

Creación de empresas y spin-off universitarias en México

Creation of companies and University spinoff in Mexico

Carlos Alberto Santamaria Velasco

Universidad de Guadalajara

carsantvel@gmail.com

Ignasi Brunet Icart

Universidad Rovira i Virgili

ignasi.brunet@urv.cat

Resumen

El objetivo de este artículo es explorar, para el caso de México, el nuevo papel ejercido por sus instituciones de educación superior (IES), centrandó la atención en tres aspectos clave de la promoción del quehacer empresarial y la transferencia tecnológica: el fomento de la cultura emprendedora de los estudiantes, la oferta de servicios tecnológicos por parte de la institución y la creación y mantenimiento de incubadoras de empresas. Nos ayudaremos de una distinción que resultó decisiva en el marco de una más amplia investigación acerca de las capacidades de vinculación de la instituciones de educación mexicanas, y cuyos resultados parcialmente se exponen aquí: la distinción por subsistemas, que distingue institutos tecnológicos, universidades tecnológicas, universidades politécnicas, universidades públicas federales, universidades públicas estatales, centros públicos de investigación, universidades particulares y otras IES.

Palabras clave: universidad emprendedora, instituciones de educación superior, cultura emprendedora, incubadora de empresas, spin-off universitaria.

Abstract

The aim of this article is to explore, in the case of Mexico, the new role exercised by their Higher Education Institutions (HEIs), focusing on three key aspects of the promotion of business activities and technology transfer: the promotion of the entrepreneurial culture of the students, the offering of technological services by the institution and the creation and maintenance of business incubators. We will rely on a distinction that was decisive in the

context of more extensive research about the capabilities of the Mexican educational institutions linking, and whose results are partially exposed here: the distinction by subsystems, which distinguishes technological institutes, technological universities, colleges, public federal universities, public State universities, Public Research Institutions, private universities and other HEIs.

Keywords: entrepreneurial University, higher education institutions, entrepreneurial culture, business, University spinoff incubator.

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1 Introduction

In the process towards a intensive economy in knowledge, a third function has been added to the universities: promote the economic development of the environment through the transfer of technology and the University-Industry relationship (Etzkowitz, 1989, 1993, 1998;) Etzkowitz et al., 2000; Etzkowitz and Leydesdorff, 1997, 2000). This new function, which adds to the two performed by humboldtian University of teaching and research, requires from the universities that they are handled in a business way, selling and/or economically exploiting the results of their researchs, either in the form of patents, contracts with companies to carry out R&D or the creation of University spin-offs. This way, the performance of the new role of universities is materialized, in addition to academic through training of human resources, through teaching, through collaborating research with companies, services, consultancy or the creation of companies. New performance that generates a new University that some authors define as "academic capitalism" (Slaughter and Leslie, 1997;) Slaughter and Rhoades, 2004), and others of "entrepreneurial University" (Etzkowitz et al. 2000;) Etzkowitz, 1998). This University, besides being more involved with its economic environment and the commercialization of the research results, assumes the creation of companies in its laboratories and facilities giving rise to a new type of University staff and a new type of researcher: the scientific-entrepreneur. In fact, in Europe and in other geographic areas some universities have already developed structures for the promotion of entrepreneurship and the creation of companies from the research carried out by its research groups, demonstrating, as well, that the University already cannot be limited to training and research, the two functions of traditional universities, but

that should become a source of economic and social development of the territory in which are immersed (Millet et to the. 2008).

The objective of this study is to explore, in the case of Mexico, this new role exercised by their Higher Education Institutions (HEIs), focusing on three key aspects of the promotion of business activities and technology transfer: the promotion of the entrepreneurial culture of the students, offering technological services by the institution and the creation and maintenance of business incubators. To do this we will help a distinction that was decisive in the context of more extensive research about the linkage capabilities of the Mexican educational institutions, and whose results are partially exposed here: the distinction by subsystems, which distinguishes technological institutes, technological universities, colleges, public federal universities, public State universities, Public Research Institutions, private universities and other HEIs.

This article first outlines the theoretical references of the third and novel entrepreneurial function of the university, further states the terms of design and methodology of the study and presents the main results on the three aspects just mentioned, distinguishing for each description HEI set of subsystem differentiation. Finally, conclusions, where the bulk of the information shown is synthesized, hypotheses for future research are proposed and the main limitations of this work are outlined.

2 Entrepreneurial University

The term "entrepreneurial university" was coined by Clark (1998, 2004) in reference to universities who are not afraid to maximize the marketing potential of their ideas and create value in society and not see this as a major threat to academic values. He defines the entrepreneurial universities through the following features: 1) a strengthened management structure, which should ensure the institution adapt to changes that occur in the environment while the new values are merged business management with traditional academic values; 2) developed a periphery, which refers to the set of (business and administrative) entities developed by the university to interact with an agile environment; 3) a diversified financial base that would reduce dependence on a single source of college resources, increasing their autonomy; 4) a motivated faculty, acting as a driver of entrepreneurial activities, and 5) an entrepreneurial culture, affecting their relationships

with the environment and how the decision-making processes are articulated. A culture which provides support structures for teachers and students start new ventures. A support structure are the incubators, created, first, to promote new links between universities and research centers and the productive development environment, and on the other, to promote entrepreneurial spirit and creating business both in academia and in society in general. Specifically, business incubators "are technical-academic arising in order to stimulate the creation of new companies, most often based on technology, experimenting with a variety of tactics to link talent, technology developments, capital and know how, to transform a new idea into a business success "(Villalvazo-Naranjo and Jasso-Gastinel, 2008: 140).

Etzkowitz (2004) describes the entrepreneurial university as a university that has a proactive stance in the implementation and use of knowledge in the application of results as an input for the creation of academic knowledge. The entrepreneurial university operates on an interactive model of innovation that part of the problems in the industry and society and seeks solutions in science, rather than a linear model of innovation, from research to move to its use. Furthermore, Etzkowitz emphasizes the importance of the independence of universities and their ability to establish strong links with the environment. It also identifies the following five interrelated principles: 1) capitalization or marketing in the sense that knowledge is to be used by the business and social sector, being the basis for economic development and society; 2) interdependence, while the entrepreneurial university must continuously interact with the business sector and public administration, according to the model of the Triple Helix; 3) independence, and that despite these interdependencies, the university maintains its independence; 4) mixing, which refers to the creation of mixed or hybrid organizational structures that incorporate practices from business and traditional college, and 5) reflection in the sense of continuous renewal of the university in order to adapt to changes in their relations with public authorities and the business sector.

Moreover entrepreneurship and business innovation is emerging as one of the options that affects job creation (Storey, 1982, 1994), in economic, social and regional development (Dubini, 1997; Sexton, 1986 , Baumol, 1993, 2004,. Reynolds et al 2002, 2005) in career choice by the population (Rodeiro et al 2008, 2010;. Acs and Audretsch, 1988, Drucker,

1985, 1986, 1988) and in promoting innovation (Drucker, 1986; Schumpeter, 1964;. Acs et al 2005, 2006), so at the public level, have taken steps and programs to support the creation of new businesses and promoting the spirit entrepreneur (Diaz et al., 2006)

Numerous studies have highlighted the role of universities as potential incubators of technology-based companies and the importance of linking educational programs in scientific knowledge with the requirements of the productive sector (Delmar and Davidsson, 2000; Vesper and Gartner, 1997). Similarly, society demands increasingly active role of universities, not only in the creation of knowledge, but in the transfer of the same. Thus, university spin-offs as part of the strategy of technology transfer from the university, have become one of the current goals of the academic authorities (Etzkowitz, 1998, 2002, 2003; Etzkowitz et al 2000;. OECD , 1996, 2000, 2001, 2003; Birley, 1998; Rodeiro et al 2008, 2010;. Fernández, 2003, 2004), is that entrepreneurship engendered based on university knowledge demonstrates the important role that universities play in the knowledge economy. It should also be noted, first, that the spin-offs are located close to where they breed and thus facilitate the growth of the local economy. Second, driving changes in the universities to facilitate the incorporation of graduates and doctors in these companies, creating a market of knowledge through human resources, and a better assessment of the results obtained in research occurs. Third, broadcasting revenue generating capital that benefit founders and universities, since those spin-offs that reach a high level of development can place part of their capital in a strategic investor or to make an initial public offering (Rodeiro et al. 2010).

3 Design and Methodology

This paper draws on the information collected from the National Survey of Bonding (ENAVI) of Mexico, designed and conducted by the Center for Economic Research and Teaching, AC (CIDE), at the request of the Department of Higher Education of the Ministry of Public Education (SEP). Questionnaires that made this survey were completed and collected between January and March 2009, with data referring to 2008.

The survey was to study population HEIs registered by the SEP, both public and private, whose original purpose did not involve an intrinsic link with any specific sector. We also

excluded HEIs exclusively dedicated to provide specialty programs without registration or without registration schooled registered.

The sampling frame included 1,687 HEIs had an enrollment of 2,406,989 students. From a stratified probability sampling, a sample whose size was 351 IES selected randomly for greater representation of both subsystems and the various regions in which Mexico is divided established. However, the information contained in the data matrices that were supplied are we lacked IES 4 of these, so that the number of cases that finally worked was 347.

Table 1 Distribution of sample by IES subsystem and region

Subsistema	Región (ANUIES)						Total	
	Noroeste	Noreste	Centro Occidente	Metro-politana	Centro Sur	Sur Sureste		
Institutos Tecnológicos	23	25	27	11	24	40	150	43,2%
Universidades Tecnológicas	5	8	7	3	10	7	40	11,5%
Universidades Politécnicas	2	5	3	2	7	3	22	6,3%
Universidades Públicas Federales	3	3	4	6	3	1	20	5,8%
Universidades Públicas Estatales	7	4	4	1	5	11	32	9,2%
Centros Públicos de Investigación	3	2	2	3	2	3	15	4,3%
Universidades Particulares	5	8	9	10	9	10	51	14,7%
Otras IES	1	3	1	3	4	5	17	4,9%
Total	49	58	57	39	64	80	347	
	14,1%	16,7%	16,4%	11,2%	18,4%	23,1%		100,0%

In Table 1 we can observe the joint distribution of the IES based on subsystem 347 and the region to which they belong. Watching the type of HEI by subsystem, we realize that the numerically most important group is the technological institutes, with 150 cases (43.2%), followed by the private universities, with 51 (14.7%), and technological universities, with 40 (11.5%). The remaining types of IES move values below 10%, public research centers, with 15 cases (4.3%) and other higher education institutions, with 17 (4.9%), groups of IES less frequent .

If we look at the distribution of HEIs by region, we realize that the most common group is

the Southeast, with 80 cases (23.1%). The remaining regional groups presented similar values, among the 39 cases (11.2%) of the metropolitan area and 64 from downtown South (18.4%).

4 Results

4.1 Entrepreneurial Culture in general terms

The promotion of entrepreneurial culture is one aspect of linkage to a greater following among Mexican IES. Specifically, 89.6% of the 347 IES during activity to promote entrepreneurial culture and 85.6% developed some careers that foster an entrepreneurial culture.

In this respect, the IES 337 whose answers consist have a similar tracking the various activities to promote entrepreneurial culture covered in the questionnaire, namely:

- a. Organization entrepreneurs events (83.1%).
- b. Organization of courses, workshops, seminars, courses or lectures (81.3%).
- c. Event organization creativity (81%).
- d. Promoting student participation in events of entrepreneurs outside the IES (77.2%).
- e. Promoting student participation in events of creativity outside the IES (74.2%).

Similarly, a majority of the IES organized fairs or exhibitions of entrepreneurial projects in 2008 (83% of 306 cases with information). Participation in these fairs and exhibitions the students performed essentially the same IES (IES 94.1% of 254 whose information has), falls far participation of students outside the IES (with values below 26 , 4%). So the audience is concerned, the set of 251 IES whose information we have shown the following pattern, which protrude teachers, students of the institution in general and authorities of the institution:

- a. Teachers (93.2%).
- b. Students of the institution in general (92.4%).
- c. Authorities of the institution (85.3%).
- d. Students carrying materials for entrepreneurs (77.3%).
- e. Entrepreneurs (73.3%).
- f. Government officials (64.9%).

With a majority but less frequently than in the previous cases, 67.6% of HEIs (about 306) organized contests for entrepreneurs to promote entrepreneurial culture. Participation the students performed essentially the same IES (95.6% of the 206 patients with response) being again far students outside the IES (with values below 18.9%). Regarding assistance, repeats the pattern again:

- a. Teachers (95.1% of 204 IES with information).
- b. Students of the institution in general (91.2%).
- c. Authorities of the institution (88.2%).
- d. Students carrying materials of entrepreneurs (77%).
- e. Entrepreneurs (68.1%).
- f. Government officials (57.8%).

Some more activities to promote entrepreneurial culture from the perspective of those responsible for linking HEIs are organizing fairs, conferences and exhibitions (77.3% of 300), the organization of lectures (75%) and the organization of graduates, courses or extracurricular workshops (60.3%).

Encourage student participation in fairs, conferences or exhibitions of entrepreneurs is somewhat widespread (91.5% of 306 cases), these being mainly at the state level (62.7% of 279) at the municipal level (56.6%) and nationally (50.2%). Less widespread is to encourage student participation in contests outside the IES (71.2% of 306). These contests were at the state level (61% of 218) and national (60.6%) and, less frequently, at the municipal level (38.5%).

Similarly, 71.9% of the 306 respondents IES supports students with entrepreneurial projects in creating a business.

4.2 Entrepreneurial Culture by subsystem

The entrepreneurial culture also presents some statistically significant differences by type of HEI in question for a given set of variables. These differences are summarized below, for typological characterization, leading to each type of track percentage bonding line.

TECHNOLOGY INSTITUTES

In 98% of the technical institutes exist entrepreneurial culture activities. These usually have a close IES overall performance average.

This is one of the profiles which are most widespread activities to promote entrepreneurial culture (events for entrepreneurs, creative events, courses, etc.), with values always above 85%.

Usually has a low participation of students from other HEIs in the same municipality (12.7% of HEIs have such participation) and other municipalities in the state (11%) at fairs or exhibitions of entrepreneurial projects. The same happens when contests of entrepreneurs (11.5% and 9.6%, and 5.8% for students from other states) are organized.

TECHNOLOGICAL UNIVERSITY

97.5% technological universities engaged in activities that foster an entrepreneurial culture and 95% included a career with materials that encourage.

For the promotion of entrepreneurial culture, the profile distinct from the other types in promoting student participation in events outside IES entrepreneurs (89.7%) and creativity in events outside the IES (84 , 6%).

A clear majority of HEIs (92.5%) fairs and exhibitions organized entrepreneurial projects during 2008 as well as contests for entrepreneurs (85%).

HEIs are most often support students with entrepreneurial projects in creating a company (90%) and give students access to the business incubator services (94.4%).

Polytechnics

100% of polytechnic colleges have activities to promote entrepreneurial culture and the vast majority of his career with IES include any materials that foster an entrepreneurial culture (95.5%).

For the promotion of entrepreneurial culture profile highlights the frequency with which events creativity (90.9%) are organized.

When you have organized contests for entrepreneurs, in a few cases have involved students from other municipalities in the state (9.1%) and in many cases did students from institutions in other states (36.4%).

His IES organized fairs, conferences and exhibitions to promote entrepreneurial culture (85.7%) and encouraged student participation in fairs, conferences or exhibitions of entrepreneurs (100%).

FEDERAL PUBLIC UNIVERSITIES

Federal public universities are the second least IES presented with activities that foster an entrepreneurial culture (50%). Also low is the percentage of HEIs include races with materials that foster an entrepreneurial culture (55%).

In all activities that promote entrepreneurial culture, IES are the second less frequently: organizing events of entrepreneurs (47.1%), event creativity (41.2%), organization of courses, workshops, seminars , etc. (41.2%), promoting student participation in events of entrepreneurs outside the IES (47.1%) and creativity events abroad (23.5%).

It is the second profile that less organized fairs or exhibitions of entrepreneurial projects in 2008 (60%) but on the other IES stands for the highest share of students from other higher education institutions in the same municipality (83.3%) and other municipalities state (50%).

Shows a low frequency in organizing contests for entrepreneurs (30%) but the highest participation of students from other higher education institutions in the municipality, other municipalities in the state and other states (66.7%).

It is also organizing talks low to encourage an entrepreneurial culture (40%), the organization of fairs, conferences and exhibitions to promote the culture (20%) promoting student participation in fairs, conferences or exhibitions of entrepreneurs (40 %).

STATE PUBLIC UNIVERSITIES

96.9% of the state's public universities undertakes activities to promote entrepreneurial culture and 87.5% of them include races with materials that foster an entrepreneurial culture.

The profile has a relatively high frequency in all activities (81 to 97%) and a high frequency in the organization of fairs and exhibitions of entrepreneurial projects (93.1%), courses, extracurricular courses or workshops to promote entrepreneurial culture (78.6%) and talks to promote entrepreneurial culture (89.3%).

PUBLIC RESEARCH CENTRES

Public research centers is where fewer activities that foster an entrepreneurial culture, occurring in 26.7% of IES are made. Equivalently, in only 6.7% of their careers there IES include materials that foster an entrepreneurial culture.

For the promotion of entrepreneurial culture, the lowest values are presented in all activities (between 0 and 18.2%).

Consequently, public research centers is where fairs or less entrepreneurial projects (25%), and contests of entrepreneurs (25%) were organized, who did not participate or attend any of the actors proposed in the questionnaire, but others (100%).

IES stands out among all the graduates nonexistent organization, extracurricular courses or workshops to promote entrepreneurial culture (0%), the low frequency in the organization of talks to promote entrepreneurial culture (25%) and poor organization of fairs, conferences and exhibitions to promote entrepreneurial culture (25%). However, where more activities other proposals are organized to promote entrepreneurial culture (75%).

Finally, also noted for its low promoting student participation in fairs, conferences or exhibitions of entrepreneurs (25%) and low support for students with entrepreneurial projects in creating a company (25%). Students are not given access to incubator companies (0%).

PRIVATE UNIVERSITIES

92.5% of the private universities is active promotion of entrepreneurial culture and a 86.3% offer careers that include materials that foster an entrepreneurial culture. This is near the average profile.

Shows a high frequency in the organization of graduates, courses or extracurricular workshops to promote entrepreneurial culture (79.1%) and in the organization of talks to promote entrepreneurial culture (86%).

OTHER IES

64.7% of the remaining IES, IES other, engaged in promoting entrepreneurial culture, while 70.6% claim to offer careers that include materials that foster an entrepreneurial culture.

The profile shows slightly lower than the mean values regarding the activities of promotion

of entrepreneurial culture, and markedly lower in promoting student participation in events of creativity outside the IES (37.5%).

Relatively high participation of students from other municipalities in the state fairs as exhibitors (44.4%) and as exhibitors contests entrepreneurs (40%) low attendance of students carrying materials shown entrepreneurs and fair, or exposure time (22.2%) and absolute assistance of teachers (100%).

It is also relatively low organizing graduate courses or extracurricular workshops to promote entrepreneurial culture (45.5%) and support for students with entrepreneurial projects in the creation of a business (45.5%).

4.3 overall technological services

60.8% of the 347 HEIs offer technology services. Of the many services they offer include testing and analysis as well as expert advice and software design:

- a. Testing or analysis (75.5% of 229 cases with response).
- b. Opinions technicians (72.9%).
- c. Design software (63.8%).
- d. Technological adaptation (52%).
- e. Rent of equipment or machinery (30.6%).
- f. Maintenance of equipment or machinery (29.7%).

But the realization of these activities related to technology services faces various difficulties, as a whole, affecting 92.4% of HEIs (about 211 whose information consisting IES). Include the following:

- a. Companies do not know the technology services that can offer the IES (53.3% of 210).
- b. Not have the resources or equipment to develop these services (38.6%).
- c. Low interest of companies (32.4%).
- d. Rules or procedures (23.8%).
- e. Costs of technological services (21.4%).
- f. Intellectual property rights (9.5%).

Also during the past year, 82.1% of HEIs (about 229) have been hired by companies to provide some of these services. During the same period, technology services were provided

to an average of 35.5 companies (IES 183 whose information available). These companies are the same municipality or state mainly specifically:

- a. Companies in the same municipality (15.1 on 170 whose information available).
- b. Companies from the same state (14.6).
- c. Companies in other states (5.7).
- d. Companies from other countries (0,7).

It also comes in your large private companies:

- a. Private companies (28.1 out of 173).
- b. Public companies (4.8).
- c. Government institutions (2,9).
- d. Civil society organizations (1,1).
- e. Other IES (0.7).

Protruding from almost exclusively among such private companies, we have the manufacturing industry. In detail:

- a. Manufacturing (16.9 out of 143).
- b. Agriculture, etc. (4.1).
- c. Other activities (3.7).
- d. Services (3.1).
- e. Commerce (3).
- f. Mining, electricity, etc. (1.7).
- g. Transport (1).

Additionally, 75.5% of HEIs (about 184) has an organizational manual and procedures for the management and administration of technology services while there are any rules or regulations established by way of exercising the proceeds of technological services in 81.3% of HEIs (about 182).

With regard to the involvement of teachers in the IES technology services, we find that most teachers are full-time (20.2 on 152 IES), followed by teachers or $\frac{3}{4}$ time average (11.1 on 37) and subject teachers (9.6 to 61).

Finally, 66.3% of HEIs (about 184) teachers and researchers receive any payment for their participation in the provision of technology services but are 83.6% of HEIs (about 122)

which have some regulation or legislation to pay teachers for their participation in the provision of technology services.

4.4 Technological services by subsystem

Let us in this section aspects of the technological services differ significantly by subsystem.

TECHNOLOGY INSTITUTES

55.3% of the technological institutes provides technological services, figure that approximates the profile somewhat below the average of all HEIs (60.8%).

Technical institutes stand on the other profiles to present as difficulty, that do not have the resources or equipment to develop these services (52.4%).

And as a revenue source, made relatively few technological adaptation services (40.8%).

TECHNOLOGICAL UNIVERSITY

Virtually all technological universities offer technology services (95%) and during the last year, almost all HEIs have been hired by companies to do some technological service (94.7%).

As a source of revenue, maintenance or repair of equipment (48.6%) is offered.

This IES profile usually associated companies of the same state but different municipality because, in 2008, an average of 21 contracting technology services companies on an average of 25.6 companies in any location was the same state.

Technological excel also by the fact that teachers receive some specific payment for their contribution in providing technology services in most HEIs (85.7%) universities.

Polytechnics

50% of polytechnic universities offer technology services (50%).

Among the difficulties that stand out is the fact that they do not have the resources or equipment to develop these services (63.6%).

As a source of income, these stand out because they offer IES maintenance or repair of equipment (40%) and conduct technological adaptation services (80%).

However, teachers receive specific payment for their contribution in providing technology services in relatively few of the IES (30%).

FEDERAL PUBLIC UNIVERSITIES

A large majority of the federal public universities, namely 90%, offering technological services (90%). Similarly, during the last year have all been employed by IES companies for some technological service (100%). And as a revenue source, technical (94.1%) opinions so remarkable is.

These IES were associated in 2008, in relative terms, companies from other states so remarkable as they average 29.5 of that did 12,4cumplían such condition.

Finally, there is a profile that has enough full-time faculty involved in providing technological services (37.3 on average).

STATE PUBLIC UNIVERSITIES

81.3% of the state's public universities, with a percentage well above average, offering technological services and 96.4% of them were contracted by companies to perform some service for the latest technology. And as a source of revenue, the state's public universities offer testing and analysis (95.5%), technical reports (95.5%) and technology services (81.8%) with distinction adaptation.

These IES associate companies of the same state but different municipality (38.1 to 67.3) and are the most full-time faculty are involved in providing technological services (47.6 on average).

PUBLIC RESEARCH CENTRES

73.3% of public research centers offer technology services. Also stresses that technology in 2008 to an average of 177.4 companies provided services mainly the same municipality (112.9). It is also noteworthy that only these IES had a remarkable relationship with companies from other countries (8,5) in 2008.

However, the idiosyncratic and characteristic difficulty here are rules and procedures (58.3%).

PRIVATE UNIVERSITIES

37.3% of the private universities offer technology services, so that the profile is positioned as the second line. As a source of income, it provides relatively little both testing and analysis (46.7%) and as technicians (53.3%) opinions.

HEIs are associated, in relative terms, companies from other states (9.5 out of 29.1) and teachers receive a specific payment for their contribution in providing technology services in most HEIs (80%).

OTHER IES

This is the profile less tracking technology services, with 29.4%. As a source of revenue, offered relatively little testing and analysis (50%) and make technical (50%) opinions.

In 2008 only 1 technology services company while half were provided teachers receive no specific payment for their contribution in providing technological services in any of your IES (0%).

Compared to the other profiles, there are two difficulties in the other IES: not have the resources or equipment to develop technology services (100%) and the rules and procedures (100%).

4.5 Business Incubator broadly

The line of business incubator is undoubtedly the least monitored by the IES had all that worked on the study. Indeed, only 38.9% of 347 HEIs have business incubator. Of the total IES incubator and whose information we have (131), 87.8% incubator has registered in the National Business Incubator of the SE.

The various specific services that offer business incubators are:

- a. Financing (87% of 131) is managed.
- b. Entrepreneurs can use desktops (84.7%).
- c. Entrepreneurs can use computers, printers and computer equipment (84%).
- d. Entrepreneurs can use some boardroom (80.9%).
- e. Entrepreneurs can use laboratories or workshops IES (76.3%).
- f. Formalities with the competent authorities (73.3%) are managed.
- g. Entrepreneurs can use the phone (71.8%).

h. Care services to clients (receiving calls, faxes ...) (65.6%) are provided.

But: what areas often offer advice business incubators? Mainly in the following:

- a. Production processes (93.9% of 131 IES).
- b. Marketing (93.9%).
- c. Legal counsel for tax and constitution of the company (93.1%) procedures.
- d. Administration and accounting (92.4%).
- e. Funding process (92.4%).
- f. Legal field (84%).
- g. Industrial design (80.9%).
- h. Customer Service (77.9%).
- i. Selecting human resources (75.6%).
- j. Quality control of products and services (71.8%).

However, under this line of track linking gives a significant role to the difficulties faced by HEIs to provide incubator services. These difficulties affect 85.4% of the IES (IES 205 on which information is available) and are as follows:

- a. Amount of investment required to initiate or maintain an incubator (44.4% of 205).
- b. Cost of business incubation services (29.8%).
- c. To formalize the incubator (28.3%).
- d. Unwillingness of teachers or researchers to participate (16.6%).
- e. Low interest of companies or entrepreneurs (14.1%).
- f. It is of interest to the IES (5.9%).

So, in 2008, between HEIs incubator, 25.2 average IES projects (about 131 cases) were incubated, of which approximately 6.1 IES (about 123 cases available) finally graduated.

The type of projects that were in process of incubation in 2008 were remarkably intermediate technology (12.2 averaged over 119 cases) and about traditional businesses (11.9), leaving away the high-tech (2.8) .

However, the weight of intermediate technology is even more prominent if we ask about the type of incubators as if they are more or less adopted by IES. Thus, intermediate technology incubators (71.8% of 131) stand above the rest, the traditional business (15.3%) and high technology (12.2%).

Continuing with this characterization of incubation in Mexico, it should be noted that the commercial scope of projects incubated by IES belongs in:

- a. Same (11.9 averaged over 119).
- b. Same municipality or city (8.7).
- c. National level (4.4).
- d. International level (0.9).

As for the sectors in which such projects are classified incubated, include the following:

- a. Services (8.2 averaged over 118).
- b. Commerce (5.8).
- c. Other sectors (4,5).
- d. Manufacturing (4.1).
- e. Agriculture, etc. (2.5).
- f. Mining, electricity, etc. (0.6) and transport (0.6).

The collaboration of teachers in the business incubator brings us to highlight the role of full-time faculty (6.2 averaged over 131) above average teachers or $\frac{3}{4}$ time (2) and subject teachers (two).

And watching the collaboration of students in the business incubator, we note that such cooperation takes the form of social services (10.2 averaged over 124 IES) and professional practices (6.5) and, more distance, as interns (0.8).

4.6 Business Incubator by subsystem

Here are the results so that significant differences subsystem refers to treat the business incubator.

TECHNOLOGY INSTITUTES

Incubator companies have 28% of the technical institutes and they face difficulty as an extended amount of investment required to initiate or maintain an incubator (52.3%).

Regarding the business scope of incubated projects, very few of these are nationally (0.7 on average).

TECHNOLOGICAL UNIVERSITY

The profile of the technological universities hosting is by far a greater relative frequency of occurrence of business incubator. Indeed, such a service have 97.5% of all HEIs. Similarly, almost all HEIs recorded their incubators in the National Business Incubator of the SE (97.4%).

As the business scope of incubated projects include those that are the same (10.1 average on a total average of 17.2 projects) and very few nationally (0.8).

Also, very often advice on industrial design (94.9%) and business incubator for entrepreneurs usually allowed to use desktops (92.3%) is offered.

polytechnics

In 36.4% of polytechnics no business incubator, although only 66.7% of HEIs recorded their incubators in the National Business Incubator of the SE.

These IES noted for having as main difficulty the amount of investment required to initiate or maintain an incubator (61.5%).

In 2008 there were very few graduates projects (0.2 on average) and with the graduation of these projects generated very few jobs (2.5 on average).

As the business scope of incubated projects there was none, in 2008, it was a national level (0).

Similarly, polytechnics offered relatively little guidance on industrial design (50%).

As far as the services offered by the business incubator is concerned, include: relatively few IES (50%) allow use computers, printers and computer entrepreneurs, allowing infrequently entrepreneurs use desktops (50%), few IES allow entrepreneurs to use the meeting room (33%) and using laboratories and workshops of the IES (16.7%).

FEDERAL PUBLIC UNIVERSITIES

Only 10% of the federal public universities have business incubator, of which 66.7% are registered in the National Business Incubator of the SE.

However, for cases with incubator, in 2008 there were many projects in incubation (57.3 average) and many graduates projects (16.5). With the graduation of these projects during the same period, many jobs (102.7) were generated.

Similarly, there were many high-technology projects that were in incubation in 2008 (27.3) and many intermediate technology (30).

As the business scope of incubated projects are concerned, these are mainly nationally internationally (38.3) and (17), highlighting the projects of other sectors (50).

Finally, the federal public universities should be noted that few HEIs (33%) allow entrepreneurs to use the boardroom.

STATE PUBLIC UNIVERSITIES

68.8% of the state universities offers business incubator.

During 2008 there were many projects in incubation (70.6) and also many graduate projects (17.5).

The business scope of incubated projects was remarkably the same (35.4) and services (25.6) sector.

The services offered by the business incubator highlights the fact that often allows entrepreneurs to use desktops (90%).

PUBLIC RESEARCH CENTRES

Public research centers are less profile tracking service business incubator, as only 6.7% of these IES, which is equivalent to one, you have such a service. The only IES not registered your incubator in the National Business Incubator of the SE (0%).

During 2008 there were no projects in graduate business incubator (0) and therefore no job (0) is not generated.

Many high-tech projects were incubating in 2008, in relative terms (6 of 12) and as many intermediate technology (6 of 12).

No incubated the services (0) industry projects and there are 100 full-time faculty and 21 students working as interns, despite having only one business incubator IES.

This business incubator offers advice on industrial design.

PRIVATE UNIVERSITIES

In 35.3% of the private universities there business incubator.

In 2008, with the graduation project, many jobs (68.8 on average) were generated.

Many projects were in incubation buffer technology in 2008, in relative terms (14.7 to 26.9), with plenty of incubated projects services (10.3) sector.

OTHER IES

17.6% of the other IES offers business incubator, facing so remarkable, the difficulty of the amount of investment required to initiate or maintain an incubator (57.1%) and, as responsible for the actions linkage, the little interest of HEIs (33.3%). Relatively few of HEIs that offer recorded their incubators in the National Business Incubator of the SE (66.7%).

In 2008 there were very few projects in incubation (0.7), none of them with the same commercial reach state (0). There was also incubated projects in the services sector (0).

The services offered by the business incubator, in all cases, entrepreneurs are allowed to use computers, printers and computers (100%), using the boardroom (100%) and using laboratories and workshops of the IES (100%).

5 Conclusions

The addition of the third role of universities, concerning the economic development of the environment through technology transfer and university-industry relationship, can and should be conceptualized from different dimensions according to the results. Evidenced by the fact that Mexican IES are unevenly each of these aspects. Indeed, the promotion of entrepreneurial culture of the students is a widespread practice, since 89.6% of HEIs working on different issues pointing in that direction. The provision of technological services by university entities, in turn, is biased by the significantly lower IES, but also widespread. They are 60.8% of HEIs that offer with some normality manifest such kind of services. However, if we analyze the entrepreneurial spirit of the university on the side of the establishment and maintenance of incubators, we realize that there are significant obstacles, since only 38.9% of HEIs have such incubator.

First, the promotion of entrepreneurial culture not only provides a high tracking results regarding its generic definition, but also shows consistent and high for each of the indicators, without exception values. This assessment allows us to conclude that the cultural aspect of the entrepreneurial university is the most easily worked by the IES and best

reflects the exercise by university entities that third function.

But are there differences tracking entrepreneurial culture by type of HEI concerned what? The answer is yes. A first group of IES in such monitoring is almost complete: polytechnic universities (100%), technological institutes (98%), technical universities (97.5%), state public universities (96.9%) and private universities (92.5%). In a second group, formed by other HEIs (64.7%) and federal public universities (50%), monitoring has an intermediate character. Finally, public research centers (26.7%), barely engaged in promotion of entrepreneurial culture.

Second, the provision of technology services, exerted mainly with private companies manufacturing the same city or state, has a somewhat lower track. HEIs need to address three outstanding difficulties: first and foremost, that companies do not know the technology services offered by the institution; second, that does not have the resources or equipment to develop these services; and third, the lack of interest of companies in the same.

In this case three groups are also evident tracking. First, are the technological universities (95%), federal public universities (90%), the state's public universities (81.3%) and public research centers (73.3%), as technological services it is widespread. Secondly, we have the technological institutes (55.3%) and polytechnics (50%), occupying an intermediate position. Finally, the private universities (37.3%) and other HEIs (29.4%) have remarkably low.

Third, business incubation is by far the largest dimension raises questions which follow. In this line, centered empirical effects in the intermediate technology, it is essential to take the kind of difficulties faced by IES, and are the amount of investment required to initiate or maintain an incubator, the costs of services incubation and processing necessary to formalize an incubator.

For this reason only highlight the technological universities (97.5%) and, more tentatively, state public universities (68.8%). Both types of institutions are undoubtedly those who have shown greater predisposition towards business and technology relationship with the college environment. The rest are a group of IES low tracking, with values ranging from 36.4% of

polytechnics to the only case of public research center.

6 Limitations and future research lines

For the reasons stated so far, will be useful to present some suggestions for future research. Some of these tips emanating from the virtues of work and presented, some of their own limitations:

- 1) The development of the entrepreneurial university in any society is composed of conceptually distinct dimensions whose empirical rates of progress can be different and even contradictory.
- 2) It must not be limited to the investigation of the IES study but generally spreads behaviors according to a typology of such entities is appropriate and relevant in the particular context in question (in our case the distinction subsystem) .
- 3) It is hypothetically expected that HEIs with similar characteristics to technological universities and state public universities in the Mexican case are those with greater length and intensity undertake entrepreneurial activities and technology transfer.
- 4) It will be a useful explanatory character study that accounts for the causal mechanisms by which specific types of behaviors and IES show disparate rates of evolution, even at the cost of centering the object of attention in one of the dimensions of the entrepreneurial university.
- 5) a comparative study will be useful for countries, linking the evolution of the traditional university to entrepreneurial university with the changing economic and social development.
- 6) It is more important to check the representativeness of the sample to try to collect an enormous amount of information on each of the questionnaires, as partially happened with the data we were supplied.

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