



# Legislative environment and others factors that inhibit transfer of Mexican publicly funded research into commercial ventures



Alma Cristal Hernandez-Mondragon <sup>a</sup>, Luis Herrera-Estrella <sup>b, 1</sup>, Walid Kuri-Harcuch <sup>c, \*, 1</sup>

<sup>a</sup> Science, Technology and Society, Multi-departmental Interdisciplinary Program, Center for Research and Advanced Studies, IPN, Mexico

<sup>b</sup> Laboratorio Nacional de Genómica para la Biodiversidad, Cinvestav Irapuato, Irapuato, Guanajuato, Mexico

<sup>c</sup> Department of Cell Biology, Center for Research and Advanced Studies, CINVESTAV-IPN, Apdo., Postal 14-740, México City, 07000, Mexico

## ARTICLE INFO

### Article history:

Received 8 January 2016

Received in revised form

18 March 2016

Accepted 19 March 2016

Available online 4 June 2016

### Keywords:

Conflict of interest

Technology transfer

Entrepreneurship

Legislative act

Innovation

## ABSTRACT

In this work we explored some factors that limit technology transfer in the process of innovation from different research institutions in Mexico. We found that one of the main inhibitors for technology transfer is the conflict of interest provision in the Federal Law of Administrative Responsibilities of Public Servants. Since most research and development activities are carried out in public institutions, and funding is mainly derived from Federal and State government programs, scientists are considered public servants in the eyes of the Law. Therefore, according to current norms scientists can incur in conflict of interest for technology transfer and commercialization of their research. From the information gathered from this study, we proposed an amendment to the above mentioned Law to eliminate potential conflict of interest, which derives from the participation of scientists from Mexican publicly funded institutions in the creation of spin-off companies, and hence, to incentivize entrepreneurship, technology transfer and innovation to effectively commercialize the products of publicly funded research. We also discovered other inhibitors of technology transfer that are discussed in this paper.

© 2016 Elsevier Ltd. All rights reserved.

## 1. Transfer technology and legislation

Since the early 1980s, governments paid special attention to the development of public policies supporting the creation and/or expansion of new enterprises or spin offs based on science and technology [1,2]. The knowledge derived from scientific research has become an essential element in product and service development for society [3] and now, is a key for productivity and innovation [4,5]. This “scientification of technology” has occurred in several industries, including biotechnology or microelectronics [2,6].

Society can perceive scientific research through its financial impact and benefit. Hence, for economies to benefit from the scientific knowledge produced by universities and research centers, knowledge needs to be transferred from these institutions to the market, through Technology Transfer (TT) [7]. There are three main forms of TT: 1) licensing contracts or sale, 2) sponsored research, and 3) start ups or spin offs companies [2]. Creating new

enterprises is one of the most visible ways for society to be aware of the scientific research activities carried out by universities and research institutions. Founding new enterprises could even be used to solicit additional public funding [8]. In addition, some studies have shown that creating new companies is more profitable than paying royalties for licensing technologies [9,10].

Flexible policies and the social and cultural environments in a society are important for universities to generate new companies [11]. These policies involve a broad range of issues comprising intellectual property rights, tax deductions on R & D activities, benefits for the institutions and their scientists, policies to avoid conflicts of interest, etc. All these require university-industry relationships in a context of legality and incentive policies. In the United States, a new type of university-industry relationships emerged in the 1980s, centering on Technology Transfer from research institutions to private firms, allowing the discovery of new roles by the researchers and their institutions. This was highly incentivized by the Bayh-Dole Act [4,12–14]. The Organization for Economic Cooperation and Development [15] reported that in Latin America a significant inhibitor for technology transfer is the lack of adequate policies and regulations [15], which seems to be part of the problem in Mexico, as well.

\* Corresponding author.

E-mail address: [walidkuri@gmail.com](mailto:walidkuri@gmail.com) (W. Kuri-Harcuch).

<sup>1</sup> These authors contributed equally to this work.

### 1.1. Public research institutions in México and their role in society

Public research institutions can improve society's perception on scientific research by showing that they can respond to social needs and economic development through the generation of products that meet existing public needs and create jobs and richness for society [16]. Scientific research has a privileged role in today's world as it is crucial for competitiveness and greater technological capabilities for businesses [17]. In fact, some of the current largest companies in their beginnings adopted a brilliant strategy by pursuing R&D combined with the acquisition of key small companies founded by scientists from universities or research centers; Roche, Monsanto or Syngenta are clear examples of this strategy [18]. The birth of spin offs included multiple variables; for example, the researchers culture, personal motivation, human resources, country in which they are developed, organization, network, prestige or infrastructure, and other essential factors such as investment, particularly through seed or venture capital [19–26].

Public funding in public research institutions has an important impact in harvesting new knowledge since it provides scientists with research autonomy to pursue either basic and/or applied scientific projects that are relevant to society, not only through science advancement but also through the development of commercial applications. During the last decades, governments, the main providers of publicly funding for research, have been mandating that public research should achieve scientific and economic impact through technology transfer to industry [27] or to private funding via the creation of new companies. Cunningham et al. (2014) have argued that others factors are important as the role of principal investigator (PI) because "Traditional knowledge, skills and technical know-how of publicly funded PIs are insufficient to deal with the increasing managerial demands and expectations i.e. growing external bureaucracy of public funding agencies". These authors also found that there are inhibiting factors that limit the research autonomy of publicly funded PIs. It has been clear that one of the critical players to ensure technology transfer success of the publicly funded research is the principal investigator [5,28,29,30].

Many studies, during the last 30 years have examined the role of universities as providers of knowledge and technology to industry [31,32]. This has been studied through intellectual property analysis, and it has been argued that patenting increased in universities due to adequate technology transfer policies [32]. Some authors have examined the effect of technology licensing by universities to industry on researchers behavior, showing that "Royalties are typically larger the higher the quality of the faculty and the higher the fraction of licenses that are executed at later stages of development" [5]. It seems that incentives helped the collaboration for partnering and for their successful outcomes [32]. Recently, some authors have re-defined the type of research collaboration. For example, they have defined property-focused research as "research that provides economic benefits (or has the potential to do so) to researchers or research that may provide commercial benefits to industry, with the academic researcher benefiting either directly or indirectly through industry's provision of resources" [32]. Several factors have been perceived that could inhibit this type of research, and one of the most important is the absence of a Technology Transfer Offices (TTOs) [33,34].

In addition to the identified problem of the lack of TTOs in academic institutions, a suitable environment for the development of these enterprises is required [35], including a friendly legislative frame since publicly funded institutions rarely have the autonomy required for this purpose [36]. In developed countries during the 1980's there was great uncertainty to generate spin-off companies from university research that could be funded by the private sector due to potential conflicts of interest (Anderson and Swazey, in

(Louis, 1989 #30)). Several legislative Acts, for example in the United States, solved this potential conflict. However, in Mexico, in 2015, such concern still exists.

### 1.2. International experience

In more advanced countries legislative action was important to promote technology transfer from scientific organizations to private companies. In the United States, The Bayh-Dole Act (PL. 96–517) allowed universities, small businesses and nonprofit organizations to retain the titles of their inventions developed with federal funds. Before this Act, the federal government retained ownership of all patents obtained through research supported by federal funds [37–41]. Subsequently to the Bayh-Dole Act, a series of laws like the Federal Technology Transfer Act (for Cooperative Research and Development Agreements or CRADA), the Economic Recovery Tax Act (for R&D credit), the Small Business Innovation Research Act (to help small businesses conduct R&D) and the National Cooperative Research Act (to reduce antitrust liabilities of research joint ventures), among others [42–46], helped to create an ecosystem that has supported the creation and growth of knowledge-based industries coming public and private universities in the United States.

Following the changes that were made in the United States by the Bayh-Dole Act and the subsequent new Acts, legislative bodies in several countries promoted changes to foster the transfer of knowledge from universities to society. For example, Nordic countries such as Denmark and Norway promoted the ownership of Intellectual Property Rights (IPR) to be given to institutions, and not the inventors, as it was previously done. In others countries like Italy, the inventor has the ownership of the intellectual property rights [8]. Similarly, some European countries have made legislative changes to encourage and promote the commercialization of the knowledge and technology generated by scientific research funded with public money [13]. These changes are contingent on the cultural and local context and include actions from government and institutions to increase commercialization [8,13]. In Japan, the Government passed the Act on the Promotion of Technology Transfer (TLO Act) and other measures in 1998 to promote university-industry collaborations. One of the major characteristics of the TLO Act was to encourage universities to create Technology-Licensing Offices (TLOs) and grant the intellectual property rights to Institutions. These offices have a role in leading and helping the institution to pursue patent applications, licensing technologies, liaising with companies, etc. Apparently, this process has achieved a similar effect as the Bayh-Dole Act in the United States. The number of patent applications by Japanese universities increased significantly since 1999 [47].

It has been shown that legislative changes can effectively influence technology transfer, mainly from publicly funded research organizations, benefitting institutions and their staff in a university-industry relationship. Institutions can get private money to fund their research, researchers can get extra financial incentives, and students can join new companies, or more easily finding jobs in companies related to their specialty [6]. Consequently, public research institutions should promote policies that encourage researchers and students to pursue commercialization of their attained knowledge [48]. However, several inhibitors can impair the development of these collaborations and entrepreneurship activities derived from scientific research funded with public money. One of such obstacles is the potential conflict of interest.

### 1.3. Conflict of interest policies

Conflict of interest policies were very broad and generally varied

Download English Version:

<https://daneshyari.com/en/article/6851574>

Download Persian Version:

<https://daneshyari.com/article/6851574>

[Daneshyari.com](https://daneshyari.com)