

PRESENTATION:

**OWNERSHIP RIGHTS TO UNIVERSITY
INVENTIONS IN JAPAN AND CHINA**

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Ownership greatly affects the success of a technology transfer system. In the U.S., universities have the right to own an invention made by their employees by virtue of the Bayh-Dole Act, if the invention was made using federal funding, and by virtue of the inventors assigning their rights to the University. Hence, technology licensing offices (TLOs) have become central in U.S. universities.

As Professor Tamai has mentioned, Japanese inventors retain rights to their inventions. However, this right is qualified by the need to determine whether an invention is a national invention. A university invention committee usually determines whether the invention is a National Invention, based on whether the invention arose under funds for a specific project for a practical application. This, in theory, can catch many inventions.

If the invention is determined to be a National Invention, then the inventor must assign the rights to that invention to the Government. A central government agency then patents and licenses the invention. The current agency is the Japan Science and Technology Corporation. In 1996, for all of Japan, only 448 inventions were reported to university invention committees. Many of these invention committees meet just once a year. In 1996, 53 of the 448 inventions, around 12%, were determined to be National Inventions. In comparison, for the fifteen year period from 1982 to 1996, the Japan Science and Technology Corporation licensed an average of eight inventions per year. Most of these were non-exclusive.

There are great incentives to avoid classification as a National Invention. Reporting requirements in Japanese universities are ambiguous, and hence many inventions remain unreported. In addition, the invention committees usually are reluctant to classify an invention as a National Invention. Anecdotal data suggests that many inventions are passed to

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companies informally, but that the vast majority of such inventions are never developed. For example, the Japan BioIndustrial Association published a survey which looked at Japanese applications in the field of bioengineering. Over a 10-year period ending in 1997, approximately 2300 applications were filed in this area. Approximately 38% of these applications listed at least one university professor as an inventor. Companies filed almost all of these applications, and more than two-thirds were neither developed by the applicant nor licensed.

The fundamental problem in Japan is that university inventions are not exploited—or more precisely, the incentives for companies, inventors, or universities to champion the development of university inventions are weak. In an "inventor retains ownership" system, where the inventors fear the classifying of an invention as a National Invention, the inventors pass their inventions without documentation to industry. The inventions are passed to companies with whom professors have long-standing relations based on donations and the hiring of their students. There are no contract agreements between the company and the professor, only a gentleman's agreement that the inventor will get some remuneration if the company chooses to develop and market the invention. It is very difficult for a professor to patent and license an invention on his own. In other words, incentives for both companies and inventors to develop university inventions are weak.

A similar situation exists in Germany. Professors retain rights to the majority of their inventions. They pass these rights to companies, usually without reporting to their universities. The companies then decide whether to apply for patents, and whether to develop and market the inventions.

Incidentally, in Japan as in the U.S., the right to apply for a patent stems from inventorship. However, unlike in the U.S., in Japan written assignments from inventors are not required and assignments are presumed valid. An inventor can challenge a purported assignment only before the application is published 18 months after filing. Therefore, a company can apply for a patent on the basis of information disclosed by a professor when he gives a talk in the company's laboratory. No other permission from the professor is required.

Japanese national universities (which account for the majority of Japanese university R&D) still have no independent legal standing, and thus have no standing to apply for patents on inventions by their faculty, to license such inventions, or to collect and distribute royalties. However, in 1998 they were given the authority to form independent or semi-independent Technology Licensing Offices (TLOs) that could perform such technology management functions. However, professors do not have to use

the services of their university's TLO; they do not have to assign their inventions to the TLO. One of the major challenges for the new TLOs is to encourage professors to let the TLOs manage their inventions. Generally, financial incentives and longstanding ties with various companies still lead professors to pass most of their inventions informally to such companies.

In China, the situation is changing quickly. A U.S. delegation that went to China last year to inquire about management of university inventions reported that ownership of such inventions is still unclear. In fact, Provisional Regulations issued in 1985 by the State Council on Technology Transfer gave Chinese universities the right to manage and use work-related inventions by their faculty, even though title still officially vested in the national government. In other words, Chinese universities have for many years had the official authority to patent, license, and collect royalties from work-related inventions by their faculty.

However, only recently has the Chinese government encouraged universities to assert such rights, and only recently have universities pushed to assert such rights. Leading universities are now establishing TLOs and are requiring professors to report their inventions.

One of the principal issues in China is determining whether an invention is work-related. Before universities established TLOs and before they had an effective technology transfer system, there were great incentives to classify inventions as non-work-related. This way they could easily be passed to companies and the inventors could realize some reward from the companies—similar to the situation in Japan.

Even today an inordinate percentage of inventions are classified as non-work-related. In Tsinghua University, roughly China's MIT, about 40% of inventions are classified as non-work-related. In Xian Communications University, this percentage is said to be considerably higher. This reflects the carry over of practices from the former system, the independent mindedness of faculty members, and a skepticism by faculty concerning the effectiveness of technology transfer via the new TLOs. However, universities are asserting their authority to make the final decision concerning whether inventions are work-related.

Inter-ministerial Guidelines issued in March 1999, in addition to affirming universities' authority to manage their inventions, also contain provisions to make classification of inventions as work-related more appealing to faculty. For example, they require that inventors receive at least 20% of royalties. They require that rights to the invention be returned to the inventor if the TLO has not been able to license it within a year. They require that inventors share in the profits of university-owned companies

that use their inventions. They also require that inventors receive equity in private spin-off companies formed to develop their inventions.

In 1997, according to the Chinese Ministry of Education, 1300 applications were filed nationwide on university inventions and 800 patents were issued. In 1998, 1450 applications were filed and 900 patents were issued. By 1998 about 530 of the available inventions had been licensed or assigned, about 28% of the available pool.

Most licenses are non-exclusive. If a company needs an exclusive license, the university often will assign (*i.e.*, sell outright) its rights to the invention. In the case of assignment to a start-up, the university often will take equity in lieu of cash. In the case of inventions made under sponsored-research agreements with companies, the sponsoring company has a guaranteed royalty-free non-exclusive license. The company can contract with the university for outright assignment even before filing a patent application; however, the university must receive some benefit under such an agreement. Many sponsors are reported to be taking this route.

If the sponsor or prospective licensee is a foreign company, special administrative approval is needed. In the case of a foreign company requesting the right to apply for a patent, approval from the State Council, the main inter-ministerial coordinating body of the national government, is necessary. In the case of a foreign company requesting a license, one TLO official said that only permission from the university president was required. However, an official of the Science and Technology Ministry said that the license would have to be registered with the central office or a local branch of the Ministry of Foreign Trade.

In summary, until very recently, the Chinese system of technology transfer was very similar to the Japanese system: central state control over a potentially large proportion of university inventions; although in practice such state control was seldom exercised, and in the vast majority of cases individual professors retained rights to patent and transfer their inventions. Such an "inventor retains rights" system allows for smooth and efficient transfers when there is a good match between the invention and the companies with which the professor/inventor happens to have longstanding relations, and where the technology has clear commercial potential. However, the Japanese experience shows that such a system provides weak incentives for either inventors, universities, or companies to develop inventions when the commercial value is not immediately obvious.

In addition, lack of data is a major problem with the Japanese system. China appears to be moving rapidly toward a U.S.-type system. Its leading universities are asserting increasing control over university technologies,

trying to create incentives for faculty to cooperate with the new system, and trying to create an environment where companies can support university research and in return receive reasonable rights to technologies that emerge from such research.