

TECHNOLOGY TRANSFER IN LATIN AMERICAN COUNTRIES: A MATTER OF CULTURE AND TRUST

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ABSTRACT

In Mexico and other Latin American countries, intellectual property (IP) protection has become much more important today than it was even a few years ago. This has been the result of key global innovation trends. The evolution of the IP landscape raises some difficult issues relating to scientific and research policies, as well as the intellectual property cultures of the countries in the region. This paper provides a survey of IP registration statistics for patents, utility models, and trademarks in Mexico. It also discusses the disparity between the high levels of research conducted by local universities and research institutions, and their relatively low levels of patenting activity. The paper then provides recommendations on how promoting a culture of IP protection and commercialization would help increase technology transfer, innovation, and economic growth. In addition to the effective protection of intellectual property, the promotion of entrepreneurship, disruptive technologies, and incentives for researchers are also proposed as important strategies for fostering innovation and technology transfer.

The situation in Mexico and Latin American countries

One of the best examples of the challenges Latin American countries face in the areas of innovation and technology transfer is UNAM University (*Universidad Nacional Autónoma de México*). This is one of the largest educational institutions in Latin America. The university is active in almost all areas of research including literature, music, the social sciences, design, astronomy, biochemistry, pharmacy, and genetics. UNAM has 314,557 students¹, 11,668 professors, and about 8,000 research projects. It is a tremendous challenge to convince professors, employees, and students about the importance of using intellectual property (IP) protection as a strategic tool for spurring innovation and generating wealth.

The state of affairs in the universities must be viewed in the context of the country as a whole. As shown in Figures 1 to 3, the statistics for patent, utility model, and trademark applications highlight the difficulties facing Mexico's IP framework.

Figure 1 shows the data² for the number of patents granted to locals in México compared with those granted to patent holders from other countries. It is important to note that the patents granted to

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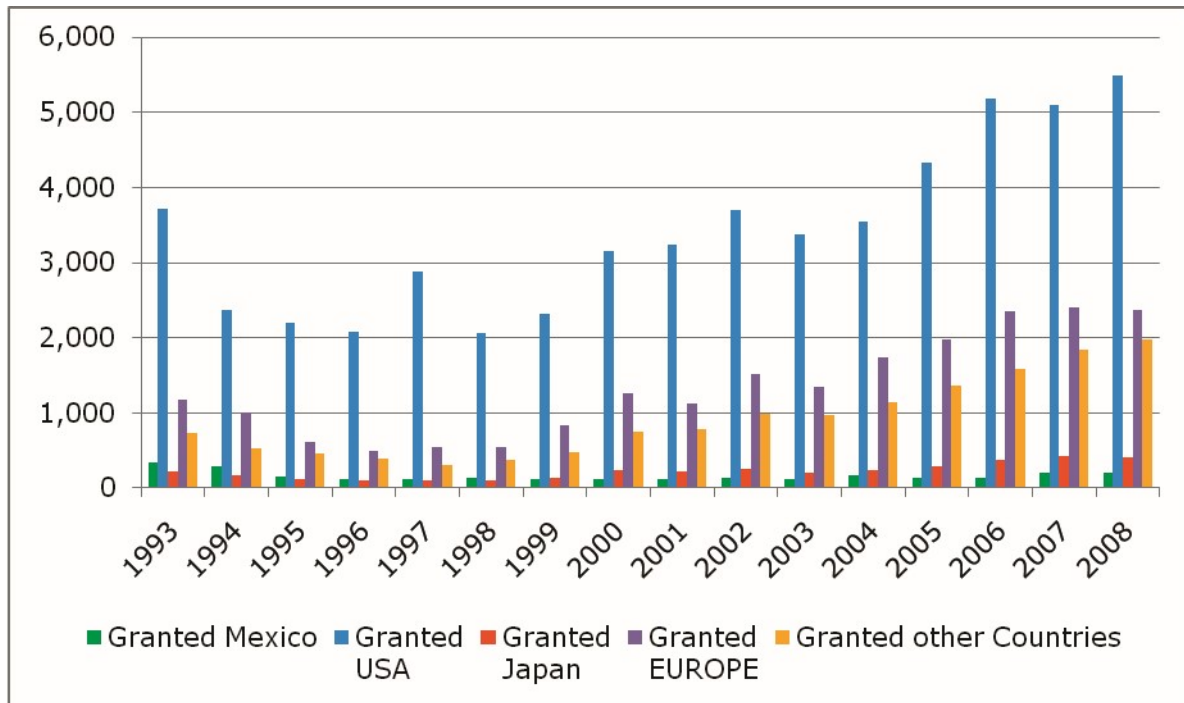
¹ Universidad Autónoma de México, Agenda Estadística 2010. www.planeacion.unam.mx/Agenda/2010/disco

² Martha L. López Orúe, 'Japan-Mexico Intellectual Property Exchange: Food, Pharmaceutical and Biotechnology Point of View, an Opportunity for SMEs', *Research on Intellectual Property* No. 6, 255-304, (Nov. 2009).

Mexican rights holders range between 400 and 600 each year. This is a very small number compared to the 3,000 to 5,000 patents granted to foreign patent holders.

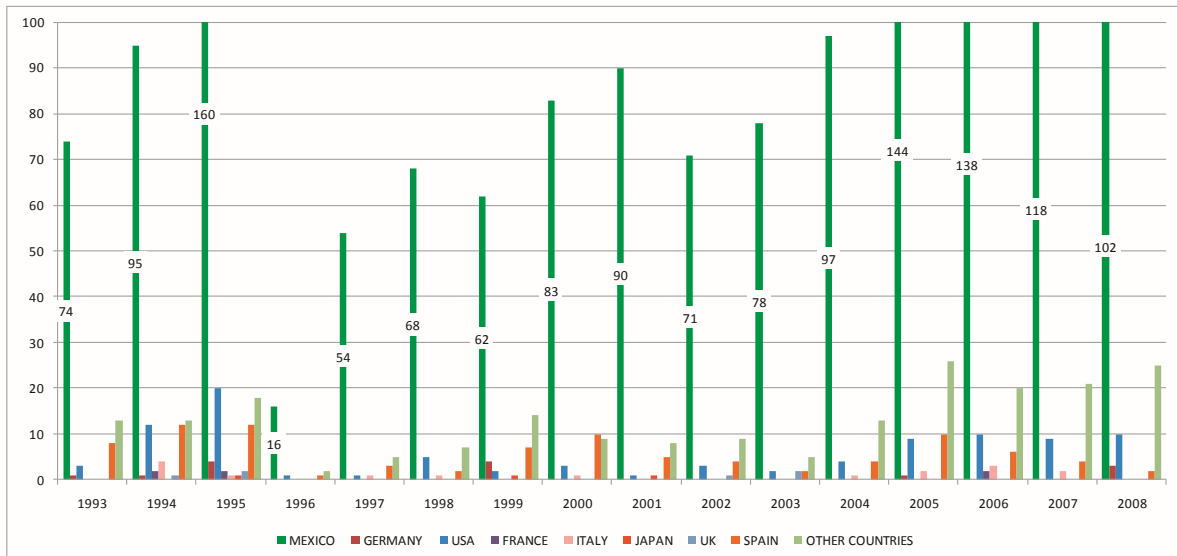
In Figure 2, the figures² for utility models are presented. What is notable in this case is that the number of Mexican rights holders is far greater than that of citizens from other countries. This pattern is even more pronounced with respect to trademarks in Figure 3.

**FIGURE 1: GRANTED PATENTS IN MEXICO BY HOLDER'S NATIONALITY
MAIN COUNTRIES
1993 - 2008**

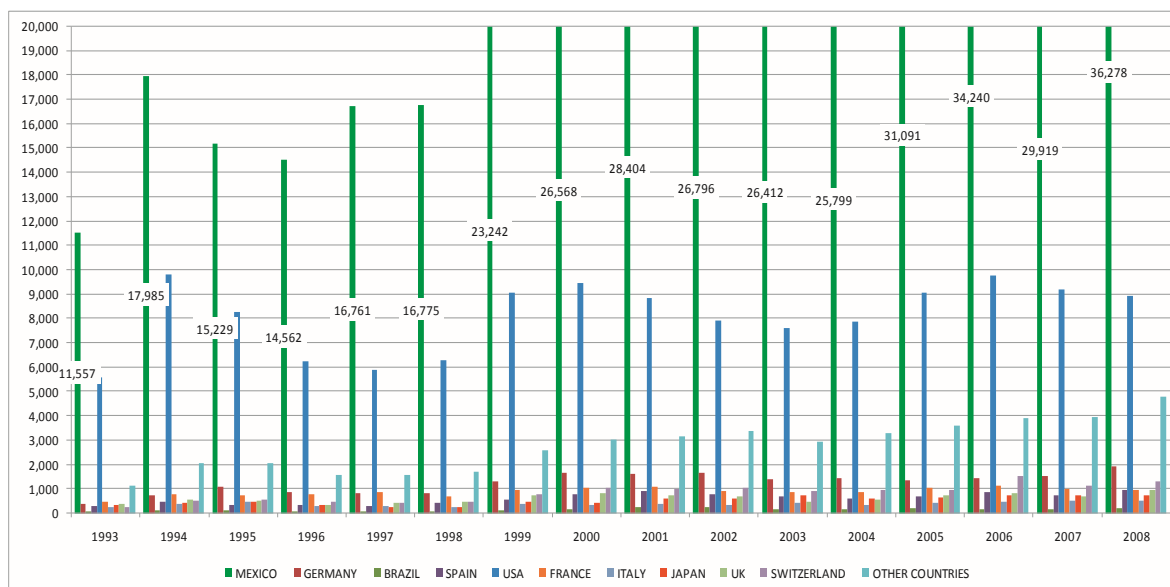


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**FIGURE 2: UTILITY MODELS REGISTERED IN MEXICO BY HOLDER'S NATIONALITY
MAIN COUNTRIES
1993 - 2008**



**FIGURE 3: REGISTERED TRADEMARKS IN MEXICO BY NATIONALITY OF HOLDER, MAIN COUNTRIES
1993 – 2008**



The results for 2009 are not included in the figures above. However, a record number of 822 patent applications by Mexicans were reported. Further, the number of utility model registrations by Mexicans rose to 495.³

Therefore given the trend of trademark and utility model registrations in the country, it is evident that large Mexican companies, small and medium-sized enterprises (SMEs) and independent inventors are aware of the benefits of the IP property system, and are actively using it. However, the case of patents is quite different. Though the situation is improving slightly, a lot still needs to be done.

The deficiencies in the area of patents are surprising. For example, UNAM University has about 8,000 research projects. Assuming that at least 10 per cent are patentable, this should amount to a total of approximately 800 patent grants. However, the reality is that the patents granted to UNAM amount to about 20 or less each year (see Figure 4 below).

The annual Webometrics ranking of the scientific research quality of universities around the world placed UNAM in 44th place.⁴ This is a very good ranking among the Latin American Universities. The second-highest ranked university from the region was *Instituto Tecnológico de Monterrey*. This Mexican institution was ranked 406th. Among the Latin American universities, the Brazilian *Universidade de Sao Pablo* was ranked 87th. *Universidade Estadual de Campinas*, which is also from Brazil, was ranked 159th, while *Universidad de Chile* was placed 234th.

³ IMPI Annual Report 2009, www.impi.gob.mx/work/sites/IMPI/resources/LocalContent/819/25/InformeAnual2009web.pdf

⁴ <http://www.webometrics.info/top12000.asp>

**FIGURE 4. UNAM UNIVERSITY: NUMBER OF PATENT APPLICATIONS
COMPARED WITH SUCCESSFUL PATENT GRANTS (1999-2008)**

Year	Applications	Granted
1999	5	1
2000	9	2
2001	7	2
2002	16	7
2003	11	8
2004	10	2
2005	13	11
2006	10	3
2007	17	9
2008	20	4
TOTAL	118	49

It is also interesting to note that about 35 percent of all Mexican scientific publications are from UNAM researchers. They amount to approximately 3,500 articles per year. Given these figures, why are the number of Mexican patent holders so low?

One of the key issues is inventors' lack of trust in the IP system as a vehicle for achieving successful technology transfer and innovation. Unfortunately, researchers tend to regard the system as more appropriate for larger companies. Researchers also tend to believe that the patenting process is lengthy and can become quite expensive if improperly used. They are yet to appreciate the idea that patent protection is the beginning of a successful technology transfer process. Consequently, the researchers do not think in terms of patents or other IP protections, when establishing their long-term vision at the beginning of their research.

Even when they are aware of the option of protecting their IP, they often view patents as just another set of administrative documents obtained after the successful completion of their research. Further, though foreign patent holders have benefited from active IP protection, the community of Mexican researchers and inventors has not developed a strong culture of protecting their creations.

In terms of other Mexican universities, the private *Instituto Tecnológico de Monterrey* filed about 37 patent applications, which was the highest figure for the 2008 to 2009 period. UNAM was in second place with 20 applications. All the other universities and research centers had less than 15 patent applications. Patent applications by foreigners are much higher.

Apart from the universities, other Mexican parties that are actively protecting their patents are the Oil Research Institute (IMP), CONDUMEX, (a metal hose company), BIMBO (one of the largest Mexican food companies), the Electric Research Institute, and Chemical Research Institute. These entities' use of the patent system is still relatively low. However, they are becoming increasingly aware of the value of their technologies and starting to develop their own technology transfer models.

There has been much discussion about how inadequate investment in research and development (R&D) has impeded the creation of patentable innovations. In the case of Mexico, the level of government investment (about 0.39 per cent of GDP) is very low compared with that of developed countries. Despite the low levels of investment in R&D, some interesting results have been

achieved, at least in the area of scientific publications as previously highlighted. Therefore, it is important to consider what ingredients are missing and how this situation can be improved. Specifically, the aforementioned issues of trust and the lack of an IP protection culture must be addressed.

Promoting innovation and technology transfer: looking beyond the IP legislative scheme

In order to achieve high levels of innovation, more is needed beyond a strong IP legislative scheme. Other legal support services and expertise are required in order to stimulate this process. Recently, in Mexico the *Science and Technology Law*⁵ was modified to stimulate innovation. The legislation has some interesting features worth mentioning. It:

- includes the concept of 'innovation': this is notable because it compels researchers to go beyond the realization and publication of scientific developments. It encourages them to consider the market application of their R&D in order to generate wealth.
- addresses the national promotion of innovation including among children and the youth. As the future scientists and professionals, their awareness of the importance of IP and innovation will be critical.
- expands on the role of Research Centers, universities, the National Science and Technology Council (CONACYT), Industry Associations and Chambers of Commerce: this focus promotes the link between the production and research sectors of the economy. Previously, strengthening this relationship was not considered to be their responsibility.
- provides for the creation of Innovation Funds: functions include financing intellectual property protection, promoting linkages between research institutes with industry, and stimulating innovation.
- promotes the creation of networks, company and associations focussed on innovation, seed capital and venture capital.
- promotes the creation of Technology and Scientific Parks.
- university professors can receive as much as 70 per cent of the royalties generated from their innovations.

All these initiatives, especially the royalty payments, are important for motivating researchers to file for patents. The next step will be to determine how to apply this new law. This will require each university and research centre to establish its own framework.

Beyond that, more work is needed to convince the researchers to enhance their understanding of the patent system, so they can maximize their royalties. They could then reinvest these proceeds into further research and innovation.

Therefore, a strategic intellectual property culture is needed, in order to realize the benefits of the IP system. This approach is an important part of the open innovation process, through which

⁵ www.diputados.gob.mx/LeyesBiblio/pdf/242.pdf

researchers can benefit from existing technologies that may provide the basis for their own new and improved technologies.

Proactively using IP as a strategic tool would help researchers to successfully anticipate patentable results in the corresponding industries. This is the approach taken by large commercial entities. When large companies apply for patents, they already have a clear associated business model. They know that the patent will be a strategic tool for achieving economic success.⁶ This perspective is needed in Mexican and Latin American centres of academia and research. Achieving this outcome will require the identification and development of disruptive innovations across the region.

Achieving this outcome will not be easy. Researchers need help. This is where another new initiative can play a role. The exact operation of the Technology Transfer Office (OTT in Mexico) is still being discussed in CONACYT. But essentially, it will comprise independent, private units that will work to commercialize the technology from different research centres and universities.

This idea of technology transfer offices is well established. The concept has been applied in other countries, mainly in the United States, Europe, and Japan. In Japan this model has been applied in almost all the universities, including Tokyo University, Tsukuba University, Kyoto University, Ristumeikan University and many others. These institutions also have a collaborative relationship with Japan Science and Technology Agency, which is an independent entity.⁷ We are currently witnessing the evolution of this model that incorporates entrepreneurship and a risk-taking culture.

In order to attract venture capital in Mexico and Latin American countries, it is critical to combine the OTT approach with strategic intellectual property protection, entrepreneurship and the perspectives of the business community. No investor would be interested in a technology that has no IP protection, as this is the basis of new technology ventures.

The patent protection process can be very expensive if it not used correctly. Therefore, a detailed analysis of the commercial potential of the research is required from the beginning⁸ to ensure that at the very least, initial expenses are recovered. This is why IP should be regarded as a strategic planning tool, with a long-term objective, focussing on the successful navigation of the licensing process.

In the Mexican research system, there is no culture of using patents as assets for obtaining funding. Researchers are accustomed to receiving funding from government programmes. They do not believe that it is possible for patents to generate more investment and royalties for them.

Further, the National Research System (Sistema Nacional de Investigadores (SNI)), promotes and provides monthly monetary benefits to researchers depending on their prominence, as measured by their publications, theses, and books. These benefits range between US\$3,000 and US\$8,000 per month and are in addition to their regular monthly payments. Therefore, there is neither recognition nor motivation for patent applications. This situation is a negative factor for the promotion of intellectual property protection.

⁶ H. Chesbrough, *Open Innovation*, (Harvard Business School Press, 2003), pp. 155-176.

⁷ Martha L. López Orúe, 'Japan-Mexico intellectual property exchange: food, pharmaceutical and biotechnology point of view, an opportunity for SMEs', *Research on Intellectual Property*. No. 6, (Japan, Nov. 2009).

⁸ G. M. Cadenhead PhD, 'Strategic Analysis for Technology Commercialization', Director MSTC Programme, University of Texas, Austin. Red McCombs School of Business, May 2010.

Additionally, since SNI registration is sometimes a requirement or useful factor in obtaining government research funds, the lengthy nature of the patent commercialization process puts it in competition with the SNI system. A researcher is more likely to prefer investing their time and effort in producing publications which provide for more immediate returns. This is often more attractive than investing in patent protection with the uncertain hope of receiving royalties in the future event of successful commercialization.

The foundations for increased technology transfer are currently being developed in Mexico. Some positive results are already starting to show. Apart from the two new laws mentioned above, research centres and universities are creating their own OTT offices. For example, UNAM established a Liaison Office that reports directly to the rector. The main function of this office is to provide researchers with the support they need to protect and effectively transfer the innovations to industry.

UNAM also organized a contest to promote the benefits of patent protection. During the contest, 80 researchers made submissions. This was more than four times the number of patent applications presented by the university in any given year. From these submissions, a selection process was conducted based mainly on novelty, patentability and market potential. Twenty-five submissions were preselected. A Quicklook⁹ analysis was then conducted to identify the business potential of each one. This was the first time such an invitation had been extended to the researchers.

The prize included the payment of application fees for a Mexican application and an international filing under the WIPO Patent Cooperation Treaty¹⁰ (PCT). The winning researcher also received a new computer. Even though the main benefit of the contest was the protection of the patent itself, this was only the beginning of a process to find the best technology transfer model for obtaining royalties for the researchers.

During the contest, some key questions were raised, including how to select those technologies with the most promising commercial potential, who would make the selection, and what would happen to the technologies that were not selected. In other institutions, such as Kyoto University, these questions are decided by a committee with the participation of the research dean and the rector.

Ultimately, the competition was a way of promoting the adoption of intellectual property protection as a strategic tool to obtain new research funds. The challenge now is to transform those patent applications into new business opportunities that will generate benefits and royalties for the society, the university and the researchers themselves.

In order to enhance the possibilities for successful technology transfer in Mexico and other Latin American countries, strategic intellectual property training is needed. This should not be limited to lawyers. It must also be extended to the main authorities and researchers of each of all institutions and universities and the personnel of government institutions that deal with new technology, innovation and research funding programmes.

⁹ T. Baaken, B. Cornwell, B. Davies, *Marketing Scientific Results and Services: a Toolkit*, (Australia: Calibre Communications, 2004).

¹⁰ *Patent Cooperation Treaty, 2001 (as in force from 1 April 2002)*, World Intellectual Property Organization. <http://www.wipo.int/pct/en/texts/articles/atoc.htm> [Accessed on 2 June 2011].

Additionally, in order to achieve the real change that could accelerate the innovation process in Mexico and Latin America, intellectual property should be taught in all areas, starting in high school, and continuing all the way to Masters and PhD levels. It is these students that will eventually become the scientists, engineers, doctors, physicists, chemical engineers and genetic researchers. They need to know that all their ideas, projects and inventions shall be protected, and that their work could become the disruptive innovations that may create new businesses and generate wealth for their countries. This goal requires a long-term investment in human resource development, and will facilitate the evolution of an intellectual property culture that will promote innovation in Latin America.

There is a need to develop trust in the IP system. Mexico and Latin America must realize that if they take the risk and use their IP systems strategically, they will enjoy lucrative results that cannot be achieved under the current risk-averse approach of relying on government funding. Patents should be seen as effective ways of obtaining research funds. The challenge is to generate assets, based on new protected technologies, that will improve business growth and development in the different industries. This would be possible with the proposed changes in the innovation and entrepreneurship culture.

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