

TOWARD A MODEL OF UNIVERSITY- REGIONAL SURROUNDINGS COLLABORATION IN MEXICO, AND SURELY LATIN AMERICA

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Abstract

This study aimed to examine the institutional and organizational characteristics of Mexican state public universities' outreach with the surrounding area, by identifying and comparing best practices to design a new model for collaboration with the environment. The central question was: "What are the regulatory foundations for the planning and educational philosophies that underpin the outreach approaches of public universities in Mexico?" In methodological terms, this research was of a qualitative nature, and used institutional documents as its main data. It was a documentary review of regulations, planning documents, educational models, and organizational structure of the nine universities considered. Qualitative evidence was collected through deductive content analysis, on the basis of preconceived theoretical and conceptual precepts that guide the search for and analysis of documentary information. One key finding was that the regulations of the institutions examined did acknowledge the importance of strengthening ties between the university and the regional surroundings but were ambiguous in their definition of collaborative activities. In most universities, outreach was seen as a support for teaching and research, and its importance was not acknowledged. This is why it is necessary for universities to make promoting economic and social development a substantive function, to be reflected in specific regulations for outreach. Similarly, greater visibility is needed in organizational structures to position outreach within universities' roles and activities.

Keywords: *collaboration, deductive content analysis, documentary review, regional impact.*

Introduction

Although collaboration (hereafter, this paper uses the terms *collaboration* and *outreach* interchangeably) between universities and the surroundings (the productive sector) has its roots in the 19th century in the German university system, it was not until the 20th century that major U.S. universities began to strengthen their linkage with agricultural and industrial development. Indeed, in the period between World War I and the post-World War II years, technological and scientific development was closely linked to the arms race, leading the government to strongly promote the advancement of science and technology. In the late 1970s, an international movement centered around the United States began to gain momentum, promoting the idea that

one of the purposes of knowledge generation in universities and public research centers, and of professional and graduate training, was to address regional issues. This in turn strengthened outreach.

University outreach is thought of as a comprehensive, strategic process, and an institutional system that includes every stage of planning and all types of resources that must be employed to fulfill the objectives and goals of the policies, strategies, and forms of environment interaction. In addition, outreach is a process that brings together the substantive functions of teaching, research, and extension for effective interaction with the social and economic landscape, ensuring mutual benefits for partners of the agreements (ANUIES-FESE, 2011; Gould-Bei, 2002).

On the other hand, the international political and ideological climate gradually came to constitute an additional burden, leading universities to seek further funding with their own instruments, and driving them to promote the commercialization of knowledge and specialized services, the foundations of which were laid with public funding. From the early 1980s, legislative reforms were carried out in the United States, followed by Europe and East Asia, and finally Latin America; in Mexico these reforms date from the early 1990s. The reforms opened the door to knowledge commercialization and an ethos that is more oriented toward regional problems.

The Mexican university system has been receptive to global and national trends regarding the role of Higher Education Institutions (HEIs) in solving regional issues. The task at hand is to explore the institutional and organizational dimensions of universities' interaction with their environment, in particular state public universities in different states of Mexico.

Although there have been more than 20 years of systematic research on this phenomenon, the discussion is still embryonic as it has not yet gotten past the diagnostic and exploratory stage; it is striking that the institutional and organizational aspects of university outreach have been overlooked. This justifies the relevance of this research.

On the basis of the above, the following question was raised: "What are the regulatory foundations of the strategic planning and educational philosophies that underpin and enrich outreach approaches in public universities in Mexico?" With this in mind, this paper searched to explore, from an institutional and organizational perspective, the various university outreach models operating in different state public universities.

Theoretically and epistemically, the methodology employed was in keeping with institutional research. The data and information collection process involved deductive content analysis (based on the main categories identified) of regulatory documents, institutional planning, and institutions' educational models and organizational structures. These categories were then considered in relation to institutional constructs.

Historical, Theoretical, and Empirical Background

Outreach in academic and research activities dates back to the 1920s in the United States, insofar as progress in scientific research could be transferred to agro-industrial production (Etzkowitz, 2003; Griliches, 1958). This was first set in motion even earlier, in the late 19th century, by the patent race in the electricity and metalworking industries. In Germany, university education (the dual education system) included application in the productive sector. Indeed, the German system was one of the first to feature a symbiosis between teaching and research (Etzkowitz et al., 2000; Etzkowitz, 2003). In addition, it was the German system itself that kick-started the second academic revolution, characterized by a clear, explicit and deliberate intent to link university education and knowledge generation with the productive sector.

With the outbreak of World War II in the late 1930s, the world's powers turned their technical and scientific efforts toward the development of warfare, and despite considerable

technological development, neither science nor technology was fully devoted to peaceful endeavors. When the war came to an end, science and technology faced an unclear future, leading Bush (1945 [1999]) to persuade President Roosevelt to continue to develop knowledge even though frontal warfare had ended, his main argument being that technological and scientific advances would solve old and new problems.

In the post-war era, as public and applied knowledge progressed, there was a growing perception that this knowledge should contribute directly to solving various economic and social problems. So it was that the late 1970s saw the first indications of a direct link between knowledge generation and the production of goods and services, with the emergence of small businesses based on scientific findings, following substantial developments in medical biotechnology (Corona, 2006; Etzkowitz, 2003).

First in the United States, and then in Western Europe, these events were replicated everywhere. University systems began to enter an epistemic crisis, as they were unsure whether to continue to follow the Mertonian norms or gradually drop them. Conflicts of interest paved the way for the acknowledgment of intellectual property rights (IPRs) and the commercialization of knowledge. These events influenced the U.S. Congress to pass the Bayh-Dole Act, which acknowledged the IPRs of researchers and academics in publicly-funded projects (Mowery & Sampat, 2005).

Since then, the literature on the development of this phenomenon has reported exponential growth. Researchers that have attested to this include Agrawal (2001), Baldini (2008), and Perkmann et al. (2013). In this context, Latin America has been no exception, as legislative IPR reforms have been observed since the 1990s (García-Galván, 2012). This progress has been echoed by the Economic Commission for Latin America and the Caribbean (ECLAC), which has documented developments over recent decades (ECLAC, 2010). Education plans and programs gradually began to include content promoting innovation and entrepreneurship, characteristics that are part of what was termed “entrepreneurialization” (*empresarialización*) by Ibarra (2005), and “entrepreneurial training” by Luna (1999).

Some Latin American researchers have criticized this trend because the Anglo-Saxon model cannot be molded directly onto the context and nature of Latin American countries. These include Arocena and Sutz (2005); Arza (2010); Kent (2005); Langer (2008); Thomas et al., (1997); and Thomas and Dagnino (2005). These studies agree that Latin American universities came into being as part of a close link to society in general (and to this day, for many, this remains the case), rather than specifically to strengthen ties with firms and, furthermore, the productive context is not even adequate to enhance technical and scientific collaboration. As acknowledged by ANUIES-FESE (2011) and Gould-Bei (2002), often firms established in Mexico prefer to import turnkey technologies rather than promote internal development. Nevertheless, since the 1990s, collaboration between universities and the surroundings has been actively promoted and expanded, in some countries (Brazil, Mexico, Colombia, and even Cuba) more so than others (ECLAC, 2010).

In Mexico, there have been research efforts to report on outreach development. One such study, by Casalet and Casas (1998), sought to diagnose academia-industry collaboration, and the collaboration mechanisms employed by HEIs in their collaboration with the surroundings. This may be the most systematic empirical study conducted in the country but was followed by research at a regional or sectoral level, such as García-Galván (2013), and Guzmán and Guzmán (2009). Other studies of interest were conducted by De Fuentes and Dutrénit (2012, 2014).

Particularly remarkable is the fact that one of the regions where most efforts have been made to research collaboration between HEIs and the environment is the north-west, where efforts are mostly associated with a research program and, to some extent, group consolidation, which does not entail deliberate institutional engagement (Alcántar et al., 2006; Bajo, 2006; Celaya & Barajas, 2012; García-Galván, 2018; López, 2002).

However, none of the studies mentioned offers a deep insight into the institutional and organizational arrangements that support the linkage between universities and the surroundings. Their marked empirical and applied bias loses sight of the importance of university regulations, institutional planning instruments, and the core aspects of educational models.

The Notions of Institution and Organization

In the words of Ayala-Espino (1999), Hodgson (2006), North (1993 [2006]), and Tylecote (2015), institutions are the game rules or norms (legal, social, and cultural) that are conducive to individuals' coexistence in society and facilitate economic transactions. Institutions are not just restrictions: they also represent opportunities. In the discussion at hand, a strong institutional framework (or game rules) will enable more rapid development of university outreach.

Institutions are not necessarily formal and coercive. Many informal institutions that do not depend on laws, by-laws, or regulations also operate, and may be *per se* agreements between stakeholders in relation to a specific phenomenon. For example, discussion on the social norms of science revolves around whether there are clear agreements about the commercialization or non-commercialization of knowledge, whether researchers are granted IPRs to their findings, and whether it is right to be a researcher at a public university and an entrepreneur at the same time. These issues go beyond conventional regulatory structures. In addition, debates focus on types of university education (educational models) and whether an epistemic, theoretical education should be strengthened or, instead, emphasis placed on building work skills and capabilities.

On another note, studies on collaboration with the surroundings have overlooked the thin line between the meaning of institution and organization. According to Hodgson (2006) and North (1993 [2006]), organizations –with their command structures, boundaries and members– become the operative base for institutions, and interestingly, conventional literature even confuses the two. In any case, proper institutional arrangements would pave the way for more efficient organizational structures.

The trend toward collaboration between universities and the surroundings includes aspects that suggest an institutional and organizational change in the Mexican university system (García-Galván, 2018). Consolidating this change requires legal reforms (adaptations, updates, and additions to university regulations) both at a higher level and within universities themselves. Strategic planning also needs to adapt to general trends and policies, as do educational models and methods of collaboration.

Research Methodology

General Background

This study was qualitative and used institutional documents as its main inputs. In this sense, it was a documentary review of the regulations, planning documents, educational models, and organizational structure of the nine universities considered.

Evidence was collected through content analysis. The analysis was deductive as it proceeds, in an institutional perspective, on the basis of preconceived theoretical and conceptual precepts that guide the search for and analysis of documentary information.

Sample

The group of state public universities was selected based on relevance in previous studies (Alcántar et al., 2006; Celaya & Barajas, 2012; García-Galván, 2018; López-Leyva, 2002), an

exploration of electronic information resources, and more concrete indicators (curriculum-based outreach [social service and internships], outreach derived from research [advanced consulting, contracting research, patent management]). Out of 34 possible universities, the following were selected:

- Meritorious Autonomous University of Puebla (*Benemérita Universidad Autónoma de Puebla*, BUAP),
- Autonomous University of Aguascalientes (*Universidad Autónoma de Aguascalientes*, UAA),
- Autonomous University of Baja California (*Universidad Autónoma de Baja California*, UABC)
- Autonomous University of Nuevo León (*Universidad Autónoma de Nuevo León*, UANL),
- Autonomous University of the State of Mexico (*Universidad Autónoma del Estado de México*, UAEMéx),
- Autonomous University of Yucatán (*Universidad Autónoma de Yucatán*, UAdY),
- University of Guadalajara (*Universidad de Guadalajara*, UdG),
- University of Guanajuato (*Universidad de Guanajuato*, UGto),
- Veracruz University (*Universidad Veracruzana*, UV).

Procedure

In the course of 2017, an electronic exploration of the web pages of the 9 selected state public universities was carried out, the goal was to search for and review –within their information resources– their main laws and regulations, their institutional planning documents, their documents of the respective educational models, and the corresponding organizational structure. In some universities it was not possible to find some of the mentioned inputs.

Data Analysis

The main university documents that guided policies, strategies, and aims associated with outreach activities were identified. The content was then thoroughly reviewed to locate references to activities involving collaboration with the surroundings. In university laws, by-laws and regulations: articles and paragraphs that made reference to activities associated with collaboration (see Table 1).

Table 1
Number of articles in university rules and regulations that make reference to outreach or collaboration with the surrounding environment

	UV	BUAP	UGto	UAEMéx	UAdY	UAA	UdG	UANL	UABC
General or Organic Law	8	6	9	6	3	6	10	3	3
University By-Laws	28	14	11	8	3	9	16	3	25
Teaching or Academic Staff Regulations	3	22	9	3	6	7	7	10	7
Research and Graduate Regulations	5	13	6	16	1	2	2	2	6
Social Service Regulations	4	22	13	1	2	NR	11	6	3
Internship Regulations	NSR	NSR	NSR	NSR	NSR	3	NSR	6	3
Dissemination and Outreach Regulations	NR	NR	NR	NR	NR	65	NR	NR	NR

Source: Own work based on rules and regulations reviewed. Abbreviation key: NR (no regulations), NSR (no specific regulations, although practices could be addressed in another of the university's regulatory documents).

In development plans: whether outreach was considered in the mission, vision, diagnosis, objectives and goals, policies and strategies, and specific outreach focal points or programs. To that end, 12 official documents were reviewed (five long-term plans and seven for the Rector's term in turn; see Table 2) from universities with deliberate discourse on outreach in their strategic planning. In educational models: whether outreach was envisaged in education, and forms of outreach and relevance for education and research (see Table 2). In organizational structures: priority level of the collaborative or outreach function.

Table 2
Outreach in strategic planning in state public universities

University	Long-term development plan	Institutional development plan (Rector's term in turn)	Explicit educational model in a document
BUAP	----	YES	----
UAA	----	YES	YES
UABC	----	YES	YES
UANL	YES	YES	----
UAEMéx	YES	YES	----
UAdY	----	YES	----
UGto	YES	----	YES
UdG	YES	----	YES
UV	YES	YES	----

Source: Own work based on the planning instruments of the above universities, available as part of their electronic resources.

These criteria provided an overview of the extent to which universities' outreach models were established. It could be that none of the universities constitutes a model to be followed, but each might offer, to a greater or lesser extent, important aspects for achieving a more comprehensive university outreach model.

Research Results

University Rules and Regulations

The clarity and presence of outreach in university rules and regulations, as game rules that promote or restrict activities, were indicative of the importance placed on this issue.

One insight into the importance of collaboration in legislation was the number of articles that made reference to the phenomenon. For example, in the university by-laws of UV, BUAP, UGto, UdG, and UABC, there were over 10 articles dedicated to outreach, while UV and UABC stood out, with 28 and 25 respectively. Similarly, BUAP devoted over 20 articles of its Teaching Regulations to outreach, which gave an idea of the importance of this aspect at a professional level. At UAEMéx, meanwhile, the Research and Graduate Regulations featured 16 articles, suggesting that this university attaches great importance to outreach in research and graduate studies.

As far as clarity is concerned in universities' outreach activities, strategies, responsibilities, and role, UV and UAA stood out in their general or organic laws and university by-laws,

although outreach also featured highly in the General By-Laws of UABC. Generally speaking, in these universities, the notion of outreach was holistic (and included connections with the productive sector, government bodies, and society, as well as with other HEIs), while UAdY was most ambiguous.

In the nine universities' teaching regulations, closer outreach with the productive sector was generally relegated to a third plane. This could be one reason why the outreach role was not taken on as the responsibility of academic staff.

The research and postgraduate regulations shared a concern for solving social, governmental, and productive sector issues. Associating research findings and graduate studies with the needs of the surroundings was no small undertaking. BUAP, by way of example, consulted industry and the government to offer graduate programs essentially geared toward solving the problems of the productive sector and boosting innovation.

The primary objective of social service was that students contributed to the development of the surroundings and solving the problems it posed. Some universities exhibited a bias toward disadvantaged groups, while others promoted social service across the social spectrum (communities, the government, and businesses).

UAEMéx was the only university with a set of Professional Study Regulations, which stated that programs would be made available based on their academic and social relevance, but social relevance was normally associated with social needs in the strictest sense, and above all, the demands of the productive sector.

UAA was the only university with a set of Dissemination and Outreach Regulations. Similarly, UANL had a policy and procedures manual for the university administrative units associated with outreach, although it had a markedly administrative bias. UABC, on the other hand, was the only university with a specific set of Intellectual Property Regulations, designed in broad terms to clarify issues associated with intellectual property to facilitate knowledge transfer to local stakeholders and contribute more directly to economic and social development.

Important aspects of UAA's (2011) Dissemination and Outreach Regulations:

- In Article 5 bis, outreach was defined as an activity through which UAA offers educational, social welfare or professional goods and services, at the request of private individuals, associations or public or private institutions, by way of contracts or agreements that met their needs.
- This same article also provided that UAA shall establish links with the productive and service sectors, in addition to providing services derived from teaching and research to different sectors. Furthermore, particular attention would be paid to user follow-up and satisfaction. Image positioning and institutional presence was another task.
- The General Directorate for Dissemination and Outreach was the administrative body responsible for outreach activities.
- The regulations made no clear distinction between extension, dissemination, and outreach.
- Emphasis was placed on technical and scientific dissemination; a distinction was made between dissemination for a specialist audience and for laypeople.
- Each year UAA announces the "University Dissemination Award".
- Outreach was divided into two dimensions: 1) an academic dimension that sought to develop knowledge and skills at a practical and professional level; 2) a service dimension aimed at providing solutions for specific problems in the public and private sectors.

The key features of UABC's (2017) Intellectual Property Regulations included:

- Generally speaking, outreach was considered to be any relationship with stakeholders outside the university (companies, governmental bodies, and social organizations).
- The two main objectives of outreach were the university's contribution to meeting needs and solving problems at the national or regional level, and knowledge application and transfer.
- Outreach mechanisms explicitly mentioned in the regulations were contracted projects, strategic partnerships, technological alliances, consortia, outreach units, new technology-based firms, and innovation networks.
- Emphasis was placed on ownership of IPRs, the beneficiaries of this property, and benefit sharing among university stakeholders.
- Of particular interest was Article 45, which read verbatim as follows: "The University shall have the power to transfer, with or without charge, knowledge protected by any form of intellectual property of which it is the owner or co-owner, with the consent of the other co-owner. Should the assignee derive profit from this transfer, the rights of the author, inventor or plant breeder must be safeguarded," [the translation from the Spanish is my own] (UABC, 2017: 10).
- University authorities were also given a mandate to create the administrative body for intellectual property management known as the Intellectual Property Body.

The respective specific regulations established by UAA and UABC were a stark departure from other universities in the group and reflected conscious efforts to organize, clarify, and delineate aspects associated with interaction with companies, governmental bodies, and social organization surroundings.

Institutional Planning

It was derived that some universities did not have a clear sense of the importance of outreach. As a result, activities need to be managed and run by specialists to achieve greater consistency. Some studies (ANUIES, 2011; García-Galván et al., 2018; Gould-Bei, 2002) have drawn attention to a need to professionalize those in charge of managing and operating university outreach.

Universities with long-term plans included collaboration with the surroundings in their missions through various mechanisms. All the universities' long-term visions anticipated better performance in outreach and an ever-growing impact on the productive sector.

The diagnosis in some universities acknowledged the need to update and improve their substantive functions, bringing them more in line with local needs and opportunities. Furthermore, UV, UGto, and UdG set down themselves ambitious targets for collaboration.

UV, UGto, UAEMéx, UdG, and UANL have clearly defined the policies, strategies, and actions that need taking forward to consolidate outreach. Some, like UGto and UANL, have included specific programs for each outreach mechanism of greatest interest to the institution, and others plainly detail the policies and strategies they were keen to promote.

In universities that established a plan for the Rector's period in turn, reference was made to a need for outreach with the surroundings to solve problems and promote development. All the universities' visions sought to consolidate their linkage with the environment to bring about a more effective solution to problems and achieve a greater impact on development.

Objectives and goals that took into account aspects of outreach were not identified directly in documentation for UV, UAEMéx, and UABC. The other universities included various plans for collaboration, such as having research and teaching closely tied to outreach in order to solve local problems and promote development, consolidate IPR management, and

make the education offered more responsive to local demand. It was also found that BUAP and UANL did not clearly state the main problems they face in terms of outreach; the remaining universities highlight problems such as:

- Limited human resources (research professors) with the training and skills to generate knowledge that has an impact on solving local problems.
- A shortage of strategies to organize and manage roles and activities associated with outreach.
- Technological potential (ICT) was not efficiently leveraged for outreach to achieve a greater impact.
- The connection needed between teaching and research to facilitate outreach was unclear.
- The lack of funding was a bottleneck that prevents progress to other stages, such as the creation of science and technology parks.

Broadly speaking, institutional development plans could be described as lax, as far as expressly designed outreach policies, strategies, actions, and programs were concerned. Generally, references to this function came coupled with categories such as extension, dissemination of culture, and even knowledge and technology transfer; in addition, often the terms were used interchangeably, suggesting a lack of clarity in university efforts to interact with other local stakeholders.

If extension, dissemination, transfer, and outreach *per se* were mechanisms that universities employed both to influence education and research within organizations and to help solve the problems of the public, private, and social sectors, it was logical to conceive of a broader, more representative category such as collaboration with the (regional) surroundings.

Seven universities had plans associated with developing outreach. These were reflected in specific policies, strategies, actions, and programs, including, for example, policies or programs to build capacities and the diversification of research to solve social problems more effectively; specific collaboration programs to better contribute to social and economic development; the need to integrate contributions from external stakeholders to improve teaching and research performance; the promotion of cross-disciplinary study programs and curricula that better reflect social needs and issues; linking outreach activities and strategies with education by recognizing them as forms of teaching and learning; promoting student and researcher-academic mobility toward sectors in which they could apply knowledge, and mobility from said sectors; and integrating and updating university catalogues of products and services that could be purchased or contracted by external stakeholders.

Outreach in University Educational Models

Only five universities (UGto, UAdY, UAA, UdG, and UABC) had educational models available electronically. These models were aligned with development plans. Key features included:

- For UGto research, innovation, outreach, and internationalization were aspects that tended to strengthen collaboration with the surroundings. Outreach was fundamental as it enabled students to engage with and address needs within their surroundings, which in turn fueled learning; through outreach, the university learned from the very society that gave it meaning and participated in the institution's own processes, leading to a relationship based on reciprocity. Outreach strategies included continuing education, the dissemination of culture, the extension of services, exchanges, social service, and internships.
- UAdY's Educational Model for Comprehensive Development laid the groundwork

for viewing the curriculum as a framework of practices, relationships, and interactions. Student education was underpinned by a sense of responsibility and solidarity toward society.

- UAA's Educational Model sought to ensure an education that promoted engagement in processes of social change and was relevant in an international, national, and local context. One component of education was the social commitment undertaken.
- For UdG outreach was a way to contribute to the sustainable and equitable development of communities. The university's vocation was to find explanations, propose improvements, offer assistance and guidance, voice opinions, intervene in emergency situations, offer points of view, make recommendations, or provide specialized services. Key outreach actions and programs at UdG included agreements, knowledge and technology transfer, business incubation, and citizens' initiatives.
- UABC's Educational Model was one of the most discursively rich. It stated that innovation is a determining, decisive factor in achieving long-term growth, and that work on knowledge transfer from the academic sector to industry is a major challenge, as a link must be established between productivity, innovation, and an improved quality of life. UABC's mission was to promote viable alternatives for the economic and social development of the state and country, supported by the generation and application of scientific, technological, and humanistic relevant knowledge. The forms of learning associated with outreach processes and activities and envisaged by the model were the practice of research, support for extension and outreach activities, outreach projects for credit, social service (formative and knowledge application activities performed by students of associate and bachelor's degrees for the benefit or in the interest of the less advantaged or vulnerable sectors of society), internships, a university entrepreneurship program, and a student mobility and exchange program.
- One of the most interesting findings from the educational models was this definition of outreach (*vinculación*) by UABC: *a set of actions performed in the form of service procurement, internships, social service, applied research, technological development and innovation, continuing education, entrepreneur training, consultancy and technical assistance that bring about the region's social, cultural, economic, and productive development* [the translation is my own]. This definition came very close to the idea of *collaboration with the surrounding environment* as a process encompassing all the connections that universities establish with their surroundings (conceptualization found in work by ANUIES, 2011; ECLAC, 2010; De Fuentes & Dutrénit, 2012; García-Galván, 2012, 2018; Gould-Bei, 2002).

It was in documentation on educational models that outreach discourse became more concrete. These documents established what was meant by outreach, outreach aims and goals, and the mechanisms, strategies, channels, and ways to realize and strengthen this collaboration.

Outreach in Universities' Organizational Structures

Consolidating collaboration between universities and the surrounding environment requires a logical alignment between university legislation, strategic planning, educational models, and a functional and effective organizational structure in managing inherent policies, responsibilities, and activities.

It was clear from Table 3 that establishing a general directorate or secretariat for local collaboration that was beyond a simple spattering of terms such as dissemination, extension, outreach, mobility, and exchange was of great relevance. Such an administrative body would

need to be vested with hierarchical responsibilities, duties, and features such as:

- Designing collaboration policies and mechanisms;
- Strategies and incentives to promote outreach;
- Defining the forms and channels of interaction;
- Comprehensive audits of outreach directorates, coordinating offices or departments;
- Preparing and spending budgets;
- Development plans and programs;
- Coordination of administrative directorates or departments;
- An umbrella body for outreach at a professional level and in graduate studies and research.

Table 3
Position of outreach in universities' organizational structure

Institution	Position of the outreach function
UV	From the President's Office (1 st level) follows the Secretariat of the President's Office (2 nd level), which leads to the General Directorate for Outreach (3 rd level).
BUAP	From the President's Office (1 st level) follow the vice president's offices for research and graduate studies, and the Vice President's Office for Extension and Cultural Dissemination (2 nd level).
UGto	The first level contains the General Rector's Office and the second level includes the General Secretary, from which follows the Academic Secretary at the third level, on which depend, in order of hierarchy, the Director of Outreach, the Director of Support for Research and Graduate Studies, the Director of Cultural Extension, and the Director of Academic Cooperation; these directorates are associated with outreach, but not until the 4 th level.
UAEMéx	President's Office, first level. Secretariat of Extension and Outreach, 2 nd level.
UAdY	President's Office at the first level, supported by a Social Engagement Council.
UAA	The President's Office follows through to the General Coordinating Office for Graduate Studies, Research, and Outreach, 2 nd level.
UdG	The President's Office is the first executive level and is followed by the General Directorate for Dissemination and Outreach (cultural dissemination, academic extension, and outreach departments) and the General Directorate for Research and Graduate Studies (2 nd level).
	General President's Office, first level. Executive Vice President's Office (2 nd level), from which follows the Coordinating Office for Cooperation and Internationalization (3 rd level), which in turn houses the Coordinating Office for Outreach and Social Service (at the 4 th level). Also associated with collaborative activities is the General Academic Coordinating Office (3 rd level), which in turn houses the Coordinating Office for Research and Graduate Studies (4 th level).
UANL	Significant organizational dispersion can be observed in UANL. The President's Office is at the first level and the General Secretariat at the 2 nd level (which has outreach responsibilities including the Directorate of Social Service and Internships, located at the 3 rd level). The Secretariat of Scientific Research and Technological Development (2 nd level) houses these directorates associated with interaction with the environment: Directorate of Research, Directorate of Innovation and Intellectual Property, the Center for Business Incubation and Technology Transfer, and the Center for Corporate Social Outreach. In addition, from the Academic Secretariat (at the 2 nd level) follows the Directorate of Continuing Education and Professional Development (3 rd level). The university also has a Secretariat of Extension and Culture (2 nd level) with a Directorate of Cultural Development (3 rd level). Lastly, the Secretariat of Sustainability (2 nd level) houses directorates with the same name as in the Secretariat of Scientific Research and Technological Development, but also includes the Center for the Development of the Software Industry (3 rd level).
UABC	Rector's Office, first level. General Secretary, second level. Coordinator of Basic Education, Coordinator of Professional Education and University Outreach, Coordinator of Graduate Studies and Research, Coordinator of International Cooperation and Academic Exchange (3 rd level, each with responsibilities that include different outreach mechanisms).

Source: Own work based on organizational charts and structures of each public university.

Discussion

From the results of the content analysis, it was obtained that some universities had good discursive platforms that sharply clarify the role of university outreach. While others were more dispersed. Especially, in the latter, there was little clarity and confusion in the discourse, heterogeneity in the constructs used to refer to collaborative activities, and ambivalence in the role given to outreach, either as a secondary or complementary function. Thus, it is still wavering if it is given the status of a function equivalent to teaching and research.

Derived from the review of university legislation, its planning documents, and its educational models, it was also identified that some universities placed greater emphasis on linkages with companies, and others with groups and social organizations; that was, some have been more influenced by the Anglo-Saxon perspective studied by Etzkowitz (2003), Etzkowitz et al. (2000), Mowery and Sampat (2005), and Perkmann et al. (2013); and the others have continued with the Latin American tradition, whose main features have been explored by Arocena and Sutz (2005), Arza (2010), ECLAC (2010), De Fuentes and Dutrénit (2012, 2014), García-Galván (2012, 2018), and Thomas et al. (1997). Although, in normative terms in a new model, the idea would be to achieve a balance in the attention of the main collaborators of the university.

On the other hand, in the documentary analysis it was found that little was said about the need to allocate more economic-financial resources, equipment, and infrastructure for a more professional boost of university collaboration with agents from the regional surroundings. For example, specific amounts to finance collaborative activities were never mentioned, no programs or projects for infrastructure development or technological updating were found. Likewise, the official university discourse never addressed the absence of specialized human resources to manage outreach activities, this problem has already been addressed by other papers such as ANUIES (2011), García-Galván (2018), García-Galván et al. (2018), Gould-Bei (2002), and Thomas et al. (1997). In this way, if university policies were more objective and clear –in their role of economic and social development through linkage–, they should contemplate specific projects and programs (establishing goals and schedules by periods). Also, in the budget year, allocate specific items to promote certain collaboration mechanisms; the development of techno-scientific infrastructure such as incubators for technology companies, techno-scientific parks, and cities of knowledge. Also, hire, for example, outreach executives to professionalize the departments in the academic units.

In the epistemic field, in the university discourse, it was identified that there is a very important conceptual weakness when trying to adequately delimit what the linkage implies. Thus, to avoid so much categorical dispersion, universities should make an effort to choose a more involving and less problematic category such as collaboration. In addition, in the documents analyzed, it was not very clear what mechanisms the universities used to collaborate with regional agents, nor was the breadth and depth of the collaboration developed through the different mechanisms.

Finally, in general, the organizational structures did not appear to be conducive to managing, in a more professional way, the university outreach. In fact, in some universities the dashboards seemed chaotic and scattered. Given which, in this study the following type of university organization has been proposed to promote –at the highest level of the authorities– the activities of collaboration with regional stakeholders.

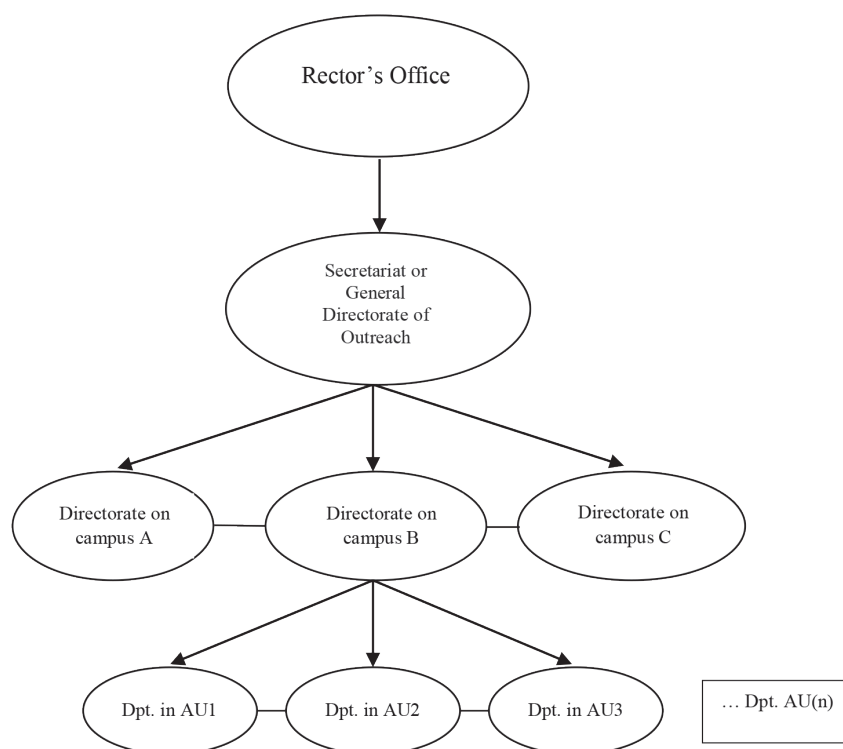
The head office for collaboration should place emphasis on second-generation approaches and act as an umbrella body both for transfer offices for research findings or technology and for business incubators, plan the design and operation of science and technology parks, and promote specialized human resource training.

This secretariat or general directorate would be vested with sufficient authority to make

decisions on outreach and engage directly with the university's highest authority. Indeed, to revisit García-Galván (2015), the following structure (Figure 1) was proposed as an update to the model for collaboration with the surrounding environment.

Before establishing connections with the directorates of the different campuses, this secretariat or general directorate could be organized as follows: a directorate for collaboration with society, another directorate for outreach with the productive sector, and a final directorate to manage links with government bodies. This proposed organizational structure was thought in line with the substantive functions of universities (teaching, research, and promoting economic and social development).

Figure 1
Fan-type organizational structure for university outreach



This is a fan-type organization that opens up the closer it gets to the outreach departments in the various academic units (AUs). This representation means that, for example, the Secretariat or General Directorate of Outreach maintains close, intensive engagement with the directorates on the different campuses. The departments at the next level, while promoting competition (connections represented by arrows), also promote cooperation (connections represented by horizontal lines). In this sense, the activities carried out by academic units in the various stages of the outreach process could be called dependent, instead of being exclusive events.

Conclusions

In all universities, rules and regulations recognized the importance of strengthening ties with the surrounding environment. Some placed an emphasis on building ties with disadvantaged groups, while others attach greater weight to collaboration with firms. However, they were ambiguous when it came to defining outreach activities, confusing them with extension and cultural dissemination, whereas this could all be classified under “collaboration with the

surrounding environment". Outreach was also seen mostly as playing a complementary (or supporting) role for teaching and research. This made the collaborative function seem irrelevant; universities need to acknowledge that this is equal in importance to teaching and research and reflect this in university outreach regulations.

Although the dynamics of science and technology are not the same as legislative opportunity, a proper adaptation and management of the advanced stages of scientific and technological revolutions entails a need to restructure institutional arrangements (regulatory foundations). Thus, a rescaling of HEI-surroundings interaction requires that universities adopt the promotion of economic and social development as a substantive function in their general and specific regulations.

From a planning perspective, most universities have taken an interest in developing and consolidating outreach; however, some HEIs lack a long-term horizon in their planning, preventing them from drawing up an adequate roadmap for the gradual and selective development of collaboration with the surrounding environment. Universities should, in fact, embark on the task of structuring an outreach development plan for the next 20 years. This planning and scheduling should impact educational models and programs, as well as outreach policies, strategies, and activities. In other words, outreach should be seen as a cross-cutting role and not just a filler.

Universities must take care not to fall into the trap of neglecting education and research as a result of a closer relationship with firms, NGOs, and the government. Collaboration with the environment must be promoted from educational models, but universities must be careful not to idealize cooperation with the corporate sector, as it would seem that HEIs are beginning to subordinate their primary function in their attempt to be receptive and committed to corporate demands. At some point, though, society as a whole may demand treatment on equal terms from the university.

In order to manage outreach more efficiently within universities, authorities need to reflect on the need to update their organizational structures. In their current form, they do not help to consolidate outreach as one of the substantive functions of a university. As a result, university governance and organization also need to reflect a belief in a full commitment to *promoting economic and social development*.

Lastly, although an effort was made to analyze –from an institutional and organizational perspective– outreach models in different state public universities in the country, it was not always possible to obtain homogeneous inputs and information in the various HEIs, complicating the analysis. Furthermore, still pending for future research is a review of private HEIs, in addition to other major universities (for instance, the National Polytechnic Institute [IPN], the Metropolitan Autonomous University [UAM], the National Autonomous University of Mexico [UNAM], the Autonomous University of San Luis Potosí [UASLP], and the Autonomous University of Sinaloa [UAS]), with a view to gaining a broader insight. Also, on the waiting list is a specific analysis of academic units in universities that exhibit close collaboration with the surrounding environment and have built up experience.

On a final note, HEIs urgently need to set about professionalizing the recruitment, training, management, and evaluation of those in charge of university outreach, if there is indeed a firm commitment to carry this mission through to the next level.

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