

A chapter of Scientific policy in México

The case of the researchers as public servants and the amendment of a Law

Alma Cristal Hernández-Mondragón, Walid Kuri-Harcuch and Luis Herrera-Estrella*

Abstract— This paper explores the legislative status on the researcher participation in *spin offs* from public research institutions (PRIs) in México. The current legislative framework includes the concept that researchers are public servants and thus, an apparent conflict of interest is present when they participate in the creation of spin-off companies. This is one of the main obstacles for innovation in Mexico. Together with Congressmen we achieved an amendment to the corresponding law.

Keywords— *entrepreneurship, innovation, public research institutions, legislative, public servant.*

1. Introduction

Advanced countries have extensive experience and knowledge about the benefits of science and technology on national economy as a generator of new products, processes or services, in which the research programs of Public Research Institutions (PRIs) play a central role. The existence of flexible policies and the social and cultural environment in the society is an essential element to achieve this aim (Franklin, Wright, & Lockett, 2001). This is the reason why since the early 1980s, the government of developed countries and emerging economies such as South Korea paid special attention to develop public policies facilitating and promoting the creation and/or expansion of new enterprises or spin offs based on science and technology (Goldfarb & Henrekson, 2003; OCDE, 2012)

These policies include intellectual property rights, tax deductions, and regulations to avoid conflicts of interest (as a essential element), among others. The common benefit of these policies was the development of a healthy and solid ecosystem of innovation with the presence of a strong university-industry relationship.

The existence of these relationships is a necessary element to accomplish a comprehensive understanding of the situation of the PRIs and the needs of the productive sector. Moreover, these relations can create synergy and provide tools to promote competitiveness. In fact in recent decades several studies have examined the role of universities as knowledge and technology providers to the industry (Bozeman, Fay, & Slade, 2013; Niosi, 2006).

The search for better conditions to strengthen the relations between these actors is necessary. Especially in developing countries where the technological balance is unfavorable, as is the case of Mexico. However, a suitable way must be identified. This is difficult, because in developing countries societies wants tangible evidence of the usefulness of science and technology beyond the publication of papers or the training of graduate students. The creation of well-paid jobs and the generation of richness for the country is the easiest way that the society can perceive the benefits and utility of scientific research.

One of the best ways to achieve this goal is based on technology transfer, which is basically the transfer of knowledge to the market in the form of products, services or processes. Technology transfer is mainly done in 3 ways: 1) the creation of spin offs companies, 2) licensing of intellectual property and 3) sale of assets and sponsored research (Goldfarb & Henrekson, 2003; Vinig, 2002). International experience shows that the creation of spin offs represents the most solid alternative when searching for the most visible impact of research on society, as it creates both jobs and richness (Rasmussen, Moen, & Gulbrandsen, 2006). This option in addition to collaborating to the visibility of research results is the most profitable in economic terms (Bray & Lee, 2000; Di Gregorio & Shane, 2003).

In Mexico, the transfer of technology still represents a clear and urgent need. Especially in relation to the creation of spin offs, mainly due to lack of clear rules in PRIs and initial funding from the state for these companies. Scientific research and technology development in Mexico is mainly made in PRIs with public funds (>65%), which creates a problem because existing legislation observe that for this reason scientists from PRIs are considered public servants. This disposition extinguishes the possibilities of entrepreneurship for researchers because it generates an apparent conflict of interest when scientists from PRIs want to participate in the creation of spin-offs based on technology and patents derived from projects funded by the Federal Government. For example if they pretend to participate in the creation of a spin off, they can be legally prosecuted.. This problem has been noticed before (Galindo et al., 2013; Mexico, 2013; OCDE, 2012; Stezano, 2011) but not solved yet.

Clearly the legislative problem is not the only obstacle to the creation of spin offs in Mexico. In this work, however, only be tracking this issue. We worked with policy makers from Congress to amend the legislation so that it encourages entrepreneurship in form to eliminate possible conflicts of interest arising from being a public servant, as nowadays occurs.

Alma Cristal Hernández-Mondragón

Science, Technology and Society. Multi-departmental interdisciplinary program. Center for Research and Advanced Studies, IPN. México City México

Walid Kuri-Harcuch

Department of Cell Biology. Center for Research and Advanced Studies, IPN Apdo. Postal 14-740, México

*Corresponding author: Luis Herrera-Estrella

Laboratorio Nacional de Genómica para la Biodiversidad, Cinvestav Irapuato, Irapuato, Guanajuato. México

2. Methodology

Before In this work we performed a legislative proposal in order to avoid the possible conflict of interest to researchers from different PRIs. First, we searched for legal advice to fully understand the respective laws. We identified the source of the problem of conflict of interest and performed an initial proposal. The Commission of Science and Technology from the Mexican Congress took up this proposal for discussion to evaluate a possible amendment of Mexican law. With had the support and conviction from Congressman Alejandro Rangel Segovia leading the effort to successfully achieve the corresponding amendments of the law. In parallel we organized a series of forums and workshops to determine the appropriated scope of the proposal. In such events researchers, managers, presidents of PRIs, government officials, consultants and congressmen were convened to discuss the need to amend the law and defined the changes required to promote the interactions between universities and private companies.

Achieving a comprehensive proposal took two years. We prepared the proposals and we lobbied all political parties present in Congress. The original proposal was modified in order to achieve a consensus. We followed all the steps shown in Figure 1.

3. Results

We spoke with researchers by different PRIs and on basis of this exercise we identified the Federal Law of Administrative Responsibilities of Public Servants as the main obstacle for the participation of scientists from PRIs in the creations of spin-off companies, because as we explained before, this law leaves open the possibility of a potential conflict of interest for researchers with entrepreneurial ideas.

In the forums and workshops around we had the participation of 160 people from different institutions and governmental agencies. Academy refers to researchers and Chiefs of different institutions (PRIs). Government include members of the Congress, Senate, Ministries of Education, Science and Technology, Treasury, Economy, Public Function, Industrial Property, Science, Tech & Innovation Office from Presidential House, students, consultants and Councils of Science and Technology.

Based on the information gathered from these meetings a proposal was developed that was discussed with all concerned federal government agencies and the different commissions of the Mexican congress Subsequently, the final proposal was presented by Congressman Alejandro Rangel Segovia to the Congress on December 11, 2014.

Step	Who has the function?	Aims
1. Initiative presentation in Chamber of Origin*	The President of the Republic, the Congressman and the Senators	Introduce to all the members of the Chamber about the Initiative content and aims
2. Turn	President of board of Trustees in turn	Assign to one or more adequate Commissions the responsibility for the analysis and elaboration of an opinion and ruling. This ruling could be positive or negative.
3. Ruling presentation	An integrant of the correspondent Commission	Inform to all the Members of the Chamber the ruling about the Initiative.
4. Discussion	Each political force/party (7 in 2014) has five minutes to express their position and justify the reason for their vote in favor, against or abstention by the ruling	Justify the reason for their vote for, against or abstention.
5. Voting record	All members in the Chambers (500 in Congress and 128 in Senate)	Quantify the votes for, against and abstentions to decide whether the opinion is approved or rejected.
6. Ruling presentation in Chamber of Review*	The Commissions responsible for the pre-bill present it to the entire Chamber (Congress or Senate) and it is voted. (Steps 3-5)	Quantify the votes for, against and abstentions to decide whether the opinion is approved or rejected.
7. Publication in the Official Journal of the Federation		

*The Chamber of origin of Review can be the Congress or the Senate.

Based in:	Next step	
	If is approved	If is rejected
The necessity of every sector		
The specific needs of each proposal. There are Commissions adequate for it.		
The process of consultation with experts in the field, meetings, interviews or any other analytic element that contributes to the ruling.		
Knowledge and interests of each political party.		
	a) Goes to House Review (Congress or Senate) as "pre-bill" and repeat steps 3-5 or b) if it is a decree on matters of exclusive competence and then goes for step 7.	a) The ruling may return to a reporting Committee to be reformulated (steps 3-5) and resubmitted or b) completely discarded.
	It refers to the Executive for publication in the Official Journal of the Federation (Federal Registry) (Step 7)	It is not a rejection as such, just enter amendments to the bill approved by the House of Origin (Congress or Senate) and is returned to it and follow steps 3-5 and 7.

The proposal was voted and approved. The proposal was sent to Senate to follows the steps shown in Figure 1.

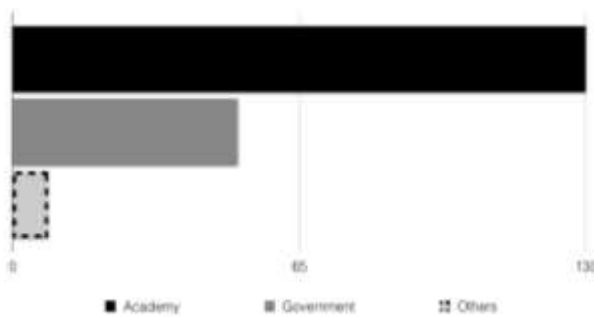


Figure 2. The total number of assistants to forums and workshops about the conflicts of interest present in the Federal Law of Administrative Responsibilities of Public Servants.

In the Senate the proposal was changed with esthetical modifications and no good characteristic. Three months later it was voted in the Senate on April 16. Because these changes the proposal was returned to Congress for analysis and subsequent steps like those shown Figure 1. On April 30, the Science and Technology Commission received this document. In this moment the Congressmen are deciding if they approved this document or it will be returned to the Senate.

In the Congress the proposal obtained 373 votes positives or in favor, 18 abstentions and 0 votes against, the total possible is 500. In the Senate the modified proposal obtained 68 votes positives and 0 abstentions and 0 against. The total possible is 128.

4. Discussion and conclusions

One way that PRIs can contribute to the visibility of the importance in society, and in particular the research they perform is based on how they can meet societal needs and contribute to the economic through job creation and the development of new products or services that generate revenue (Fairweather, 1990; Hewitt-Dundas & Roper, 2011). That is with technology transfer.

We found that in Mexico researchers from PRIs considered a major obstacle for their participation in the creation of spin-offs the legislation on conflict of interest. Therefore, we decided to work on amending this law. We believe that with this effort we collaborate in the creation of a stable ecosystem of innovation. We are aware that this is a necessary element, but also that many other aspects need to be corrected to effectively promote the impact of science and technology as an important axis of economical and social development in Mexico and possibly other developing countries. Proof of this is the US experience, where through legislative amendments that began with the Stevenson-Wylder Act and the Bayh-Dole Act (Goldfarb & Henrekson, 2003; Grimaldi, Kenney, Siegel, & Wright, 2011; Lind, 2013) considered the most important piece in US legislation in the last 100 years, an economy based on science and technology was effectively promoted. It has been calculated that these amendments contributed to more than half of the

US economic growth in recent decades (Tassey, 1997). In other countries like Japan and France, the existence of amendments to legislation on science and technology and entrepreneurship it has been necessary and beneficial (Goldfarb & Henrekson, 2003; Kato & Odagiri, 2012).

Certainly, changes like this required an institutional capacity among various actors. Also in México an additional capacity is necessary because of the limited investment in science and technology. For this reason public resources for this field should be strategically applied in areas that have a substantial comparative advantage. The importance of basic science at this point is critical. The country cannot continue with a minimum attention as now it happens. Clearly, there are various factors contributing to the current situation of technology transfer and entrepreneurship. One of this is the absence of Offices of Technology Transfer in PRIs (Ambos, Makela, Birkinshaw, & D'Este, 2008; Druilhe & Garnsey, 2004) by the hand of an appropriate legislative framework, especially in a matter of potential conflicts of interest (Louis, Blumenthal, Gluck, & Stoto, 1989). In recent years Mexico has promoted the creation of technology transfer offices, however the lack of an adequate legislative frame has hindered it's effectively and this situation contribute to lack of innovations in the country.

Clearly, the lack of innovation is a complex problem and should be approached from different ways but we believe this amendment is a necessary step. In México only 5% of companies engaged in R&D (ESIDET, 2014), clearly this is an important and scary issue for the entire ecosystem.

In addition to solving the apparent conflict of interest of researchers, this amendment is intended to contribute to greater industry linkages between business, government and science, all in the niche that represents society. In parallel, it is intended to encourage investment in research and development from the private sector, which is currently around 35%.

We hope that this proposal to amend the Mexican legislation to remove uncertainty about the potential conflict of interest will encourage innovation through the participation of researchers in technology transfer activities. It is noteworthy that within the proposed amendment security locks are included to ensure transparency and legality to the technology transfer process. The final decision is currently in the hands of the Congress for final approval. The problem is that Congressmen have a three years period, and in august of 2015 the current legislative period ends and the next Congressmen must be aware of the importance that this proposal entails.

The political will of all political parties represented in Congress was required for this process. One of the objectives of the current government is "Making knowledge and innovation a key lever for sustainable economic growth in Mexico, which promotes human development, enable greater social justice, strengthen democracy and peace, and strengthen the sovereignty national" (Mexico, 2013). In addition, all them agreed on the importance for the development of the country, so we believed it would be easier to get the support of political parties. However, we find that there is a lack of knowledge of these issues in most policy makers, which hampered the process.

Acknowledgment

Alma Cristal Hernández-Mondragón received the National Council of Science and Technology (CONACyT) 323768 scholarship.

References

- [1] Ambos, T. C., Makela, K., Birkinshaw, J., & D'Este, P. (2008). When Does University Research Get Commercialized? Creating Ambidexterity in Research Institutions. *Journal of Management Studies*, 45(8), 1424-1447. doi: DOI 10.1111/j.1467-6486.2008.00804.x
- [2] Bozeman, B., Fay, D., & Slade, C. (2013). Research collaboration in universities and academic entrepreneurship: the-state-of-the-art. *The Journal of Technology Transfer*, 38(1), 1-67. doi: 10.1007/s10961-012-9281-8
- [3] Druilhe, C., & Garnsey, E. (2004). Do Academic Spin-Outs Differ and Does it Matter? *The Journal of Technology Transfer*, 29(3-4), 269-285. doi: 10.1023/B:JOTT.0000034123.26133.97
- [4] ESIDET. (2014). *Encuesta sobre Investigación y Desarrollo Tecnológico ESIDET México*, D.F.: Instituto Nacional de Estadística y Geografía (INEGI).
- [5] Fairweather, J. S. (1990). The university role in economic development—lessons for academic leaders. *SRA—Journal of the Society of Research Administrators*, 22(3), 5-11.
- [6] Franklin, S., Wright, M., & Lockett, A. (2001). Academic and Surrogate Entrepreneurs in University Spin-out Companies. *The Journal of Technology Transfer*, 26(1-2), 127-141. doi: 10.1023/A:1007896514609
- [7] Galindo, E., Serrano-Carreón, L., Gutiérrez, C. R., Allende, R., Balderas, K., Patino, M., . . . Jurado, C. (2013). The challenges of introducing a new biofungicide to the market: A case study. *Electronic Journal of Biotechnology*, 16(3). doi: DOI 10.2225/vol16-issue3-fulltext-6
- [8] Goldfarb, B., & Henrekson, M. (2003). Bottom-up versus top-down policies towards the commercialization of university intellectual property. *Research Policy*, 32(4), 639-658. doi: Doi 10.1016/S0048-7333(02)00034-3
- [9] Hewitt-Dundas, N., & Roper, S. (2011). Creating advantage in peripheral regions: The role of publicly funded R&D centres. *Research Policy*, 40(6), 832-841. doi: http://dx.doi.org/10.1016/j.respol.2011.03.005
- [10] Kato, M., & Odagiri, H. (2012). Development of university life-science programs and university-industry joint research in Japan. *Research Policy*, 41(5), 939-952. doi: http://dx.doi.org/10.1016/j.respol.2012.02.011
- [11] Louis, K. S., Blumenthal, D., Gluck, M. E., & Stoto, M. A. (1989). Entrepreneurs in Academe: An Exploration of Behaviors among Life Scientists. *Administrative Science Quarterly*, 34(1), 110-131. doi: 10.2307/2392988
- [12] Mexico. (2013). *Plan Nacional de Desarrollo 2013-2018*. México, D.F.
- [13] Niosi, J. (2006). Introduction to the Symposium: Universities as a Source of Commercial Technology. *The Journal of Technology Transfer*, 31(4), 399-402. doi: 10.1007/s10961-006-0001-0
- [14] OCDE. (2012). Evaluación de la OCDE del sector de las nuevas empresas basadas en el conocimiento.
- [15] Stezano, F. (2011). Construction of knowledge transfer networks in the biotechnology sector in Mexico. A case study of technological linkages between researchers of CINVESTAV-Irapuato and LANGEBIO and companies of the agro-biotechnology sector. *Estud.soc*, 20(39).
- [16] Tasse, G. (1997). *The economics of R&D policy*. Westport, Conn.: Quorum.
- [17] Vinig, T. G. (2002). Determinant of Successful Technology Sector. *UVA Working Paper No. 2002-04*.

About Author (s):



MSc. Alma Cristal Hernández Mondragón is student in the Science, Technology and Society. Multi-departmental interdisciplinary program. Center for Research and Advanced Studies, México where she develop research about scientific policy.

Dr. Walid Kuri-Harcuch is full professor at Department of Cell Biology and member of professor in the Multi-departmental interdisciplinary program. Center for Research and Advanced Studies, IPN.

Dr. Herrera-Estrella is chief of the National Laboratory of Genomics for Biodiversity, Center for Research and Advanced Studies of the National Polytechnic Institute, Irapuato, Mexico.