

REPORT HIGHLIGHTS
PERFORMANCE AUDIT

Subject

Technology transfer occurs when a university moves an invention from an academic research lab to industry for further development, production, and marketing. Arizona's universities have had a wide variety of technology transfer successes.

Our Conclusion

The universities can enhance technology transfer in a few areas. To increase the number of commercially viable inventions disclosed, the universities should increase interaction between licensing officers and inventors, and improve incentives that are offered to inventors. The universities should improve aspects of their marketing practices. They should also take steps to improve management of conflicts of interest.



2008

Technology Transfer

Technology transfer moves inventions from the university research lab to industry. Perhaps the most well-known technology transfer success was the development of Gatorade at the University of Florida. Researchers there formulated a carbohydrate-electrolyte drink to replenish the fluids that football players lost through sweat and exercise. Since 1973, Gatorade has brought more than \$80 million to the university.

Technology transfer process has four common stages—The first step in technology transfer is disclosure, or the official declaration that an inventor has created an invention. The next step is to evaluate the disclosure to determine if the invention is commercially viable. To protect the property, a university then obtains a patent. Once protected, the university works with industry to license the property and develop it into a commercial product. As part of the licensing agreement, the industry partner will typically pay royalties that are shared by the inventor, the inventor's university department, and the university.

Two organizational models—Arizona State University (ASU) and Northern Arizona University (NAU) use an external organization called Arizona Technology Enterprises (AzTE) to manage their technology transfer processes, although in April 2008, NAU and AzTE began reassessing their relationship, and NAU may use a different provider in the future.



AzTE was established in 2003 by the ASU Foundation, which is a nonprofit organization that supports ASU through fund-raising and other efforts. AzTE, a limited liability company, has staff who are responsible for working with university inventors and doing an initial evaluation of the technologies, and other staff who specialize in marketing technologies and developing industry relationships. As of April 2008, AzTE had 16 full-time employees, including 4 licensing officials. Compared to ASU's board-approved peer institutions, AzTE had twice as many licensing officials per \$10 million in research expenditures.¹

The University of Arizona (UA) manages its technology transfer process in-house through its Office of Technology Transfer (Office). The Office uses licensing officials who each manage technology from the lab to the market. As of April 2008, the Office had ten full-time employees, including the equivalent of four full-time licensing officials. UA had about one-third the number of licensing officials per \$10 million in research expenditures as UA's peer institutions.

¹ The Arizona Board of Regents has designated a list of peer institutions for each of the three universities. Each university's peers are comparable to the university based on mission, size, research emphasis, and/or other factors. NAU, like many of its peer universities, does not participate in the annual licensing survey used for comparing ASU and UA with their peers. Therefore, auditors did not compare NAU's technology transfer activity to its peers.

Universities can increase the number of commercially viable invention disclosures

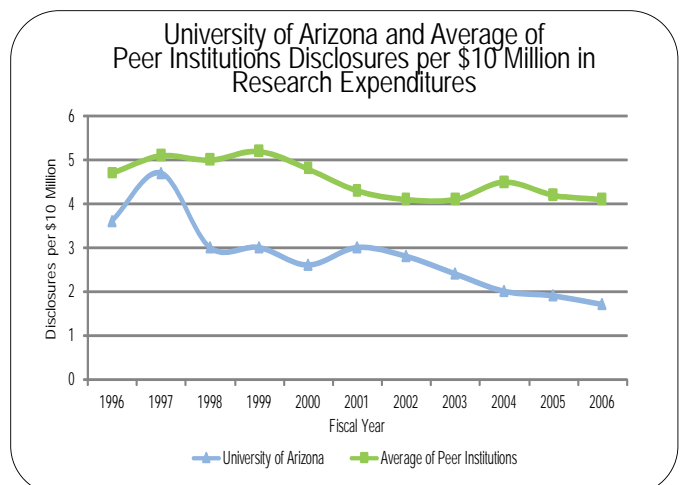
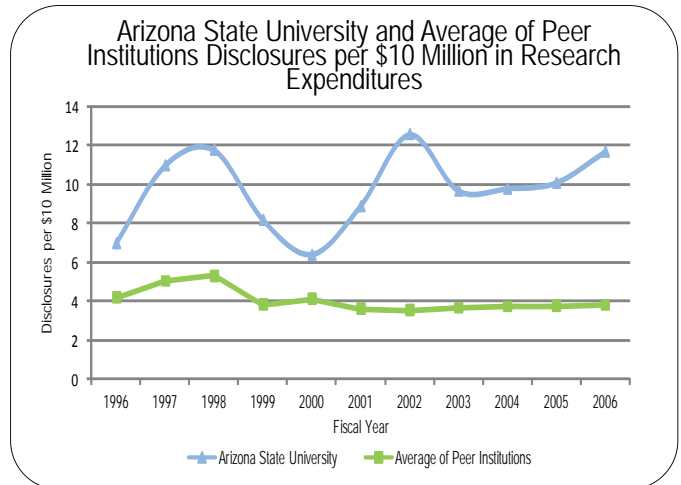
The success of a university's technology transfer program depends on the number of disclosures it can elicit from inventors. The common method of comparing institutions is by the number of disclosures per \$10 million in research expenditures, and for many universities, it is reported in an annual national licensing survey conducted by the Association of University Technology Managers (AUTM).

ASU—Receives more disclosures per \$10 million in research expenditures than its peers. From fiscal years 1996 to 2006, ASU's peer group averaged between 3.5 and 5.3 disclosures per \$10 million in research spending. In contrast, between those same fiscal years, ASU never fell below 6.4 disclosures, and in fiscal year 2006, it received 11.7 disclosures per \$10 million in research expenditures.

Although many factors influence invention disclosures, AzTE's frequent interactions with inventors positively impact program results. Both AzTE staff and ASU inventors reported frequent contacts between AzTE and inventors.

UA—Although UA was ranked among the top 15 public universities nationally in research expenditures in fiscal year 2006, its inventors disclose relatively few inventions. Between fiscal years 1996 and 2006, UA's research expenditures nearly doubled, but the number of disclosures submitted per \$10 million in research expenditures decreased from 3.6 to 1.7, a 53 percent decline. UA's peers averaged between 4.1 and 5.2 invention disclosures during those same fiscal years.

UA can increase the number of disclosures by increasing interactions with the UA inventors. According to a study, successful university technology transfer programs develop and maintain close connections with inventors conducting commercially viable research. This allows the programs to identify potentially viable inventions in their very early stages. Although licensing officials from UA's Office visit inventors in their labs, this usually occurs after inventions are disclosed. However, there is one research unit—UA's Bio5 Institute—which has a licensing official assigned to it. This official helps inventors identify the potential of an invention, encourages them to disclose inventions, and locates possible industry



partners. In fiscal year 2007, the Bio5 Institute had more disclosures than any other UA research unit.

Part of the Office's lack of interactions with inventors may be due to a lack of resources. As noted previously, the Office has comparatively fewer licensing officials than UA's peer institutions.

NAU—NAU spent \$21.2 million on research in 2006 and had the equivalent of 2.8 disclosures per \$10 million in expenditures. NAU, like many of its peers, does not participate in the annual national licensing survey and therefore could not be compared to other institutions. To further promote disclosure activity, NAU should work with its technology transfer provider to increase its presence on campus by having a licensing official scheduled to visit periodically throughout the year.

Improved incentives could increase disclosures—Inventor participation in technology transfer is directly related to the incentives they receive.

Royalties are the most common incentive offered, and all three universities share royalties with the inventors. However, the universities can increase their use of two other incentives:

- Offering credit toward promotion and tenure—According to a study, universities with model technology transfer programs commonly recognize technology transfer in promotion and tenure decisions. At Arizona's universities, some departments do, but many do not.
- Providing informal recognition—Publicizing inventors' accomplishments in the local media and conducting department- or university-wide award ceremonies

recognizing inventors can be effective incentives. Both ASU and UA provide some informal recognition, but all three universities can increase their efforts.

More faculty education could also increase disclosures—All three universities could better educate their faculty about technology transfer. Inventors from all three universities told us that it is primarily up to them to learn about the technology transfer process. By contrast, peer institutions indicated that they seek to educate faculty by hosting intellectual property workshops, attending department meetings and orientations, speaking with deans and department chairs, and publishing newsletters.

Recommendations

The universities should:

- Increase their use of incentives to encourage more faculty participation in technology transfers.
- Increase faculty education and exposure to technology transfer.

UA and NAU should:

- Increase the level of interaction between licensing officials and inventors.

UA should:

- Evaluate its Office's staffing levels.

Universities should improve aspects of marketing and negotiation

Technology transfer requires not only that inventions be disclosed, but that they are licensed and brought into production in the marketplace.

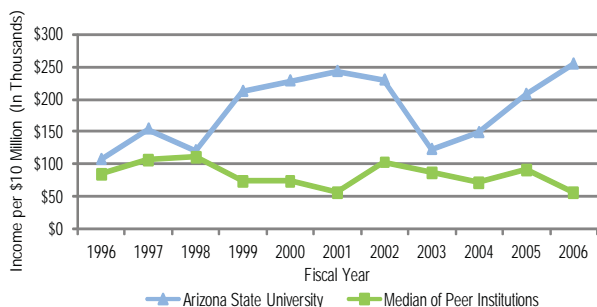
ASU's marketing program has been strong and is making progress—ASU's research expenditures have steadily increased while licensing activity has fluctuated in recent years. ASU outperformed its peers in licenses and options to license at a later time during most years between fiscal years 1996 and 2006. In addition, ASU's licensing income from these agreements is also above its peers.

AzTE's marketers are specialized and are aware of recommended practices. These practices include:

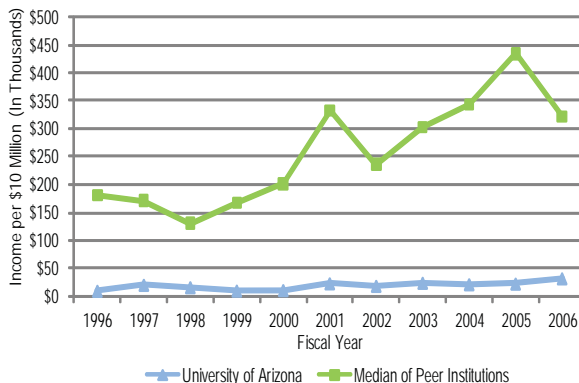
- Starting the marketing with a critical evaluation of the technology disclosed.
- Using market research to supplement firsthand knowledge.
- Making industry contacts a high priority.
- Using multimedia advertising.

UA's marketing efforts need improvement—UA's licensing activity has been constant in recent years, but has been low compared to its peer institutions. As a result, UA's income from licensing compared to its peers is also lower, sometimes as little as one-tenth the peer average.

ASU and Median of Peer Institutions' Licensing Income per \$10 Million in Research Expenditures, Fiscal Years 1996 through 2006 (Unaudited)



UA and Median of Peer Institutions' Licensing Income per \$10 Million in Research Expenditures, Fiscal Years 1996 through 2006 (Unaudited)



This lower licensing activity may be the result of the Office's not following all recommended practices for marketing technologies. Some of these deficiencies include:

- A lack of criteria for identifying technologies with a higher market potential.
- Limited resources devoted to market research.
- Under-utilization of direct marketing.

However, the Office's staffing level may limit its ability to follow all recommended practices.

Universities should review industry negotiation practices—Industry-sponsored research can result in direct technology transfer because it targets research toward problems that industry is trying to solve. However, according to some university inventors and some industry representatives, contract negotiations with Arizona's universities for industry-sponsored research take longer and are more difficult than at other universities. The industry representatives indicated that this reduces the amount of sponsored research they do with Arizona's universities.

Recommendations

The universities should:

- Work with industry to improve the process for negotiating industry-sponsored research.

UA should:

- Develop criteria for evaluating the market potential of its technologies, increase its marketing efforts, and evaluate the adequacy of its staffing level.

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Contact person for this report:
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Need to better manage conflicts of interest

Conflicts of interest can occur when a university inventor has a financial interest in the company that licenses and intends to develop the inventor's technology. State and federal laws and Arizona Board of Regents policies require the universities to prevent or control conflicts.

ASU—Generally manages conflicts of interest adequately. It has good processes for identifying and reporting potential conflicts and requires that plans be developed to manage conflicts.

However, ASU can improve its monitoring of the plans.

UA—Requires inventors to disclose conflicts, but does not require annual updates or disclosure of relevant changes. UA also lacks criteria for when to require management plans and has not assigned responsibility for monitoring plan implementation.

NAU—Does not have comprehensive conflict-of-interest policies and manages conflicts on a case-by-case basis.

Recommendations

The universities should:

- Correct the deficiencies associated with their respective conflict-of-interest management processes.

The Arizona Board of Regents should:

- Establish minimum standards for the universities' conflict-of-interest policies.