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ORIGINAL ARTICLE

Key Technology Transfer Office Functions in the Mexican Context: A Comparative Analysis

Karina Flores-Tuxpan,[1*] Víctor García-Flores,[2*] Luis Antonio Palma Martos[3]

[1]Facultad de Ciencias Económico Administrativas, Universidad Autónoma de Tlaxcala, Av. Ribereña s/n, Centro, 90000, Tlaxcala, Tlax., México; [2]Consejo Superior de Investigaciones Científicas, C. Américo Vespucio, 0, 41092, Sevilla, España; [3]Facultad de Ciencias Económicas y Empresariales, Universidad de Sevilla, Avda. Ramón y Cajal, s/n, 41018, Sevilla, España.
*Corresponding authors: karina.flores.t@uatx.mx, victor.garcia.flores@csic.es

ABSTRACT

This study focuses on the investigation of the key functions played by Technology Transfer Offices (TTOs) in public higher education institutions in Mexico. To address this issue, a comprehensive review of the literature at the global level, as well as specific studies for Mexico, was conducted. Semi-structured interviews were also conducted with 24 TTO directors. As a result, 18 essential functions performed by Mexican TTOs were identified using Atlas.ti software as an analysis tool. Each of these functions is detailed thoroughly to facilitate their understanding and study. In addition, these functions were contrasted with those performed by TTOs at the international level, which allowed us to identify coincidences and discrepancies. The results obtained are a valuable tool for both TTO directors and public decision-makers.

Keywords: Technology transfer offices; Public higher education Institutions; Innovation.

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INTRODUCTION

A few decades ago, the concept of the knowledge society emerged, emphasizing the importance and benefits generated by knowledge, which is why attention began to focus on the creators of knowledge, including higher education institutions (HEIs) with their arsenal of researchers, technicians, and specialists dedicated to creating and transmitting this knowledge. The traditional way of transferring knowledge has been through teaching classes, participation in congresses and forums, and publication in high-impact journals (Rogers *et al*., 2001). However, knowledge needs to be materialized in a product, technology, or providing a service; it can be said that knowledge has shape, size, weight, and above all, whoever created it had the objective of generating some benefit for society. On the other hand, there is the productive sector made up of companies from different economic sectors that need to innovate to be in the consumers' preferences among the rest of the competing companies. To achieve this, they must adopt the knowledge and the newly created technology.

For a country to generate innovation, technology transfer (TT) plays a fundamental role since it is the way to materialize knowledge into technology and transfer it to others (Rogers *et al*., 2001; Markman *et al*., 2005; Olaya-Escobar *et al*., 2020). Thus, TTOs, especially those linked to HEIs, are key players in this process. Despite their importance, TTOs have been the object of limited research, especially in the Mexican context. This has left a gap in our understanding of how these offices operate, what key obstacles they face, and how they can overcome these challenges to promote TT effectively. This article aims to identify the main functions that TTOs should perform to be effective in TT.

Mexico is one of the most innovative countries in Latin America, alongside Brazil and Chile, but its position in the Global Innovation Index has remained stagnant at 56–58 over the last three years (World Intellectual Property Organization, 2022, 2023, 2024). Despite government initiatives to create an innovation ecosystem and encourage the creation of TTOs (Castañón-Ibarra et al., 2015), Mexico has not succeeded in converting its scientific output into innovation at the expected rate. One possible explanation, little explored in the literature, is that the lack of definition of the functions of TTOs in Mexico and their inconsistent implementation could constitute a bottleneck for the country's innovative performance.

THEORETICAL BACKGROUND

Technology transfer is a complex process involving multiple factors, actors and stages. Our understanding of it has evolved as innovation models have changed. Among these actors, TTOs play a central role, as they are the units responsible for facilitating TT through a set of functions that have changed and diversified over time.

The first functions identified in the literature fall within the traditional linear model, focused on *technology push*.

From this perspective, the TTO was conceived as responsible for two fundamental functions: (1) Protection of intellectual property and (2) Technology commercialisation (Siegel *et al*., 2004). This model generated significant benefits, but it also had limitations.

One of the studies that highlighted the complexity of TT was that of Goldhor & Lund (1983), who described the importance of mediation function in the TT process. The TTO acts as a bridge, reconciling interests and facilitating agreements between technology creators and adopters. This study shows *market pull* and introduces the sub-processes of learning, adapting and using technology. Bozeman (2000) also highlights the mediation function, stating that an economic and political environment is necessary for successful TT**.**

The Triple Helix Innovation model university-industry-government (Etzkowitz & Leydesdorff, 2000) is based on the interdependence and synergy among the three actors to generate innovation. The most recent approach corresponds to National Innovation Systems, which consider various actors, conditions and their capacities to generate an ecosystem that fosters and drives innovation jointly and simultaneously (Mowery & Sampat, 2009). As these innovation models have evolved, TTOs have expanded and specialized in their functions.

Based on a review of the literature, it was possible to systematically identify the functions of TTOs reported in global and national studies. Table 1 was developed to present these functions in detail. Column 2 shows the model's approach; column 3, the associated innovation model; column 4 identifies the function; column 5 provides a description; column 6 presents the global literature that supports it; and column 7 presents specific studies on the Mexican case. To facilitate consultation and comparison, the functions were grouped by approach and innovation model.

The classification of functions shows a clear evolution from operational functions towards relational, strategic and coordination functions with various actors in the innovation ecosystem. Furthermore, it should be noted that the column "Specific literature for Mexico" reveals significant gaps that reinforce the relevance of this research. In particular, essential functions such as "Creation of the TT process and dissemination" and "Promote the creation of regulations on TT within HEIs" have not been studied in depth in the Mexican context. These gaps are critical, as these functions are fundamental to institutionalising TT, establishing clear rules and promoting organisational capacities. Similarly, the "Global literature" column shows that the functions "TTOs members training" and "Linking and generating alliances with other TTOs" are only addressed by literature specific to Mexico, reflecting their importance in that country. These findings underscore the need for an empirical analysis of the functions to understand how TTOs actually operate in Mexico and to what extent they coincide or diverge from the functions reported in the international literature.

METHOD AND DATA

Qualitative analysis techniques were used in this study. The process began with a review of the literature related to TTOs at the global level and that related to Mexico. Subsequently, a series of semi-structured interviews were conducted with twenty-four directors of TTOs from Public Higher Educations Institutions[1] (PHEIs) in Mexico. This stage allowed us to obtain valuable perspectives from leading experts and connoisseurs of Mexican TTOs.

Sample and selection of interviewees

The first step was to identify the interviewees based on the latest list of TTOs recognized by the PROSOFT-Innovation program Sectoral Fund in Innovation of the Ministry of Economy and the National Council of Science and Technology of 2018. Only TTOs from PHEIs were selected[2]. A total of 43 TTOs were identified. Once this was done, an inquiry was made to find out who their directors or heads were in order to contact them.

The contact procedure began with a first round of contacts by e-mail, in which 14 TTO directors responded and expressed their interest in participating, making it possible to schedule a total of 14 interviews. Subsequently, a second attempt was made, in which 12 people responded. Of these, 10 agreed to participate, and 2 said they did not want to participate, so 10 more interviews were added to the agenda. A final number of 24 interviewees was obtained, of whom 9 belong to Public Research Centres, 4 to Federal Public Universities and 11 to State Public Universities (the participating TTOs are shown in Appendix I). As for the possible limitations of this work, we can mention the differences between each Higher Education Subsystem. Each subsystem is governed by specific regulations, and its institutional management and organisational structure are different. Therefore, TT is managed differently in each institution depending on the subsystem to which it belongs.

The interview guide was developed, consisting of three sections, which can be found in Appendix II. In this article, we will focus on the responses from the second section.

The interviews were conducted from February 28th to June 15th, 2022, via Zoom[3], with an approximate duration of 40 to 80 minutes. The next step was the transcription of the audios to proceed with their analysis.

[1] Public Higher Education Institutions include 12 subsystems. Each subsystem is made up of institutions located throughout Mexico. https://educacionsuperior.sep.gob.mx/ These institutions are characterised by the fact that they are funded by public funds.

[2] This study focused exclusively on TTOs from PHEIs, as they represent the majority of TTOs recognized by the PROSOFT-Innovation programme. Furthermore, due to their 'public' nature, they are willing and open to participate. They cannot refuse due to their principles of supporting research and society. TTOs belonging to private HEIs were excluded due to their organisational heterogeneity and limited willingness to participate based on their principle of confidentiality. Furthermore, there are only six such TTOs.

[3] The interviews were conducted through the zoom platform due to the conditions of the Covid-19 pandemic in Mexico. In addition, the distance to travel to the different cities where the TTOs are located was costly in terms of time and economic resources.

Table 1. Functions of TTOs identified in global and Mexico-specific literature.

No.	Model's approach	Innovation model	Function	Description	Global Literature	Specific Literature for Mexico
1	Traditional	Linear	**Protection of the intellectual property of technology**	Assessment of the technology in terms of knowledge, state of maturity, to decide how to protect. Consider national and international legislation for protection.	Goldhor & Lund, 1983; Carlson & Fridh, 2002; Siegel *et al*., 2004; Markman *et al.*, 2005; Rivas-Echeverria *et al*., 2016; Villani *et al*., 2017; Castillo *et al*., 2018; O´Kane, 2018; Solís Lima *et al.,* 2020; Lee & Jung, 2021; Ossa, 2024; World Intellectual Property Organization, 2025.	Luna-López & Solleiro Rebolledo, 2007; Calderón-Martínez, & García-Quevedo, 2013; Torres Vargas & Jasso Villazul, 2019; Ortiz Cantú & Solleiro Rebolledo, 2020.
2	Traditional	Linear	**Technology commercialisation**	Choose the appropriate mechanism for the TT of each technology, according to its state of development. It also negotiates the amount or value of the technology and the transfer mechanism.	Rogers *et al*., 2001; Nieto Rivera, 2001; Carlson & Fridh, 2002; Feldman *et al.*, 2002; Siegel *et al*., 2004, Markman *et a.l*, 2005; Villani *et al*., 2017; Castillo *et al*., 2018; Lee & Jung, 2021; Ossa, 2024.	Luna-López & Solleiro Rebolledo, 2007; Pedraza Amador & Velázquez Castro, 2013; Castañón Ibarra *et al*., 2015; López-Hernández & Serrano-Santoyo, 2017; Torres Vargas & Jasso Villazul, 2019; Ortiz Cantú & Solleiro Rebolledo, 2020.
3	Traditional	Linear	**Researcher training**	Providing courses to researchers on intellectual property protection.	Siegel *et al*. 2004; Ossa, 2024.	Solís Lima *et al.,* 2020.
4	Traditional	Linear	**TT culture creation**	Delivery of conferences aimed at the HEI community, as well as the dissemination of culture using the institution's media.	Siegel *et al*. 2004; Ossa, 2024.	Pedraza Amador & Velázquez Castro, 2013; López-Hernández & Serrano-Santoyo, 2017; Solís Lima *et al.,* 2020.
5	Traditional	Linear	**Creation of the TT policy and promotion of its dissemination**	Elaboration of the TT policy in conjunction with the institution's senior management. It is also responsible for updating and disseminating it.	Di Gregorio & Shane, 2003; Olaya-Escobar *et al.,* 2020.	Solís Lima *et al.,* 2020.
6	Traditional	Linear	**Creation of the TT process and dissemination**	Preparation of manuals, procedures, and guides for the TT, based on the standards. This includes their updating. It shall promote their dissemination through the institution's media communication.	Villani *et al*., 2017; Noack & Jacobsen, 2021.	
7	Traditional	Linear	**Promote the creation of regulations on TT within HEIs**	The regulations must contemplate the rights and obligations of those involved, forms of remuneration, etc. To promote TT, start with the institutional regulations. The regulations must be kept up to date.	Olaya-Escobar *et al.,* 2020; Ossa, 2024.	
8	Traditional	Linear	**Patent drafting**	Has the knowledge, experience, and expertise to apply for the patent. Knows the process, formats, documents to submit, etc.	O'Kane *et al*., 2015; O´Kane, 2018; Lee & Jung 2021; World Intellectual Property Organization, 2025.	Solís Lima *et al.,* 2020.
9	Traditional	Linear	**TTO members training**	To educate and train their work team in the areas of their specialization, as well as to keep them updated		Necoechea-Mondragón *et al.,* 2013; Castañón Ibarra *et al*., 2015; Solís Lima *et al*., 2020.

10	Network-based	National Innovation Systems Triple Helix	**Mediation**	It is a facilitator (unifier or bridge) between technology creators and adopters. Reconciles interests between both parties, facilitates agreements and facilitates communication. It also acts as an intermediary with others.	Goldhor & Lund, 1983; Bozeman, 2000; Etzkowitz & Leydesdorff, 2000; Siegel *et al*., 2004; Moutinho *et al.,* 2016; Villani *et al*., 2017; Alvarado-Moreno, 2018; Castillo *et al*., 2018; O´Kane, 2018; Olaya-Escobar *et al.,* 2020; Lee & Jung, 2021; Noack & Jacobsen, 2021; Chen *et al*., 2024; Ossa, 2024.	Pedraza Amador & Velázquez Castro, 2013; Ogarrio & Culebro Moreno, 2019.
11	Network-based	National Innovation Systems	**Find funding**	Find funding includes government, international organizations, venture capital or companies, in order to support the research process, mature technology or create spin-offs.	Goldhor & Lund, 1983; Di Gregorio & Shane, 2003; O´Kane, 2018.	Pedraza Amador & Velázquez Castro, 2013.
12	Network-based	National Innovation Systems	**Creation and consolidation of links with associations, government, and international organizations**	TTO knows that linking with different organizations promotes the generation of an innovation ecosystem and opens horizons.	Smilor *et al*., 1989; Chen *et al.,* 2024; Ossa, 2024.	Solleiro & Castañón, 2005; Ogarrio & Culebro Moreno, 2019.
13	Network-based	National Innovation Systems	**Market research**	Analyse the market to diagnose it and identify needs.	Siegel *et al.,* 2004; Castillo *et al*., 2018; O´Kane, 2018; Lee & Jung, 2021; Ossa, 2024.	Ortíz Cantú & Solleiro Rebolledo, 2020.
14	Network-based	National Innovation Systems	**Promote the creation of spin-offs**	It motivates and trains researchers, and also generates the conditions for the creation of spin-offs.	Rogers *et al.,* 2001; Carlson & Fridh, 2002; Di Gregorio & Shane, 2003; Aceytuno-Pérez & De Paz Bañez, 2008; Fundación C y D, 2020; Ossa, 2024.	Ortiz Cantú & Solleiro Rebolledo, 2020.
15	Network-based	National Innovation Systems	**Working together with researchers**	Advises the researcher on recently patented technology that has been incorporated into the market. Advises the researcher on the needs of the market.	Carlson & Fridh, 2002; Siegel *et al*., 2004, O'Kane *et al*., 2015; Fundación C y D, 2020; Noack & Jacobsen, 2021; Chen, *et al.,* 2024; Ossa, 2024.	Solís Lima *et al*., 2020.
16	Network-based	National Innovation Systems	**Technology assessment and valuation**	Assess the function and characteristics of the technology, as well as its possible applications in other areas. Have a clear understanding of the problem it solves, which will be useful for its valuation. Valuation is determining the price or value of the technology for its transfer.	Sullivan, 2001; Razgaitis, 2002; Probert *et al*., 2011; Ossa, 2024.	Medellín & Arellano 2019; Ortiz Cantú & Solleiro Rebolledo, 2020.
17	Network-based	National Innovation Systems	**Linking with the productive sector**	Creates and maintains links with entrepreneurs to take advantage of marketing opportunities and meet their needs.	Smilor *et al*., 1989; O'Shea *et al*., 2007; Ossa, 2024.	Torres Vargas & Jasso Villazul, 2019; Solís Lima *et al*., 2020.
18	Network-based	National Innovation Systems	**Linking and generating alliances with other TTOs**	Knowledge sharing for mutual support		Castañón Ibarra *et al*., 2015; Ortiz Cantú & Solleiro Rebolledo, 2020.

Data Processing and Analysis

The analysis of the content continued using Atlas ti. software version 22.2.4.0 as a tool. Through this, an exhaustive analysis of the text was carried out to identify the key elements of a particular phenomenon. The analysis process was carried out in different stages. The first consisted of a general reading of the text of the interviews to identify the main category "Technology Transfer Offices". Subsequently, the subcategory of analysis, functions, was identified. In this way, each time a quote was identified that captured a relevant and interesting concept about functions, it was labelled with a code. It is important to mention that some sentences were labelled by more than one code if their content was associated with several of these. In this way, different codes were created during the analysis of all the interviews to focus attention on the key codes. In this process, Atlas ti. presents the codes in a synthesized and summarized way, since it uses the WordCruncher tool that provides the absolute frequency of the identified codes. The absolute frequencies of the codes are used as a proxy to weight their importance, which is then used to perform statistical analyses of the content (López-Noguero, 2002).

RESULTS

In this research, 18 codes were created corresponding to the functions that the directors of Mexican TTOs consider essential to achieving TT. Table 2 was organised into different columns. The first shows the function number assigned according to its importance. The second column shows the specific function. The third shows the description of the function provided by the interviewees. The fourth column shows the absolute frequencies, meaning the number of times the interviewees mentioned that function. The fifth column shows the relative frequency of the function, which is used as a proxy to weight the importance of the functions according to the number of times they were mentioned. This is where the importance of this study lies, as in addition to identifying the functions, it also provides an order of importance according to the context in Mexico. Finally, the sixth column shows the findings and supporting literature.

DISCUSSION AND CONCLUSIONS

The discussion begins by revisiting the comparative analysis presented in Table 3, which groups the 18 functions identified in Mexican TTOs into five thematic clusters: Foundational & Regulatory; Internal-Facing; External-Facing; Ecosystem & Capacity Building; and Technology Assessment & Commercialization. This structure allows for a more analytical comparison between the empirical evidence and the functions documented in the global and Mexico-specific literature, while also highlighting those activities that appear to be unique responses to the Mexican context.

The classification presented in Table 3 allowed us to identify the functions "Propose improved mechanisms for researchers participating in TT processes" (Function 16) and "Connect different research groups" (Function 18) as unique to the Mexican context. Furthermore, they are not yet found in Mexican or global literature. These functions reflect that the consolidation of TT in Mexico depends on strengthening internal structures and institutional incentives.

Likewise, the relevance of the functions "Provide training to TTO employees and collaborators" (Function 9) and "Seek partnership with other TTOs" (Function 10) is confirmed. These functions are not widely discussed in global literature but have already been identified in Mexican literature. This suggests that TTOs are still in the process of developing basic capacities.

The consolidation of TTOs' capabilities has been limited by structural and institutional factors. First, the short duration of public policies that promoted their creation and development, as well as financing and links with the productive sector, from 2008 to 2018. As of 2019, these public policies disappeared. As a result, those TTOs whose PHEIs generate technology for transfer and, above all, have a team committed to innovation, survived.

Secondly, the regulatory framework at the federal level. The General Law on Administrative Responsibilities discouraged researchers from participating in TT processes until early 2025. Furthermore, in 2023, the General Law on Humanities, Sciences, Technologies and Innovation eliminated the existence of TTOs.

Thirdly, some PHEIs have not yet made changes to their institutional regulatory framework to promote TT and facilitate the work of TTOs. Finally, changes in institutional leadership from time to time have led to changing institutional priorities.

Regulatory actions aimed at promoting the functional maturity of TTOs should focus on: 1) Establishing a federal programme focused on the professionalisation and integration of TTOs; 2) Implement a federal regulatory framework that reduces legal uncertainty for TT; 3) Establishing guidelines for the certification of TTOs in collaboration with IMPI; and 4) Reforming academic evaluation systems to include TT indicators.

The Latin American region shares some structural features. In Colombia, the creation and strengthening of TTOs is promoted, but with limited funding and little connection to companies (González *et al.,* 2019). In Brazil, TT regulations are complex and there is a lack of TT culture (Soares *et al*., 2020). In Chile and Argentina, despite the efforts made, there is a fragmented innovation ecosystem and discontinuity in public programmes (Fuquen & Olaya, 2018).

Table 2. Functions of Technology Transfer Offices at Public Higher Education Institutions in Mexico.

No.	Function	Description	Absolute Frequency	Relative Frequency	Literature and findings
1	**Establish clear regulations and procedures regarding TT**	This refers to establishing institutional regulations on TT that cover rights, obligations, define the scope of action of each of the participants, and the management of resources. It also includes the creation of the TT policy and process, accompanied by manuals and action guides. These should be disseminated through the institution's official website. This function provides certainty, clarity, and motivation to those involved in the TT process.	27	0.1233	This function is empirically confirmed and is identified in global literature as having three distinct functions: 1."Promote the creation of regulations on TT within HEIs" (Olaya-Escobar *et al.,* 2020; Ossa, 2024). 2. "Creation of the TT process and dissemination" (Villani *et al*., 2017; Noack & Jacobsen, 2021). 3. "Creation of the TT policy and promotion of its dissemination" (Di Gregorio & Shane, 2003; Olaya-Escobar *et al.,* 2020). However, in literature specific to Mexico, the latter function has been studied (Solís Lima *et al.,* 2020).
2	**To achieve an effective linkage between TTOs and researchers**	It refers to the need for TTOs to connect with those researchers who create technology and who are at the forefront of research lines. To achieve this, meetings are organised to discuss and learn more about the research they are conducting. In addition, attending forums organized by the researchers themselves, where TTOs can get closer to the research carried out by them, is highlighted as very relevant.	21	0.0959	This function is recognised by the interviewees and is empirically confirmed by "Working together with researchers" which is supported by global literature (Carlson & Fridh, 2002; Siegel et al., 2004, O'Kane et al., 2015; Fundación C y D, 2020; Noack & Jacobsen, 2021; Chen, et al., 2024; Ossa, 2024). As well as literature specific to Mexico (Solís Lima et al., 2020).
3	**Serve as a bridge between researchers and companies**	The TTO facilitates collaboration and the exchange of information and resources. It is responsible for identifying and promoting opportunities for collaboration between researchers and companies. One of the interviewees pointed out that 'you have to act as a mediator or translator of technical and business languages' in order to bring TT to a successful conclusion. To achieve this, it is necessary to understand academic culture and corporate culture. Therefore, TTO reconciles the interests of the parties by acting as a mediator, translator or bridge between them, promoting a 'win-win' situation for everyone.	20	0.0913	This finding empirically confirms the function "Mediation" (Moutinho et al., 2016; Villani et al., 2017; Alvarado-Moreno, 2018; Castillo et al., 2018; O´Kane, 2018; Olaya-Escobar et al., 2020; Lee & Jung, 2021; Noack & Jacobsen, 2021; Chen et al., 2024; Ossa, 2024). In the national literature (Pedraza Amador & Velázquez Castro, 2013; Ogarrio & Culebro Moreno, 2019).
4	**Evaluate the competitiveness of technology in the market**	It means analysing and determining whether the technology is capable of competing in the current market with other similar technologies. In other words, it involves assessing whether the technology offers effective and cost-effective solutions that are attractive to users and can generate economic benefits for the companies that will use it. This involves analysing several key factors, such as efficiency, innovation, quality, usability, flexibility and profitability.	18	0.0822	This function is mentioned by interviewees in relation to the concept of 'evaluation'. In global literature, it is identified as "Technology assessment and valuation" (Sullivan, 2001; Razgaitis, 2002; Probert *et al*., 2011; Ossa, 2024). And specific to Mexico (Medellín & Arellano, 2019; Ortiz Cantú & Solleiro Rebolledo, 2020).
5	**Manage intellectual property**	This consists of the protection and management of your intangible assets. This function includes filling out applications, completing procedures with the Mexican Institute of Intellectual Property[4] (IMPI) until the corresponding certificate is obtained. In addition, some interviewees mention that obtaining patents has been costly and time-consuming, leading to the need to establish internal strategies and partnerships to streamline the process. Despite these challenges, all interviewees	16	0.0731	Empirical results show that this function is one of the first developed by the TTOs since its creation. Two functions were identified in the literature. The first "Protection of the intellectual property of technology", in global literature (Goldhor & Lund, 1983; Carlson & Fridh, 2002; Siegel *et al*., 2004, Markman *et al.*, 2005; Rivas-Echeverria *et al*., 2016; Villani *et al*., 2017; Castillo *et al*., 2018 O´Kane, 2018; Solís Lima *et al.,* 2020; Lee & Jung, 2021; Ossa, 2024; World Intellectual Property Organization, 2025). In literature specific to

[4] The Mexican Institute of Intellectual Property is a decentralised public institution with legal authority to administer the intellectual property system in Mexico. https://www.gob.mx/impi#7023

		share the common goal of technology transfer and see industrial property management as a key tool for achieving this.			Mexico (Luna-López & Solleiro Rebolledo, 2007; Calderón-Martínez, & García-Quevedo, 2013; Torres Vargas & Jasso Villazul, 2019; Ortiz Cantú & Solleiro Rebolledo, 2020). The second "Patent drafting" which is based on global literature (O'Kane *et al*., 2015; O´Kane, 2018; Lee & Jung 2021; World Intellectual Property Organization, 2025). In literature specific to Mexico (Solís Lima *et al.* 2020).
6	**Promote technological offerings**	TTO should be present at events such as technology exhibitions or industry forums where they can showcase their technology portfolio. Such promotion should seek to solidify relationships by signing collaboration agreements between the university or research centre and interested companies, including licensing agreements, joint research and development projects, and even the creation of spin-offs. It should also involve setting up meetings with investors, entrepreneurs and/or business associations with the aim of bringing them closer to the institution and familiarising them with the research being carried out there.	16	0.0731	This function is related to "Linking with the productive sector" which is based on global literature (Smilor *et al*., 1989; O'Shea *et al*., 2007; Ossa, 2024). In the national literature (Torres Vargas & Jasso Villazul, 2019; Solís Lima *et al.,* 2020).
7	**Seek strategic alliances**	It refers to the process by which collaborations are sought to achieve common objectives. The main objective is to take advantage of the strengths generated from collaboration to create a competitive advantage and results that would be difficult to achieve without such an alliance. These alliances are formed within the PHEIs with different areas: communication, design, legal office. As well as externally with other PHEIs, the IMPI and chambers or business associations.	14	0.0639	This is empirically confirmed by the function of "Creation and consolidation of links with associations, government, and international organizations" which is supported by both global literature (Smilor *et al*., 1989; Chen et al., 2024; Ossa, 2024) and specific to Mexico (Solleiro & Castañón, 2005; Ogarrio & Culebro Moreno; 2019).
8	**Train researchers**	The training programmes cover a range of topics, from understanding the functions of the TTO, its objectives and how it operates, to promoting entrepreneurship, from basic to advanced levels. They also address issues related to intellectual property protection and awareness-raising talks are held to motivate researchers to develop transferable technologies in the future. The training is delivered by TTO staff and external personnel.	12	0.0548	This function is empirically confirmed and supported by global literature (Siegel *et al*., 2004; Ossa, 2024), as well as literature specific to Mexico (Solís Lima *et al.,* 2020).
9	**Provide training to TTO employees and collaborators**	This is a key function due to the lack of trained personnel. TTOs must commit to offering a series of activities and services aimed at developing and updating the skills and knowledge necessary for their staff to perform their duties effectively and efficiently. These training programmes cover various areas, such as intellectual property, negotiation, project management, marketing and communication, among others. To achieve this, they take advantage of the training provided by the IMPI and the World Intellectual Property Organisation.	12	0.0548	This function is empirically confirmed by the function of "TTO members training" which is supported only in literature specific to Mexico (Necoechea-Mondragón *et al*., 2013; Castañón Ibarra *et al.,* 2015; Solís Lima *et al*. 2020).
10	**Seek partnership with other TTOs**	We are seeking collaboration with the most experienced and recognised TTOs, as well as with the "Red OTT Mexico" and the Latin American Network of Knowledge Transfer Offices. This would allow TTO managers and workers to raise their questions and cases and obtain better solutions based on the experiences of other TTOs that have already encountered the same problem.	11	0.0502	This function is empirically confirmed by the function "Linking and generating alliances with other TTOs" which is supported only in literature specific to Mexico (Castañón Ibarra *et al*., 2015; Ortiz Cantú & Solleiro Rebolledo, 2020).

11	**Diagnose market needs**	The interviewees expressed their responsibility to respond to market needs (*market pull*), in other words, to solve problems of common interest.	10	0.0457	This function is empirically confirmed by the function "Market research" highlighted by global literature (Siegel *et al.,* 2004; Castillo *et al*., 2018; O´Kane, 2018; Lee & Jung, 2021; Ossa, 2024). And specific to Mexico (Ortíz Cantú & Solleiro Rebolledo, 2020).
12	**Conduct negotiations with companies**	Negotiating requires communication skills, empathy and leadership to know how to sell the technology to companies. The TTO must strike a balance between the parties.	9	0.0411	Negotiations with companies are related to "technology commercialisation" according to global literature. (Rogers *et al.,* 2001; Nieto Rivera, 2001; Carlson & Fridh, 2002; Feldman *et al.*, 2002; Siegel *et al*., 2004, Markman *et al.*, 2005; Villani *et al*., 2017; Castillo *et al*., 2018; Lee & Jung, 2021; Ossa, 2024). As well as literature specific to Mexico (Luna-López & Solleiro Rebolledo, 2007; Pedraza Amador & Velázquez Castro, 2013; Castañón Ibarra *et al*., 2015; López-Hernández & Serrano-Santoyo, 2017; Torres Vargas & Jasso Villazul, 2019; Ortiz Cantú & Solleiro Rebolledo, 2020).
13	**Generate a culture of technology transfer**	TTO offers activities and services aimed at cultivating entrepreneurial spirit and promoting a culture of TT within the research community.	8	0.0365	This function is empirically confirmed by the function "TT culture creation" according to global literature (Siegel *et al*., 2004; Ossa, 2024); as well as that relating to Mexico (Pedraza Amador & Velázquez Castro, 2013; López-Hernández & Serrano-Santoyo, 2017; Solís Lima *et al.,* 2020).
14	**Support spin-off creation**	TTOs have promoted programmes that encourage entrepreneurship within their institutions. They also pointed out that they do not have the financial resources to create spin-offs. Support consists of facilitating licensing and, in some cases, deferring upfront payment. They also recognise that this is an issue that is still in its initial stages.	7	0.0320	This is empirically verified with the function "Promote the creation of spin-offs" according to global literature (Rogers *et al.,* 2001; Carlson & Fridh, 2002; Di Gregorio & Shane, 2003; Aceytuno-Pérez & De Paz Bañez, 2008; Fundación C y D, 2020; Ossa, 2024) and literature related to Mexico (Ortiz Cantú & Solleiro Rebolledo, 2020).
15	**Involve stakeholders in transfer processes**	The participation of social groups and the government is important in order to respond to society's needs and generate the common good.	6	0.0274	This function relates to "Creation and consolidation of links with associations, government, and international organizations" in order to participate in the innovation process. Supported by global literature (Smilor *et al*., 1989; Chen *et al.,* 2024; Ossa, 2024). As well as that relating to Mexico (Solleiro & Castañón, 2005; Ogarrio & Culebro Moreno, 2019).
16	**Propose improved mechanisms for researchers participating in TT processes**	Some directors of the TTOs interviewed have promoted changes in evaluation metrics to their researchers. They have established the following evaluation criteria: number of patent applications, number of patents obtained, transfers achieved, collaboration with companies; which is reflected in the monetary recognition given to researchers.	6	0.0274	This function is not identified in the global literature, neither specific to Mexico. It represents an original contribution.
17	**Seek investors for spin-offs**	The directors of the TTOs interviewed have sought out investors and organised meetings to present the research carried out at their institutions and the resulting technology, with the aim of creating spin-offs.	3	0.0137	This function is directly related to "Find funding" according to global literature (Goldhor & Lund, 1983; Di Gregorio & Shane, 2003; O´Kane, 2018) and literature related to Mexico (Pedraza Amador & Velázquez Castro, 2013).
18	**Connect different research groups**	This refers to connecting the different research groups within the institution, between those doing basic science and those doing applied science. The TTO has a transversal function. The research groups are the ones who provide the input for TT.	3	0.0137	This function is not identified in the global literature, neither specific to Mexico. It represents an original contribution.
	Totals		219	1	

Table 3. Functions of TTOs in Mexico compared with literature.

Thematic clusters	Function number	Function determined empirically	Function identified in the literature	Global	Specific to Mexico
Foundational & Regulatory	Function 1	Establish clear regulations and procedures regarding TT	Promote the creation of regulations on TT within HEIs	X	-
			Creation of the TT process and dissemination	X	-
			Creation of the TT policy and promotion of its dissemination	X	X
Internal-Facing	Function 2	To achieve an effective linkage between the TTOs and researchers	Working together with researchers	X	X
	Function 8	Train researchers	Researcher training	X	X
	Function 9	Provide training to TTO employees and collaborators	TTO members training	-	X
	Function 13	Generate a culture of technology transfer	TT culture creation	X	X
	Function 16	Propose improved mechanisms for researchers participating in TT processes		-	-
	Function 18	Connect different research groups		-	-
External-Facing	Function 3	Serve as a bridge between researchers and companies	Mediation	X	X
	Function 6	Promote technological offerings	Linking with the productive sector	X	X
Ecosystem & Capacity Building	Function 7	Seek strategic alliances	Creation and consolidation of links with associations, government, and international organizations	X	X
	Function 10	Seek partnership with other TTOs	Linking and generating alliances with other TTOs	-	X
	Function 15	Involve stakeholders in transfer processes	Creation and consolidation of links with associations, government, and international organizations	X	X
Technology Assessment & Commercialization	Function 4	Evaluate the competitiveness of technology in the market	Technology assessment and valuation	X	X
	Function 5	Manage intellectual property	Protection of the intellectual property of technology	X	X
			Patent drafting	X	X
	Function 11	Diagnose market needs	Market research	X	X
	Function 12	Conduct negotiations with companies	Technology commercialisation	X	X
	Function 14	Support spin-off creation	Promote the creation of spin-offs	X	X
	Function 17	Seek investors for spin-offs	Find funding	X	X

Conclusions

Implication for TTOs directors. Our results, which rank that "Establish clear regulations and procedures regarding TT" (Function 1) and "To achieve an effective linkage between the TTOs and researchers" (Function 2) are the most important functions. This suggests that Mexican TTOs should prioritise the creation of solid internal foundations and relationships before focusing on more complex external activities, such as "Support spin-off creation" (Function 14).

Implication for Policy makers. The identification of "Propose improved mechanisms for researchers participating in TT processes" (Function 16) and "Provide training to TTO employees and collaborators" (Function 9) as key functions highlights the absence of public policies.

This research has made valuable contributions to the improvement of TT in Mexico. This will enable it to reap the economic and social benefits associated with TT.

CONFLICTS OF INTEREST

None to declare.

REFERENCES

Aceytuno Pérez, M. T., & De Paz Báñez, M. A. (2008). La creación de spin-off universitarias el caso de la Universidad de Huelva. *Economía Industrial*, 368, 97-111. https://www.mintur.gob.es/Publicaciones/Publicacionesperiodicas/EconomiaIndustrial/RevistaEconomiaIndustrial/368/97.pdf

Alvarado-Moreno, F. (2018). El papel de las Oficinas de Transferencia Tecnológica (OTT) en las universidades: Una perspectiva de la última década. *Journal of Technology Management & Innovation,* 13(3), 104-112. https://doi.org/10.4067/S0718-27242018000300104

Bozeman, B. (2000). Technology transfer and public policy: a review of research and theory. *Research Policy,* 29, 627-655. https://doi.org/10.1016/S0048-7333(99)00093-1

Calderón-Martínez, M. G. & García-Quevedo, J. (2013). Transferencia de conocimiento y patentes universitarias en México. Academia. *Revista Latinoamericana de Administración*, 26(1), 33-60. https://doi.org/10.1108/ARLA-05-2013-0039

Carlsson, B. & Fridh A. (2002). Technology transfer in United States Universities: A survey and statistical analysis. *Journal of Evolutionary Economics,* 12, 199-232.

Castañón-Ibarra, R., Solleiro-Rebolledo, J. L. & González-Cruz, J. D. (2015). Los retos de las Oficinas de Transferencia de Conocimiento en México. In Garrido-Noguera & Rondero-López (Eds.), *Encuentro de saberes: Universidad- Empresa para la Innovación*. Volumen II. Oficinas de Transferencia de Tecnología (pp.9-22). Unión de Universidades de América Latina y el Caribe y Red Universidad-Empresa ALCUE.

Castillo F., Gilless J. K., Heiman A., & Zilberman, D. (2018). Time of adoption and intensity of technology transfer: an institutional analysis of offices of technology transfer in the United States. *The Journal of Technology Transfer*, 43,120-138. https://doi.org/10.1007/s10961-016-9468-5

Chen, Z., Little, V.J, & Thuan, N. H. (2024). The evolving role of technology transfer offices in the entrepreneurial university: Go-betweens or playmakers?. *Journal of Technology Transfer*. https://doi.org/10.1007/s10961-024-10123-4

Di Gregorio, D. & Shane, S. (2003). Why do some universities generate more start-ups than others? *Research Policy*, 32, 209-227. https://doi.org/10.1016/s0048-7333(02)00097-5

Etzkowitz, H. & Leydesdorff, L. (2000). The dynamics of innovation: from National Systems and "Mode 2" to a Triple Helix of university - industry- government relations. *Research Policy,* 29(2), 109-123. https://doi.org/10.1016/S0048-7333(99)00055-4

Feldman, M., Feller, I., Bercovitz, J. & Burton, R. (2002). Equity and the technology transfer strategies of American research universities. *Management Science*, 48 (1), 105-121. https://doi.org/10.1287/mnsc.48.1.105.14276

Fundación C y D. (2020). *Mejorar la creación de spin-off y las licencias de patente en las universidades españolas*. https://www.upv.es/entidades/VINV/info/ICYD_2019.pdf

Fuquen, H. S., & Olaya Escobar, E. S. (2018). A technology transfer strategy based on the dynamics of the generation of intellectual property in Latin-America. *Intangible Capital*, 14 (2), 203-252. https://doi.org/10.3926/ic.873

Goldhor, R. S. & Lund, R. T. (1983). University to industry advanced technology transfer. A case study. *Research Policy*, 12, 121- 152. https://doi.org/10.1016/0048-7333(83)90015-X

González, I. Á., Natera, J. M., & Castillo, Y. (2019). Generación y transferencia de ciencia, tecnología e innovación como claves de desarrollo sostenible y cooperación internacional en América Latina. *Documentos de trabajo* (Fundación Carolina): Segunda época, (19), 1-57. https://doi.org/10.33960/issn-e.1885-9119.DT19

Lee, K. & Jung H. J. (2021). Does TTO capability matter in commercializing university technology? Evidence from longitudinal data in South Korea. *Research Policy* (50) 104133 https://doi.org/10.1016/j.respol.2020.104133

López-Hernández, C. G. & Serrano-Santoyo, A. (2017). Hacia el surgimiento de una cultura de la innovación en un centro público de investigación en México: Hallazgos y aprendizajes. *Nova Scientia*, 18 l9(1), 313-341. https://doi.org/10.21640/ns.v9i18.650

López-Noguero, F. (2002). El análisis de contenido como método de investigación. *XXI Revista de Educación*, 4, 167-179.

Luna-López, K., & Solleiro-Rebolledo, J. L. (2007). La gestión de la propiedad intelectual en centros de investigación mexicanos: El caso del instituto mexicano del Petróleo. *Journal of Technology Management & Innovation*, 2(2), 157-169. https://www.jotmi.org/index.php/GT/article/view/cas7

Markman, G. D., Phillip, P. H., Balkin, D. B. & Gianiodis, P. T. (2005). Entrepreneurship and university-base technology transfer. *Journal of Business Venturing*, 20, 241-263. https://doi.org/10.1016/j.jbusvent.2003.12.003

Medellín Cabrera, E. A. & Arellano Arellano, A. (2019). Technology valuation at universities: Difficulties and proposals. *Contaduría y Administración,* 64(1), 1-17. http://dx.doi.org/10.22201/fca.24488410e.2019.1811

Moutinho, R., Au-Yong–Oliveira M., Coelho, A. & Manso, J. P. (2016). Determinants of knowledge-based entrepreneurship: an exploratory approach. *International Entrepreneurship and Management Journal,* 12. 171-197. https://doi.org/10.1007/s11365-014-0339-y

Mowery, D. C. & Sampat, B. N. (2009). Universities in National Innovation Systems. In Fagerberg, J., Mowery, D. C. & Nelson, R.R. (Eds.), *The Oxford Handbook of Innovation* (pp. 209-239). Oxford University Press

Nieto Rivera, M. (2001). El gerente de tecnología, perfil e impacto de su gestión en las organizaciones. *Innovar*, 18, 115-122. https://revistas.unal.edu.co/index.php/innovar/article/view/24428

Noack, A. & Jacobsen. H. (2021). Transfer scouts: from intermediation to co-constructors of new knowledge and technologies in Germany. *Research Policy*, 50(4), 104209. https://doi.org/10.1016/j.respol.2021.104209

Necoechea-Mondragón, H., Pineda-Domínguez, D. & Soto-Flores, R. (2013). A Conceptual Model of Technology Transfer for Public Universities in Mexico. *Journal of Technology Management & Innovation*, 8 (4), 24-35. http://dx.doi.org/10.4067/S0718-27242013000500003

Ogarrio, P., & Culebro Moreno, J. E. (2019). Coordinación y transferencia del conocimiento en las universidades públicas en México. El caso de la Universidad Autónoma Metropolitana, Unidad Cuajimalpa. *Revista de la Educación Superior, 48*(191), 81-96. https://dialnet.unirioja.es/servlet/articulo?codigo=7703536

O'Kane, C., Mangematin, V., Geoghegan, W. & Fitzgerald, C. (2015). University Technology Transfer Offices: The search for identity to build legitimacy. *Research Policy,* 44, 421-437. https://doi.org/10.1016/j.respol.2014.08.003

O´Kane, C. (2018). Technology transfer executives´ backwards integration: An examination of interactions between university technology transfer executives and principal investigators. *Technovation*, 76-77, 64-77. http://dx.doi.org/10.1016/j.technovation.2016.08.001

Olaya-Escobar, E. S., Berbegal-Mirabent, J. & Alegre, I. (2020). Exploring the relationship between service quality of technology transfer offices and researchers´ patenting activity. *Technological Forecasting & Social Change*, 157, 120097. https://doi.org/10.1016/j.techfore.2020.120097

Ortíz-Cantú, S. & Solleiro-Rebolledo, J. L. (2020). Evaluación del desempeño de las oficinas de transferencia de tecnología en México. *Revista de ciencias de la gestión*, 5, 2020, 45-73. https://doi.org/10.18800/360gestion.202005.002

O'Shea, R. P., Allen, T. J., Morse, K. P., O'Gorman, C. & Roche, F. (2007) Delineating the anatomy of an entrepreneurial university: the Massachusetts Institute of Technology experience. *R&D Management,* 37, 1-16. https://doi.org/10.1111/j.1467-9310.2007.00454.x

Ossa, A. (2024). *From research to market a comprensive guide*. Springer. https://doi.org/10.1007/978-3-031-71340-8

Pedraza-Amador, E. M. & Velázquez-Castro, J. A. (2013). Office of Technology Transfer at the University as a strategy to promote innovation and competitiveness. Case: Hidalgo State, México. *Journal of Technology Management & Innovation*, 8(2). https://doi.org/10.4067/S0718-27242013000200018

Probert, D., Dissel, M., Farrukh, C., Mortara,L. Thorn, V. & Phaal, R. (2011). *Understanding and Communicating the Value of Technology: A process Perspective*. 2011, Proceedings of PICMET'11: Technology Management in the Energy Smart World (PICMET), Portland, OR, USA. https://ieeexplore.ieee.org/document/6017614/authors#authors

Razgaitis, R. (2002). Techology Valuation. In Goldscheider, R. (Eds.), *Licensing best practices. The LESI Guide to Strategic Issue and Contemporary Realities*. (pp. 19-51). New York: Jonh Wiley & Sons, Inc.

Rivas-Echeverria, F. I., Pérez, A. G., Rubio-Gómez, M. J. & Aguilera-Bravo, T. P. (2016). Papel y transcendencia de las universidades en el proceso de transferencia tecnológica. *Visión gerencial*, 2, 375-398.

Rogers, E. M., Takegami S. & Jing, Y. (2001). Lessons learned about technology transfer. Transfer. *Technovation*, 21 (4), 253-261. https://doi.org/10.1016/S0166-4972(00)00039-0

Siegel, D. S., Waldman, D. A., Atwater, L. E. & Link, A. N. (2004). Toward model of the effective transfer of scientific knowledge academicians to practitioners: qualitative evidence from the commercialization of university technologies. *Journal of engineering and technology management*. 21(115-142). https://doi.org/10.1016/j.jengtecman.2003.12.006

Smilor, R. W.; Gibson, D. V. y Kozmetsky, G. (1989). Creating the Technopolis: High-Technology Development in Austin, Texas. *Journal of Business Venturing*. 4(1), 49-67. https://doi.org/10.1016/0883-9026(89)90033-5

Solís Lima, A., Ovando, C., Olivera Pérez, E. & Rodríguez Lozada, M. Á. (2020). Desempeño de una Oficina de Transferencia de Tecnología en el contexto de gestión de patentes: Estudio de caso de la OTT de la Benemérita Universidad Autónoma de Puebla. *Nova Scientia,* 12(24), 1-31. https://doi.org/10.21640/ns.v12i24.2193

Soares, T. J., Torkomian, A. L., & Nagano, M. S. (2020). University regulations, regional development and technology transfer: The case of Brazil. *Technological Forecasting and Social Change*, 158, 120129. https://doi.org/10.1016/j.techfore.2020.120129

Solleiro, J.L. y Castañon, R. (2005). Competitividad y sistemas de innovación: los retos para la inserción de México en el contexto global. *Revista Iberoamericana,* 5(15), 165-197. http://infoandina.org/infoandina/sites/default/files/publication/files/85.Competitividad_y_sistemas_de_innovaci_n_los_retos_para_la_inserci_n_de_M_xico_en_el_contexto_global.pdf

Sullivan, P.H. (2001). *Extracción del valor de los activos intelectuales*. Paidós.

Torres Vargas, A. & Jasso Villazul, J. (2019) Capabilities and knowledge transfer: evidence from university research center in the health area in Mexico. *Contaduría y Administración*, 64(1), 1-16. http://dx.doi.org/10.22201/fca.24488410e.2019.1808

Villani, E., Rasmussen, E. & Grimaldi, R. (2017). How intermediary organizations facilitate university-industry technology transfer: A proximity approach. *Technological Forecasting & Social,* 114, 86-102. http://dx.doi.org/10.1016/j.techfore.2016.06.004

World Intellectual Property Organization. (2022). *Global innovation index 2022. What is the future of innovation-driven growth.* https://www.wipo.int/en/web/global-innovation-index/2022/index

World Intellectual Property Organization. (2023). *Global innovation index 2023. Innovation in the face of uncertainty.* https://www.wipo.int/en/web/global-innovation-index/2023/index#:~:text=Photos%20on%20Flickr-,Which%20are%20the%20most%20innovative%20economies%20in%202023%3F,Global%20Innovation%20Index%202023%20rankings

World Intellectual Property Organization. (2024). *Global innovation index 2024. Unlocking the promise of social entrepreneurship.* https://www.wipo.int/web-publications/global-innovation-index-2024/assets/67729/2000%20Global%20Innovation%20Index%202024_WEB3lite.pdf

World Intellectual Property Organization. (2025). *Technology Transfer Organizations* https://www.wipo.int/en/web/technology-transfer/organizations

APPENDIX I. TTO TO WHICH THE PARTICIPANTS INVOLVED IN THE RESEARCH BELONG

TTO	Institution	Type of Institution
1. Social Engagement Coordination	Centre for Research in Food and Development (CIAD)	Public Research Centre
2. Technology Transfer Office	Centre for Research and Assistance in Technology and Design of the State of Jalisco, A.C. (CIATEJ)	Public Research Centre
3.Coordinator of Engagement, Innovation, and Knowledge Transfer to Society (COVITECS)	Northwest Biological Research Centre, S.C. (CIBNOR)	Public Research Centre
4.Innovation and Development Promotion Office (DIID)	Scientific Research and Higher Education Centre of Ensenada, Baja California (CICESE)	Public Research Centre
5.Technological Management Office	Scientific Research Centre of Yucatan (CICY)	Public Research Centre
6. Engagement and Technological Transfer Coordination / Technological Transfer Office	National Autonomous University of Mexico (UNAM)	Federal Public University
7. Technological Enterprise Incubation Office (DIET)	National Polytechnic Institute (IPN)	Federal Public University
8. Business Services and Technological Transfer Office (DSETT - IPN)	National Polytechnic Institute (IPN)	Federal Public University
9. Knowledge Engagement and Transfer Unit	Ecology Institute, A.C. (INECOL)	Public Research Centre
10. Engagement Secretary / Chemistry Institute	National Autonomous University of Mexico (UNAM)	Federal Public University
11. Technology Transfer Section	Autonomous University of Aguascalientes (UAA)	State Public University
12. Intellectual Property and Transfer Department	Autonomous University of Baja California (UABC)	State Public University
13. Technology Transfer Coordination at the Centre for Enterprise Incubation and Technology Transfer (CIETT)	Autonomous University of Nuevo Leon (UANL)	State Public University
14. Innovation Office	Autonomous University of Querétaro (UAQ)	State Public University
15. University Engagement Office	Autonomous University of San Luis Potosi (UASLP)	State Public University
16. General Coordination of Technological and Knowledge Transfer	University of Guadalajara (UDG)	State Public University
17. Technology Transfer Office and Entrepreneurship and Innovation Development Department	Veracruz University (UV)	State Public University
18. Innovation and Knowledge Transfer Office	Meritorious Autonomous University of Puebla (BUAP)	State Public University
19. Engagement Office	Autonomous University of Tabasco (UJAT)	State Public University
20. Centre for Atmospheric Sciences and Green Technologies	Autonomous University of Ciudad Juarez (UACJ)	State Public University
21. Technology Transfer Office	Centre for Research in Applied Chemistry (CIQA)	Public Research Centre
22. Institutional Relations	Potosi Institute of Scientific and Technological Research (IPICYT)	Public Research Centre
23. Technology and Knowledge Transfer Office	University of Sonora (UNISON)	State Public University
24. Technological Engagement Coordination	Centre for Research in Advanced Materials (CIMAV)	Public Research Centre

APPENDIX II. INTERVIEW GUIDE

BLOCK I. Knowledge transfer in Mexico. Institutional situation, determining factors for its development and mechanisms.

1. What is the importance of knowledge transfer? Why is it important for knowledge to be transferred from the university to the market?
2. What role does this public higher education institution play in knowledge creation in Mexico? And its TTO?
3. How do you help to increase the transfer of knowledge from your institution to the market?
4. What are the main success factors that make knowledge transfer possible? What is done to enhance these success factors?
5. What are the main barriers that prevent and hinder greater knowledge transfer?
6. Which actors do you believe should participate in the process for the knowledge transfer to be successful?
7. What government-level policies do you believe should be implemented to enhance knowledge transfer?
8. How would the knowledge transfer system in Mexico improve? Are there any appropriate structures and mechanisms?
9. Are there enough resources for knowledge transfer? Specifically, what is your opinion regarding existing human resources? And financial resources?
10. What new measures can the TTO take from your institution to promote knowledge transfer? Are researchers and technicians involved enough?
11. How long does it take for a technology to be transferred to the market? What factors make this happen faster?
12. Has your institution issued regulations on technology transfer to prevent conflicts of interest? How long ago was this done? If not, what are the reasons?

BLOCK 2: The role of TTOs in Mexican public universities.

1. How is the TTO structured within the institution and what is its organizational position?
2. In which year was the TTO created with the name which was given to it at that time?
3. Currently, as of 2022, what place or importance has TTO gained in Mexico over time, institutionally?
4. What skills does the TTO team possess that are useful for interacting with the researcher, as well as understanding and diagnosing the market?
5. Which are the objectives of the TTO that you manage or coordinate? Are they contingent on other objectives, and if so, in which areas?
6. Which are the functions that this TTO perform? What role do they play?
7. What is the profile of the people who work at your TTO? Are there researchers?
8. Which are the mechanisms of transfer that this TTO uses to facilitate the technology offer? Which of these transfer mechanisms does it use most, and why?
9. What indicators are used to measure the results obtained? What is their frequency of issuance?
10. Do you believe researchers understand the importance of knowledge transfer? What about public decision-makers? And does society value the role of TTOs?
11. What means are used to contact them? What is their relationship like? Do they attend the TTO or are the researchers sought out after analyzing their profiles and publications?
12. What new federal policies could be developed to support the role of TTOs? And at the institutional level?
13. What are the most commonly used knowledge transfer mechanisms in your institution?
14. What strategies are you trying to incentivize in your TTO? Patenting and licensing? Utility models? Public-private partnerships? Spin-off creation?
15. What percentage of licenses are patented at your institution? How many patents are there? Are they filed under the PCT *(Patent Cooperation Treaty)?*

BLOCK 3: Spin-offs as a mechanism for knowledge transfer in Mexico.

1. What is your institution's experience in participating in and creating spin-offs?
2. How do you support them? What actions has your institution taken to facilitate or strengthen their creation? Do you participate in the company's equity capital?
3. What do you think deters researchers from having greater interest in creating their own spin-offs?
4. Are there any branches or areas of knowledge where there is a tendency to create spin-off companies? In which areas are they most successful?
5. Do the spin-offs that your institution helps to create tend to become established in the market?
6. Are there entrepreneurship and training courses aimed at researchers? Are they successful?
7. Are young researchers more predisposed to creating this type of company than tenured researchers? And are women more predisposed than men?

8. How would you define the profile of researcher who participates in spin-offs?
9. What factors limit the creation of spin-offs, considering the legal and institutional framework, funding, and economic conditions?
10. What factors must coexist to facilitate the creation of spin-offs, considering the legal and institutional framework, funding, and economic conditions?
11. How many spin-offs have been created at this Public Higher Education Institution?
12. Is a stable relationship maintained with the spin-offs created that allows and facilitates knowledge transfer?
13. What funds have been used primarily? Public funds? Private funds?