's Gigot Center for Entrepreneurial Studies.[111] In addition, the ND Tech Transfer web site includes a list of available technologies.[112]

E. Massachusetts Institute of Technology ("M.I.T.")

The M.I.T. Technology Licensing Office ("TLO") is a department of the university and reports to the Vice President of Research.[113] The TLO has a staff of about thirty, which includes technology licensing officers, associate technology licensing officers, technology licensing associates, financial operations staff, information systems staff, patent and office operations staff, and administrative assistants.[114] Most licensing officers have technical backgrounds and industry

(Feb. 11, 2003) [hereinafter Edwards Interview].

104. *See* University of Notre Dame, Office of Research, *at* http://www.nd.edu/~research/ (last visited Mar. 2, 2004).

105. University of Notre Dame, Office of Research, Frequently Asked Questions in Technology Transfer, *available at* http://www.nd.edu/~research/TechTransfer/TTfaq.html (last visited Mar. 2, 2004) [hereinafter TT FAQ].

106. University of Notre Dame, Office of Research, Inventors at Notre Dame, *at* http://www.nd.edu/~research/TechTransfer/inventors.html (last visited Mar. 2, 2004).

107. Edwards Interview, *supra* note 103.

108. *Id*.

109. *See* TT FAQ, *supra* note 105.

110. *Id*.

111. Edwards Interview, *supra* note 103.

112. University of Notre Dame, Office of Research, Available Technologies, *at* http://www.nd.edu/~research/TechTransfer/available.html (last visited Mar. 2, 2004) [hereinafter Notre Dame Available Technologies].

113. Massachusetts Institute of Technology, Technology Licensing Office, Questions Frequently Asked, *at* http://web.mit.edu/tlo/www/qfa.html (last visited Mar. 2, 2004) [hereinafter TLO QFA].

114. Massachusetts Institute of Technology, Technology Licensing Office, The Staff of the Technology Licensing Office, *at* http://web.mit.edu/tlo/www/tlostaff.html (last updated Jan. 31, 2003).

experience.[115] Individual licensing officers manage individual technologies from beginning to end, starting with evaluation and ending with monitoring licensee performance.[116] The TLO uses outside patent counsel.[117]

In fiscal year 2002, the TLO received 484 invention disclosures, filed for 245 patents, was issued 126 new patents, granted 125 licenses (including 13 trademark licenses), granted 41 software end-user licenses, started 24 new companies, and generated $33.52 million in revenue.[118] After payment of any patenting costs and deduction of a 15% administration fee for the TLO, licensing revenues are distributed evenly among the inventor, the inventor's academic department, and the university's general fund.[119]

The TLO does not publish a list of available technologies. Instead, it uses "rifle-shot" marketing, matching specific technologies with the needs and interests of companies or investors.[120] The TLO focuses a great deal of attention on the diligence of licensees in bringing products and services to market, generally insisting on measurable milestones in the licensing agreement.[121]

F. University of Cambridge

University technology transfer is not unique to the United States. For example, the University of Cambridge in England has a well-established Technology Transfer Office ("TTO").[122] Cambridge University Technical Services, Ltd. ("CUTS") was formed to hold patents on behalf of the University, to receive royalties from licensing agreements, and to hold equity in start-ups.[123] CUTS, which has no employees and is administered by the TTO, passes along all of its profits to the University.[124]

The TTO has sixteen employees.[125] It receives more than 100 invention disclosures[126] and is involved in the formation of about five companies each year.[127] The TTO generates approximately $5.6 million yearly, which includes $2.4 million from licensing its technologies and $2.1 million from managed

115. TLO QFA, *supra* note 113.

116. *Id*.

117. *Id.*

118. Massachusetts Institute of Technology, Licensing Office, TLO Statistics for Fiscal Year 2002, *at* http://web.mit.edu/tlo/www/fy02.html (last visited Mar. 2, 2004).

119. Pressman, *supra* note 55.

120. *See* TLO QFA, *supra* note 113.

121. *Id*.

122. *See* University of Cambridge, Technology Transfer Office, Frequently Asked Questions, *at* http://www.rsd.cam.ac.uk/tto/faq/ (last visited Mar. 2, 2004).

123. *Id.*

124. *Id*.

125. E-mail Interview with Becky Finnimore, Case Administrator, University of Cambridge, Technology Transfer Office (Mar. 5, 2003) [hereinafter Finnimore Interview].

126. University of Cambridge, Technology Transfer Office, Licensing Opportunities, *at* http://www.rsd.cam.ac.uk/tto/licensing/opportunities/ (last visited Mar. 2, 2004).

127. University of Cambridge, Technology Transfer Office, Spin-Out Companies, *at* http://www.rsd.cam.ac.uk/tto/ventures/ (last visited Mar. 2, 2004).

consulting services that it provides to academic staff members who wish to consult for external organizations.[128] The TTO advises these staff members on issues such as costing and pricing, negotiating terms with the client company, drafting legal agreements, and invoicing.[129] The TTO also holds equity in about forty start-up companies based on University technology.[130]

For marketing purposes, the TTO cultivates relationships with local, national, and international businesses, and uses these relationships when appropriate in the search for licensees.[131] Often, the researchers have relationships with potential licensees that are exploited.[132] In addition, the TTO sometimes performs research in order to identify potential licensees and mails them a non-confidential description of the technology, which may be followed up by a phone call in order to determine interest.[133]

IV. COMMERCIALIZATION MISSTEPS

Not everything has gone smoothly for all universities that have thrown their hats into the commercialization ring. Numerous cautionary tales illustrate the need for universities to proceed cautiously and prudently with regard to technology transfer activities.

The University of Florida was not prepared to take full advantage of technology transfer when a University researcher invented Gatorade in 1965.[134] At the time, the University did not have a formal policy in place regarding the ownership of faculty inventions and, initially, had no interest in marketing the new drink.[135] After the inventors independently reached an agreement with Stokley-Van Kamp to produce and sell Gatorade, the school decided that it did, indeed, want to be involved with Gatorade.[136] By this time, in order to receive any of the licensing revenue from Gatorade, the University was forced to go to court and was only granted a 20% share of the profits.[137] Although the University reportedly receives in the neighborhood of $4.5 million each year from Gatorade, it is easy to conclude that it would be receiving substantially more than that if it had formal revenue sharing agreements in place with its researchers at the time of the invention.[138] The University's current revenue sharing agreement with its researchers gives ownership of all inventions and innovations developed by school employees using its resources to the school and calls for the University to receive up to 70% of any

128. Finnimore Interview, *supra* note 125.
129. *Id*.
130. *Id*.
131. *Id.*
132. *Id.*
133. *Id*.
134. *See* Villano, *supra* note 29.
135. *Id.*
136. *Id*.
137. *Id.*
138. *See id*.

licensing revenue.[139]

The University of Arizona learned the hard way that there are risks involved in technology transfer. In 1993, a licensee of the University's technology transfer program brought a fraud lawsuit against the University, alleging that University researchers had violated a contract in which they agreed to consult exclusively with the company, and sought $70 million in damages.[140] The case was settled for a reported $4.4 million, a significant sum of money especially when one considers that the University's technology transfer program only brought in about $180,000 a year at the time.[141]

The University of California at Berkeley ("Berkeley") was criticized for the public-relations aspect of a sponsored research and technology transfer agreement entered into with a Swiss company in 1998.[142] The deal called for Novartis to give $25 million to Berkeley's Department of Plant and Microbial Biology in exchange for first rights to negotiate licenses on roughly one-third of the department's discoveries, as well as two of the five seats on the department's research committee.[143] This arrangement led to widespread protest and dissent within the Berkeley community by those who felt that the agreement gave Novartis too much control over Berkeley research and its results.[144] Berkeley faced protests from both faculty and students, as well as outside groups.[145] Petitions against the deal were circulated, a five-part series in the student newspaper decried the deal and the growing privatization of Berkeley in general, and a group of students protested at graduation by wearing the Novartis logo on their caps.[146]

Boston University fell victim to too much optimism and poor investment controls when it took a large equity position in a University start-up. During the 1980s and early 1990s, the University invested $85 million, nearly one-fifth of its endowment, in one company, Seragen, a biotech firm founded by several Boston University professors that focused on cancer research.[147] Seragen eventually failed and was sold, leaving the University with a net loss of almost $60 million.[148] It was later discovered that the University's president, as well as a number of the University's trustees, had personally invested millions of dollars in Seragen.[149]

Despite the many possible pitfalls and hurdles, most universities continue to move forward in their pursuit of technology transfer success. Some universities may proceed conservatively. These cautionary tales, however, have intimidated few, if any, universities away from technology transfer—and rightfully so.

139. *Id*.
140. Slind-Flor, *supra* note 29.
141. *Id*.
142. Press & Washburn, *supra* note 3, at part 1.
143. *Id.*
144. *Id*. at part 3.
145. *Id*.
146. *Id.*
147. *Id*.
148. The Student Underground, *BU: Not So Well Endowed*, *available at* http://thestudentunderground.org/print.php3?ArticleID=174 (last visited Mar. 2, 2004).
149. *Id*.

V. SUGGESTED GUIDELINES FOR COMMERCIALIZATION

University commercialization presents vast opportunities, but also daunting challenges. The reality is that all too many universities do not generate sufficient return from technology transfer, and many others are struggling to establish effective commercialization programs. The expectations for a return are very high at the same time these institutions are budget-constrained to invest in these programs. Technology transfer is a complex landscape that requires expertise in a wide variety of disciplines. While much guidance is available, it is also undoubtedly true that given the vast environmental differences among universities, there is no one optimal structure for programs of this type. Nonetheless, each program should do no less than carefully analyze and focus on the following nine fundamentals: (1) institutional mission alignment, (2) program structure and resources, (3) funding sources, (4) asset protection and defense, (5) missionary work, (6) asset evaluation and valuation, (7) marketing and distribution channels, (8) documentation, and (9) the re-evaluation process, each as discussed in greater detail below.

1. Institutional Mission Alignment

A university's technology transfer program should not, and does not have to, conflict with the mission of the university. In fact, a properly developed commercialization program will only enhance a university's ability to achieve its mission by increasing financial resources and educational opportunities. A concerted effort should be made to ensure that a conflict with mission does not arise, both during the establishment of a technology transfer program and throughout its life. The participation of stakeholders from throughout the university community in a technology transfer program and the establishment of a conflict-of-interest policy are two important alignment considerations.

It should be kept in mind that it is likely not all members of a university community will be supportive of a university's technology transfer program. University technology transfer has its critics.[150] Thus, in order to integrate any such opposition in a positive manner, it is advisable to construct programs with appropriate representation from various sectors of the university community and to establish consistent, productive lines of communication.

Further, the development of a well-structured and comprehensive conflict-of-interest policy is key to a successful technology transfer program. The policy should encourage commercialization of inventions and innovations, while simultaneously guard against potential abuses and improprieties, whether real or perceived. Moreover, the university's mission statement should be kept in mind during the creation of a conflict-of-interest policy, as well as throughout the life of the program, to ensure that the operation of the technology transfer program remains consistent with the mission of the university.

150. *See supra* Part II.

2. Program Structure and Resources

As evidenced by the case studies,[151] a university technology transfer program can take many different forms. For example, although a university's leadership may be supportive of a technology transfer program in concept, they may not be enthusiastic about a large initial capital outlay necessary to establish an in-house program. In this instance, many of the essential technology transfer functions, such as patenting, licensing, and marketing, can be outsourced to qualified third parties. Alternatively, if maintaining strict control of the program is critical, in-house professionals may be hired if necessary funding is available. Other relevant factors that may be considered when determining the structure for a university's technology transfer program include the size of the school, the type and nature of research conducted at the university, and the number of inventions disclosed annually.

When a university technology transfer program is in its earliest stages, it may be wise to start a small in-house program and outsource many of its functions.[152] As the program matures, an in-house team of professionals and staff can be added. This strategy allows the university to avoid the large initial capital outlay required to set-up a fully functioning in-house technology transfer program. Additionally, this strategy will allow the university to avoid mistakes in the initial structuring of the program and to access the expertise of those with experience. Needs should be accurately identified and addressed slowly and methodically.

3. Funding Sources; Projections

There are many ways to fund a university technology transfer program. Usually, the university provides some level of initial funding—cash or in-kind services. If a university, however, cannot, or will not, budget for an adequate commitment, there are other options. For instance, individuals and private foundations sometimes fund technology transfer programs, such as in the case of the University of Wisconsin's Alumni Research Foundation.[153] Also, corporations may be willing to fund technology transfer operations at a university in exchange for rights or preferences in the technology that comes through the technology transfer office.[154] Nonetheless, a long-term goal of any technology transfer program must be to become financially self-sufficient and, eventually, a source of sustained value for the university.

Financial planning for a technology transfer program is challenging. It is difficult to project a program's income because it is impossible to predict the

151. *See supra* Part III.

152. The work may be outsourced on a case-by-case basis, or as a whole.

153. *See supra* Part III.

154. *See, e.g.*, Press & Washburn, *supra* note 3, at pt. 1. Press and Washburn find:

> In exchange for the $25 million, Berkeley grants Novartis first right to negotiate licenses on roughly a third of the department's discoveries—including the results of research funded by state and federal sources as well as by Novartis. It also grants the company unprecedented representation—two of five seats—on the department's research committee, which determines how the money is spent.

quantity and quality of new technologies that will be developed by university researchers. It may also take many years before a promising technology begins to generate positive cash flow, or any cash flow at all. Nevertheless, just as in any speculative venture, the process of financial planning and projecting is essential. In essence, these technology transfer programs must have a business and financial plan at least as rigorous as such programs require of third parties that commercialize the university's technologies.

4. Identifying, Protecting, and Defending Assets

Without assets (in this case most likely intellectual property), there is no technology transfer program. The fundamentals of identifying, protecting, and defending intellectual property rights are, however, often not initially concentrated on by researchers. At a minimum, it is therefore imperative that university researchers be educated in the basics of intellectual property law so that the university does not unwittingly lose "control" of the inventions or innovations. It should be incumbent upon technology transfer offices to ensure that researchers are apprised of these matters.

Additionally, a comprehensive intellectual property policy should be developed that clearly articulates ownership and control issues, as well as obligations of both the university and the researchers, including graduate students and research assistants. Some of the important topics that should be addressed in an intellectual property policy include: scope, ownership of inventions and innovations, income sharing formulae, disclosure mechanisms, obligations of inventors, and publication policies.

It is also important that a process, through which researchers disclose inventions and innovations, be developed. Generally, universities should create an invention disclosure form and mandate that researchers complete such a form for every invention or innovation they develop. An invention disclosure form should require identification of the research funding source, detailed description of the invention or innovation, names of potential licensees in the field, disclosures of the invention or innovation made to other persons or entities, and proposed dates of publication or presentations about the invention or innovation.

Technology transfer programs will also need to take the necessary steps to secure protection of assets by contract and by securing appropriate copyright, patent, trademark, and other legal protections.[155] Outside legal counsel or dedicated in-house counsel with appropriate expertise must be consulted and utilized. Moreover, no program is complete without a strategy to identify and deal with third-party infringement and to enforce these hard-earned rights.

5. Missionary Work

Identification and protection are essential, but marketing and distribution are

155. For a detailed resource on securing intellectual property protection, see ROBERT C. DORR & CHRISTOPHER H. MUNCH, PROTECTING TRADE SECRETS, PATENTS, COPYRIGHTS, AND TRADEMARKS (3d. ed. Aspen Publishers 2000).

synonymous with "commercialization." University researchers need to be made aware of the existence and role of the technology "transfer" program. They need to have a sense of the value of the technology transfer program to themselves, their research, the university, and the community. Thus, another essential mission of technology transfer officials must be to focus on internal marketing. Effective internal marketing educates and communicates the program's value to university administration, alumni, boards of trustees, and any other stakeholders whose support is needed to nurture or grow a program. Public universities should also be sure to take taxpayers, another important group of stakeholders, into account. The more support the program has within the university community, and among any other stakeholders, the better. Internal marketing should also educate stakeholders on the benefits and risks inherent to the commercialization process. As with all commercial ventures, there will be both gains and losses. Methods of internal marketing may include informational meetings, publication of inventor's handbooks, mailings, and a technology transfer web site. These activities should not only focus on the financial benefits of technology transfer, but also on the educational benefits and the benefits to our society as a whole.

6. Evaluation and Valuation of Assets

One of the more difficult aspects of university technology transfer is the assessment and prioritization of the inventions and innovations. Technology transfer offices must weigh answers to important questions as: What assets hold a reasonable chance to be marketable and under what terms? Which inventions should the technology transfer program spend its valuable time and resources developing and marketing? This process will greatly depend on the structure of the technology transfer program. Some programs are set up with this evaluation function in mind, being staffed by licensing professionals with knowledge and experience in particular technology fields.[156] Technology transfer programs may also have advisors that include academics and individuals from private industry to evaluate the commercial potential of particular disclosures. The use of outside consultants with expertise in the field is not uncommon. If a particular invention or innovation is deemed to have commercial potential, it is sound to focus on marketing and distribution strategies.

7. Marketing and Distribution Channels

There are numerous possible ways to derive market value from inventions and innovations, including through direct licensing, ventures, alliances, start-ups, and donation. Finding the right choice or choices (since few formats are mutually exclusive) is no small task. Researchers are often good resources for information on potential partners in their particular areas of expertise. A university's technology transfer office should also develop a network of contacts both in private industry and in the venture capital community. AUTM is a resource for both marketing information and contacts. Some university technology transfer

156. *See*, *e.g.*, Wiesendanger, *supra* note 32.

programs also display their inventions and innovations at technology trade shows.[157] Others, such as the University of Illinois, hold their own showcases of university technology.[158] Most university technology transfer programs include a list of available technologies on their web site.[159] These are just a few of the many marketing options available. Regardless of which method is chosen, a technology transfer program's marketing plan should be aggressive if it is to succeed in the commercialization arena.

Another consideration is the different types of partners with whom a university technology transfer program may choose to work. Some of these partner types include: licensees, capital sources, investors, joint venture partners, consultants, and counsel. When choosing potential partners, it is important to carefully evaluate their skills and experience in the relevant field or discipline.[160] For example, one significant evaluation measure is a potential licensee's or joint venture partner's ability to help maximize the commercial potential of the technology. An acceptable candidate should have proven skills in commercializing products or services in the relevant field, as well as a realistic plan for developing and marketing the product or service. Other important attributes to look for include contacts in the field, financial stability, and an established distribution system. It is advisable to consult with other university technology transfer programs that may have dealt with a potential partner in the past.[161]

Another aspect of the evaluation process is determining the optimal path to market. This determination often leads to a licensing of the technology. In some instances, however, it is advisable to start a new company to develop and market the technology. Factors to be considered in determining whether a start-up is the proper path to commercialization include whether the product or service is ready for commercialization or must be developed further, the willingness and ability of the inventor(s) to work on the marketing and development of the product or service, and the availability of additional mangers and the necessary funding.

When evaluating capital partners and other potential investors, it is important to be both practical and prudent. It can be difficult to attract investment dollars. It is necessary, therefore, to have a realistic outlook regarding potential investors and what to expect. Regardless of the difficulty, it is important to carefully assess the skills and attributes of all potential investors. Characteristics to evaluate include the types of projects in which they have invested in the past, their experience in the relevant field, experience in the management of start-ups, contacts, reputation, and

157. *See., e.g.*, Bringing Your Invention to WARF, *supra* note 66.

158. *See* Nair, *supra* note 98.

159. *See, e.g.*, Bringing Your Invention to WARF, *supra* note 66; Stanford Technology Brainstorm, *supra* note 87; Illinois Available Technologies, *supra* note 101; Notre Dame Available Technologies, *supra* note 112.

160. *See* PAUL J. KOLLMER & PHILLIP L. SPECTOR, COMMUNICATIONS AND TECHNOLOGY ALLIANCES: BUSINESS AND LEGAL ISSUES (1996) (detailed resource on joint ventures and other business alliances). *See* JAY DRATLER, JR., LICENSING OF INTELLECTUAL PROPERTY (2002) (detailed resource on intellectual property licensing).

161. This is true for all types of potential partners.

experience working with universities. Contractual terms offered by the investor must also be carefully evaluated.[162] It is wise to interview multiple candidates for roles to find the professionals best suited for the desired purpose.

8. Documenting Transactions

No part of our commercial marketplace works without documenting understandings and expectations. Experience, knowledge, diligence, and careful planning are especially important. Proper terms and conditions can make the difference between success and failure.

It is a good idea for a technology transfer office to develop a library of basic form contracts for different situations. This library could include exclusive and non-exclusive licensing agreements of various types (i.e., patent license, software license, etc.), sponsored research contracts, joint venture contracts, and non-disclosure agreements. These basic contracts will serve as starting points in various circumstances.

It is also important to have an understanding of industry standard terms and conditions. Moreover, some terms that may be standard in private industry may not be acceptable or standard (or even, possibly, legally permissible) when a university is involved. For instance, the Stanford OTL will not enter into agreements that require the university to keep all information about the license confidential, that require the university to guarantee that the invention does not infringe any patents, or that demand first rights to future inventions in the same field for a partner.[163]

9. Consistent, Critical and Continuous Re-evaluation

University technology transfer programs are often very focused on getting inventions or innovations to market. Such a "launch" of a technology does not end the process for a technology transfer office. Continued monitoring and evaluation of both products and partners are necessary to ensure that the commercial potential of an invention or innovation is maximized. Moreover, university personnel can make program assessments and necessary adjustments. In general, a technology transfer office should conduct regular audits of its partners' activities and its own internal processes.

VI. CONSIDERATIONS FOR PRACTITIONERS

Legal practitioners involved with university commercialization will experience a range of demanding issues, from structuring contractual arrangements to intellectual property protection, and from matters concerning taxation to legal liability. Distinctly and pointedly, these issues will be experienced from the prospective of a tax-exempt entity, and possibly as a governmental entity (in the

162. *See* J. ROBERT BROWN, JR., RAISING CAPITAL: PRIVATE PLACEMENT FORMS & TECHNIQUES (2002) (detailed resource on finding and working with investors).

163. Wiesendanger, *supra* note 32.

case of public universities). What follows is an introduction to three of the more prominent demands.

A. Taxation

1. Licensing Activities

Even as universities benefit from their exemption from federal income taxation for their commercialization activities under section 501[164] of the Internal Revenue Code ("IRC"), some have argued that commercialization activities should be subject to taxation as unrelated business taxable income[165] under IRC section 511.[166] While IRC section 512 explicitly excludes "royalties"[167] earned by universities from taxation, the underlying rationale for exemption under IRC section 501 is tied to their organization and operation "exclusively for . . . scientific . . . or educational purposes."[168] To the extent that a university engages in any trade or business that is not "substantially related to the exercise or performance by such organization of its charitable, educational or other purpose or function constituting the basis for its exemption under section 501,"[169] monies earned from such trade or business are deemed subject to taxation under the unrelated business income tax ("UBIT").[170]

In a revenue ruling concerning privately-sponsored research for a tax exempt scientific institution, the Internal Revenue Service ("IRS") ruled that, to be excluded from UBIT treatment, research must be conducted for the public benefit.[171] This is achieved by such an organization if:

> (a) the results of such research (including any patents, copyrights, processes, or formulae resulting therefrom) are made available to the public on a nondiscriminatory basis; (b) such research is performed for the United States, or any of its agencies or instrumentalities, or for a State or political subdivision thereof; or (c) such research is directed toward benefiting the public.[172]

The IRS concluded that substantial delays in the release of research results (beyond the time necessary for filing for patent or copyright protection) interfere with the public purpose of such research and thus would mandate treatment as UBIT.[173] Conversely, if publication is "adequate and timely,"[174] then the public interest

164. 26 U.S.C.A. § 501(c)(3) (2002).
165. *See, e.g.*, Blumberg, *supra* note 34, at 120–38.
166. 26 U.S.C.A. § 511 (2002).
167. *Id*. § 512(b)(2).
168. *Id*. § 501(c)(3).
169. *Id*. § 513.
170. *Id*. §§ 511, 512.
171. Rev. Rul. 76-296, 1976-2 C.B. 141.
172. *Id*.
173. *Id.*
174. *Id*.

would be served and the scientific institution would not be subject to UBIT. Consequently, some have argued that, to the extent commercialization activities conflict with the primary purposes of a university (i.e., its scientific and educational mission), such activities should be subject to UBIT treatment. [175]

Therefore, a practitioner should bear in mind that restrictions on university personnel and research stemming from commercialization activities may be seen as conflicting with the university's publicly subsidized purposes. As a result, practitioners should be cognizant of the following in their commercialization activities: (1) restrictions or limitations on the publication of research and data beyond the time necessary to obtain a patent or other intellectual property protection (arguably, trade secret protection's underlying confidentiality substantially conflicts with a university's primary mission); (2) restrictions on what persons or entities may benefit from the research (i.e., whether commercialization is exclusive or nonexclusive); and (3) reductions in the teaching requirements for personnel engaged in commercialization activities (as education is one of the primary missions of a university). Finally, practitioners should also be aware of potential conflicts of interest that may compromise the university's overall goal of contributing to the public good.

2. Other Commercialization Activities

Other types of commercialization activities, such as supporting and capitalizing start-ups formed by university personnel, may have other implications for practitioners to consider. Under a university's tax exemption, "no part of the net earnings [may inure] to the benefit of any private shareholder or individual."[176] This so-called rule against "private inurement" is to ensure that the public subsidy granted to universities does not benefit private individuals. The IRS addressed the factors that must be analyzed in determining whether compensation to an employee of a tax exempt organization violates the private inurement rule in a revenue ruling.[177] Specifically, three issues must be addressed: (1) whether the compensation is consistent with the university's tax exempt purpose; (2) whether the compensation is the result of arm's length bargaining; and (3) whether the compensation is reasonable.[178]

As practitioners wrestle with the complexities of modern commercialization activities, such as dealing with university personnel forming outside companies, universities licensing university-owned technology to university personnel, and university personnel being employed by outside entities, practitioners should be aware of the rule against private inurement and carefully evaluate university practices to ensure that outside parties would not question the benefit accruing to university personnel.

175. *See, e.g.*, Blumberg, *supra* note 34, at 120–38.
176. 26 U.S.C.A. § 501(c)(3) (2002).
177. Rev. Rul. 69-383, 1969-2 C.B. 113.
178. *Id*.

B. Creating and Protecting a Patent Portfolio

1. Patentability

After a university commercialization office receives an invention disclosure,[179] assistance from in-house or outside patent counsel is often sought to help determine whether a particular disclosure merits patent protection. In addition to determining whether the statutory requirements of usefulness, novelty, and non-obviousness have been met,[180] this patentability assessment may include searches of the state of existing art and patents in the field to help determine the strength of possible claims for a patent application. This search also may help assess the ability for third parties to engineer around the possible claims of an invention and may assist in determining the difficulty in detecting infringement and withstanding litigation.[181]

Of particular concern to practitioners is the United States statutory patent requirement that an invention not be "described in a printed publication . . . more than one year prior to the date of the application."[182] Further, most foreign patent regimes do not allow any publication of an invention prior to the filing of a patent application without jeopardizing patent protection.[183] Nonetheless, not only are the institutional biases of universities keyed toward early sharing and publication of findings amongst university personnel, but also governmental incentives, such as universities' tax exempt status, are designed to encourage, if not require, early disclosure to the public of research findings.[184] Thus, university commercialization operations often find themselves in the unenviable position of needing to file patent applications much earlier than their private industry counterparts.[185] This has the unfortunate consequence of limiting the amount of well-developed information that may be included in the patent application or made available to the patent attorney. In this circumstance, patent counsel is often left to formulate patent claims and commercial strategy with little additional guidance from university commercialization offices.[186] Practitioners should bear in mind that while patentability is a necessary part of commercialization efforts, patentability alone does not guarantee actual commercial use of the invention; thus, practitioners should help mediate between those developing commercialization strategies for inventions and those filing patent applications.

179. *See supra* Part V, sec. 4.

180. 35 U.S.C.A. §§ 101–103 (2001 & West Supp. 2003).

181. *See* Louis P. Berneman & Dr. Kathleen A. Denis, *University Licensing Trends and Intellectual Capital*, 718 PATENTS, COPYRIGHTS, TRADEMARKS, AND LITERARY PROPERTY COURSE HANDBOOK SERIES 551, 562 (2002).

182. 35 U.S.C.A. § 102(b) (2001).

183. *See, e.g.*, European Patent Office, Convention on the Grant of European Patents, Oct. 5, 1973, art. 54(2), *available at* http://www.european-patent-office.org/legal/e/ma1.html#CVN (last visited Apr. 4, 2004).

184. *See* Berneman & Denis, *supra* note 181, at 565.

185. *Id.*

186. *Id*.

2. Commercial Viability

"According to a common rule of thumb, for every 100 inventions or discoveries, only 10 are patented and just one marketed."[187] Further, of those technologies actually marketed, very few bear a high rate of return.[188] While patentability of inventions may be seen as one measure of success for university commercialization,[189] the high cost of attorneys' fees for filing patent applications and responding to office actions,[190] in addition to patent office filing fees and maintenance expenses, may make the "hit or miss" approach to commercialization inordinately expensive. Instead, some commentators have suggested that universities, in addition to evaluating the patentability of invention disclosures, also evaluate the technical merit and commercial potential of inventions.[191]

The two-pronged approach of researching technical merit and commercial potential of inventions requires the active assistance of the inventor under the guidance of an experienced technology manager and university commercialization office. The inventor is often in the best position to describe the technical merit of the invention, such as its relationship to existing art in the field. Inventors may also assist the technology manager in determining factors such as time to market, key milestones and hurdles to commercialization, and the extent of existing competition. This information aids technology managers and other advisors to effectively evaluate the commercial potential of inventions. Commercial potential is measured in how an invention may be used to define a particular product or service, in its range of possible customers and end users, and its attractiveness to potential partners in private industry. Patentability remains a valuable evaluation tool in the commercialization process. By evaluating technical merit and commercial potential, however, universities may be able to avoid the "scattershot" approach to technology commercialization and concentrate limited resources on those inventions with the best chance of success in the marketplace.

3. Terms of Technology Transfer

Technology transfer is primarily about the transfer of rights in an invention (or patent) from one party, here a university, to another party. Technology transfer may take many forms, including an assignment, license or joint venture.[192] Commonly, universities use a form of license agreement to transfer rights in an invention to a third party; such a license would include terms concerning: (1) scope (i.e., the restrictions on use by the third party, the territories covered by the license,

187. Villano, *supra* note 29.

188. Only 22.4% of the 26,086 active license agreements in fiscal year 2002 had product sales associated with them. 2002 AUTM SURVEY, *supra* note 5, at 1.

189. *See* Berneman & Denis, *supra* note 181, at 565 (noting that universities on average filed patent applications for thirty-five percent of all technology disclosures for the period of 1991 through 2000).

190. Legal fee expenditures for fiscal year 2002 totaled $194.8 million. 2002 AUTM SURVEY, *supra* note 5, at 8.

191. *See, e.g.*, Berneman & Denis, *supra* note 181, at 562–63.

192. *See* Himmelrich & Holda, *supra* note 1, at 32.

and rights to improvements); (2) monetary terms, including flat fees or a formula for calculating ongoing royalties (i.e., whether a licensee would pay a one-time fee or other structured payment or would instead pay the university a portion of revenues received); (3) allocations of risk (i.e., obligations for either party to protect the other from charges of infringement or the obligation to obtain insurance); and (4) rights to enforce patents (i.e., whether the university would retain the right to sue for patent infringement).[193]

In the context of university technology commercialization, practitioners should bear in mind that under the Bayh-Dole Act and a university's mission on behalf of the public, licensees of university technologies should have the obligation to diligently commercialize those technologies. This may be accomplished by contractually obligating licensees to meet specific milestones (i.e., production dates of new products or sales levels for products)[194] or generally to require licensees to exercise their "best efforts" in marketing of university technology.[195]

C. Defending Against Claims of Patent Infringement

1. Sovereign Immunity

In 1999, the Supreme Court held that states, and thereby their instrumentalities, could not be subject to lawsuit in federal court for violations of federal intellectual property statutes as they had not, pursuant to the Eleventh Amendment to the Constitution, waived sovereign immunity.[196] Thus, public universities are not at this time subject to lawsuit for patent infringement in federal court under the Federal Patent Act.[197] Therefore, practitioners for public universities may at present defend a claim of patent infringement under the doctrine of sovereign immunity.

Congress may address the balance between state universities receiving the benefits of federal patent and other intellectual property laws (i.e., that state universities are able to enforce patent infringement claims against others) and the exemption of universities from liability under such laws. At present, several bills are pending in the 108th Congress addressing this matter.[198] If a bill passes

193. *See* Berneman & Denis, *supra* note 181, at 567. For a thorough discussion of technology transfer agreements, see Himmelrich & Holda, *supra* note 1.

194. *See* Berneman & Denis, *supra* note 181, at 567–68.

195. *See* Himmelrich & Holda, *supra* note 1, at 32.

196. Fla. Prepaid Postsecondary Ed. Expense Bd. v. Coll. Savings Bank, 527 U.S. 627 (1999); Coll. Savings Bank v. Fla. Prepaid Postsecondary Ed. Expense Bd., 527 U.S. 666 (1999).

197. As the Supreme Court noted, this does not mean that a person alleging that a public university has infringed his intellectual property has no remedy. Rather the remedy for such alleged action must be found under state law and in compliance therewith. *Fla. Prepaid*, 527 U.S. at 647–48. As an example, under Illinois law, the Board of Trustees of the University of Illinois may be sued for a tort claim; however, any such claim must be made in compliance with Illinois law, requiring, for example, that such a claim be brought in the Illinois Court of Claims. *See* 100 ILL. COMP. STAT. 305/1 (2002).

198. *See, e.g.*, Intellectual Property Protection Restoration Act of 2003, H.R. 2344, 108th Cong. (2003) (currently in committee). Under this bill, states would have to waive sovereign

restoring the waiver of sovereign immunity, then practitioners for public universities must again be aware that they may be sued for federal patent infringement.

2. *Madey v. Duke University*

Private universities, unlike public universities, cannot utilize the doctrine of sovereign immunity to defend against claims of federal patent infringement. Moreover, should Congress pass a bill abrogating sovereign immunity for public universities, then they too will be subject to suit for patent infringement. Thus, practitioners for both private and public institutions should be aware of the federal circuit case *Madey v. Duke University*.[199] In *Madey*, the Federal Circuit held that the "experimental use" exception from patent infringement is extremely narrow. Neither the non-profit status of an alleged infringer nor whether an alleged infringer was engaged in an endeavor for commercial gain is determinative.[200] The "experimental use" exception cannot be used if the act of infringement was part of the alleged infringer's legitimate business and not solely for "amusement, to satisfy idle curiosity, or for strictly philosophical inquiry."[201] The Federal Circuit further explained that for research universities, research without commercial application would nonetheless fall within the definition of its "legitimate business" activities.[202]

Therefore, under *Madey*, most activities undertaken by university researchers are not protected by the "experimental use" exception from patent infringement. As a result, practitioners should be proactive in ensuring that issues of possible patent infringement and licensing of necessary technology from third parties be undertaken expeditiously to ensure that the university's risk of exposure from liability for patent infringement is minimized. Furthermore, university personnel should be educated both in what constitutes patent infringement and that, according to *Madey*, not-for-profit educational institutions can be subject to patent infringement claims.

immunity from claims of patent infringement in order to receive the right to sue under the federal patent act. *Id*. Nonetheless, some have voiced concern that this bill requires a state, as a whole, to waive sovereign immunity (covering, for example, state hospitals, in addition to universities) which may cause states to refuse to waive sovereign immunity; if that occurs, then state universities, under this bill, would not be able to benefit from the Federal Patent Act, essentially undoing the results of the Bayh-Dole Act discussed *supra* notes 24 and 30 and accompanying text. Testimony of Leslie J. Winner, Vice President and General Counsel of the University of North Carolina, The Intellectual Property Protection Restoration Act of 2003: Hearing on H.R. 2344 Before the Subcommittee on Courts, the Internet and Intellectual Property of the House Committee on the Judiciary, 108th Cong., *available at* http:www.house.gov/judiciary/winner 61703.htm (last visited Apr. 4, 2003).

199. 307 F.3d 1351 (Fed. Cir. 2002), *cert. denied*, 535 U.S. ___, 123 S. Ct. 2639 (2003).

200. *Id*. at 1362.

201. *Id*.

202. *Id.*

3. Patent Insurance

Because of the high cost of patent litigation (the median cost of litigating a patent case through trial is about $2,000,000 per side), let alone the amount of damages that may actually be awarded for infringement, some may consider so-called patent infringement liability insurance.[203] This type of insurance is a form of professional liability insurance that covers defense of claims of patent infringement, and may include protection for profits and royalties that are awarded in a damage claim. Patent infringement insurance often has premiums of between 2% and 5% of the insured amount (i.e., between $20,000 and $50,000 per $1,000,000 of coverage), though this varies depending upon the areas of technology in which the insured practices (the most likely to draw higher premiums are in the areas of telecommunications and biotechnology).[204]

Insurance also exists to help fund enforcement costs for patent infringement (when a third party infringes one of the university's patents). This type of "offensive" patent infringement insurance typically has premiums of less than 3% of the insured amount.[205]

Generally, patent insurance (either offensive or defensive) makes little sense for large organizations with the financial wherewithal to self-insure. As one considers whether to obtain such insurance, however, practitioners should consider the value of the university's patent portfolio, the likelihood that others are infringing some of those patents, the likelihood that the university is infringing another's patents, and the likelihood that litigation would be brought either by or against the university for patent infringement.

VII. CONCLUSION—THE FUTURE OF UNIVERSITY TECHNOLOGY TRANSFER

There is every reason to believe that university technology transfer will continue to grow in years to come. All of the players involved in university technology transfer in the United States, including the federal government, state and local governments, corporations, and the universities (including researchers), have many incentives to support such activities, and to continue to increase support.

The federal government will continue to support technology transfer, both through laws and with financial aid. University technology transfer has become an important component of the United States' fight to remain competitive in the global marketplace.[206] In addition, university technology transfer adds to the bottom line of the economy. From 1980–2002, at least 4,320 new companies were

203. Bruce Berman, *Patent Litigation Costs*, PATENT CAFÉ MAGAZINE, Sept. 2002, *available at* http://www.//cafezine.com/printable_template.asp?deptid=19&artcileid=627 (last visited Apr. 4, 2004).

204. *See* William M. Hulsey II, *Patent Insurance Can Guard Intellectual Capital*, AUSTIN BUS. J., June 1998, *available at* http://austin.bizjournals.com/austin/stories/1998/06/15/focus3.html (last visited Apr. 4, 2004).

205. *Id*.

206. *See supra* Part I.

formed based on university-developed technology.[207] In fiscal year 1999, university technology transfer activities contributed almost $40 billion to the economy and supported over 260,000 jobs in the United States.[208] In addition, about $5 billion in federal, state, and local tax revenue was generated by technology transfer activities.[209] Finally, the revenue that universities generate through their technology transfer activities supplements and invigorates government funding of university research.[210]

For the same reasons, state and local governments are motivated to support university technology transfer in their areas. These governments are interested in remaining competitive on a smaller scale. They will support activities, such as university technology transfer, that lead to business and job creation, as well as tax revenue and other economic growth in their areas. In addition, state governments will support university technology transfer because it can be an additional revenue stream for cash-strapped state universities and budgets.

Private industry, likewise, will continue to increase its support of university technology transfer. By working with universities, corporations are able to gain access to advanced research facilities and talent. As university research is already subsidized by the government, private industry may benefit from this research subsidy by supporting universities and their technology transfer programs; this is a major reason why the percentage of university research funding by corporations increased from 2.6% to 7.1% between 1970 and 1997.[211] Further, as private industry has increased its connection to universities, universities have likewise become more responsive to the needs of industry.[212]

Universities themselves have great incentives to grow and strengthen commercialization efforts. Clearly, the potential to generate significant revenues via technology transfer is a strong incentive for many universities. As Pennsylvania State University economist Irwin Feller pointed out, the fastest growing source of funding for university research is the universities themselves.[213] There may also be more direct educational benefits from university technology transfer: participation in such activities can be a means to lure top professors and graduate students to a university.[214] It is also a way to teach students about entrepreneurialism, and to demonstrate in a real world manner the social and commercial utility of university research.[215]

Nonetheless, there have been some missteps on the road to university

207. 2002 AUTM SURVEY, *supra* note 5, at 22.

208. AUTM, LICENSING SURVEY, FY 1999: A SURVEY SUMMARY OF TECHNOLOGY LICENSING (AND RELATED) PERFORMANCE FOR U.S. AND CANADIAN ACADEMIC AND NONPROFIT INSTITUTIONS, AND PATENT MANAGEMENT FIRMS, at 1, *available at* http://www.autm.net/surveys/99/survey99A.pdf.

209. *Id*.

210. *Id*.

211. Florida, *supra* note 38, at 365.

212. *See supra* Part I.

213. Florida, *supra* note 38, at 369.

214. *See* Pressman, *supra* note 55.

215. *Id.*

technology commercialization.[216] Further, some see an inherent conflict between the traditional role of the university as an educator and producer of research for the public good and the new role of commercialization of technology and partnership with private industry.[217] This tension between the traditional role of universities and their new roles may also yet be seen in how university commercialization efforts are treated for tax-exempt purposes and for questions of sovereign immunity and other exemptions from patent infringement.[218]

Notwithstanding missteps and other challenges, the success of university technology commercialization efforts to date, coupled with the alignment of so many forces in government, private industry, and universities themselves, leads one to conclude that university commercialization efforts are not transient. Instead, the challenge for each university is to structure the most beneficial commercialization program for its organization, balancing its needs and its mission of benefiting the public and its students with its technology commercialization efforts.

216. *See supra* Part IV.
217. *See supra* Part II.
218. *See supra* Part VI.