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MEXICAN HIGHER EDUCATION: FIVE CENTURIES OF GROWTH, DIVERSIFICATION AND INEQUALITY

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INTRODUCTION

The Mexican higher education system is among the oldest in the Americas, predating that of the United States by more than a century. In 1551, 30 years after the Spanish conquest of Mexico, Prince Felipe II of Spain inaugurated the Royal University of Mexico[1]. The new institution was entrusted with training clerics, doctors and lawyers (and a few other professional trades) for what was then the Viceroyalty of New Spain, a vast territory expanding northward from the Isthmus of Panama into what is now the western United States. Founded the same year as the University of San Marcos in Peru and 13 years after the University of Santo Domingo (1538), the new institution formed part of a strategy by the Spanish crown and the Catholic Church to cement their hold in the New World[2].

Over nearly 500 years, Mexican higher education has expanded from a handful of institutions dedicated to the colonial elite to a highly diversified and mass system. Roughly a dozen Mexican institutions figure in the international university rankings — most notably the National Autonomous University of Mexico (UNAM), the modern reincarnation of its colonial predecessor, and the Monterrey Institute of Techno-

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[1] The prince, who inherited the Spanish thrown in 1556, was acting on behalf of his father, the Holy Roman Emperor Charles V.

[2] GREDIAGA KURI, 2011.

logy and Higher Studies, the country's largest private tertiary institution[3]. In all, there are more than 3,000 higher education institutions (HEIs) in the country. These range from large federal and state universities and a half-dozen prestigious private institutions to technological institutes and universities, teachers' colleges and tiny private institutions of questionable quality.

With a population of 127 million people[4], it is not surprising that Mexico has the second-largest tertiary enrollment in Latin America after Brazil. In 2016-2017, total enrollment in the sector, including in distance education programs, was 4.4 million, of which about 334,000 were graduate students[5]. However, the gross enrollment rate of 37% is below the regional average of 43%[6]. More than two-thirds of Mexican students (68.5%) are enrolled in the public sector, where tuition is virtually free[7]. This is somewhat of an anomaly for the region, where private higher education providers have made major inroads in most countries. In terms of the number of institutions, however, the public-private ratio is reversed: of a total of 3,145 higher education institutions reported in 2016, 1,005 (32%) were public institutions and 2,140 (68%) were private[8].

As in the rest of Latin America, the public sector accounts for the vast majority of scientific research in Mexico. For instance, public universities produced 74% of the 15,006 articles registered in the ISI Web of Science in 2015, compared with just 6.6% by private institutions (the rest were produced by other public institutions)[9]. Still, in terms of investment in science and technology (S&T), Mexico lags behind Argentina and spends less than half that of Brazil, as a percentage of GDP[10]. Despite Mexican laws and government development plans dating to the early 2000s mandating that at least 1% of GDP go toward S&T, investment in the sector has stagnated at about 0.5%; by comparison, in 2015, Argentina spent 0.63% and Brazil, 1.28%[11]. The number of PhD graduates in Mexico is also relatively low: 5,798 in 2015, compared with 18,625 in Brazil; the difference is particularly relevant, given that Brazil's population of 208 million is less than twice that of Mexico[12].

Other challenges facing the system include the inequality of access for low-income and indigenous students, lax quality controls (primarily in the private sector), the concentration of top institutions in the capital and a few urban centers, and the relatively

[3] THE, 2018.
[4] WORLD BANK, 2018.
[5] ANUIES, 2017.
[6] ANUIES, 2017; FERREYRA *et al.*, 2017.
[7] ANUIES, 2017.
[8] ANUIES, 2017.
[9] RICYT, 2017; ExECUM, 2018.
[10] RICYT, 2018.
[11] RICYT, 2018.
[12] RICYT, 2008; WORLD BANK, 2018.

low level of internationalization. With a net enrollment of 27%[13], Mexico is also a long way from becoming a universal system, defined by Trow as having more than 50% of the relevant age group (in this case, 18 to 23-year-olds) enrolled in higher education[14].

Despite those challenges, Mexico has one of the most highly consolidated and diversified higher education systems in the region, as well as a robust research sector. Public investment at the tertiary level is among the highest in Latin America, while the country is second only to Brazil in knowledge production. In addition, Mexico has made strides in recent years in expanding the level of academic collaboration with institutions abroad, particularly with counterparts in the United States[15].

The largest public institutions — in particular the UNAM — have served a key role in the nation's development, as part of a distinctly Latin American tradition of «state--building universities»[16]. The public universities have produced a majority of professionals, bureaucrats and presidents in Mexico and designed the main public institutions. They also offer a wide array of community service and cultural programs; the UNAM alone operates several museums, the National Astronomical Observatory, the National Library, four ecological reserves, and the country's chief volcanic and seismic monitoring centers, among other institutions[17]. Such public service aspects are not taken into the account in the international rankings, which partly explains the relatively low visibility of the Mexican universities on a global level.

In this chapter, I provide a broad overview of Mexican higher education, placing it within the Latin American context. I begin by tracing the origins and transformation of the Mexican system from the 16th century onwards — through three centuries of colonial rule, independence from Spain, a 30-year dictatorship, the Mexican Revolution and a century of modernization. I pay particular attention to the policies and developments in the sector since the 1950s, which have shaped the current structure, strengths and weaknesses of the country's tertiary system. The second section analyzes the current state of Mexican higher education (with figures from the 2015-2016 and 2016-2017 academic years), with emphasis on the institutional structure and funding models. It provides data on the following areas: students (enrollment by type of institution, level and gender), professors and researchers (levels of education, types of contracts, salaries), and science and technology production (articles and patents). Section three discusses the main challenges facing Mexican higher education: in particular, the hyper-centralization of the system and the persistent inequalities in terms of access for low-income groups, among different states

[13] SEP, 2017.
[14] TROW, 1974.
[15] LLOYD, 2016; GOBIERNO DE MÉXICO, 2017.
[16] ORDORIKA & PUSSER, 2007.
[17] LLOYD, 2013.

and institutional types, and between professors and research faculty. Finally, I conclude with some final comments and details on the system, as well as recommendations for future research.

A BRIEF HISTORY OF MEXICAN HIGHER EDUCATION

From its origins in the 16th century, Mexican higher education has been characterized by its highly centralized nature and the powerful roles played by both the State and the Catholic Church. Both institutions were dominant during the early colonial period, before entering into a period of open conflict starting in the 18th century — power struggles from which the State emerged victorious. However, the initial proposals for a national university came from Catholic friars, who had been operating a College for Indians in the capital in the early years after the Conquest[18].

In 1595, Pope Clemente VIII granted the fledgling Royal University of Mexico the title of Pontifical, and starting in the 16th century, numerous colleges and Catholic seminaries, and later professional schools, opened in the capital and the provinces[19]. In 1624, the Royal and Pontifical University of Mérida opened in the Yucatán Peninsula (although it was later closed in 1767 due to the expulsion from Mexico of the Jesuit order)[20]. In the latter half of the 18th century, as part of the modernizing reforms promoted by King Carlos III, the first non-religious professional schools were established in Mexico in the areas of medicine, art, botany and mining. Of particular importance was the creation, in 1791, of the University of Guadalajara in what is today Mexico's second largest city[21].

After independence from Spain in 1821, Mexico entered a period of profound instability and armed struggles between liberals and conservatives, which centered largely on the role of the Catholic Church in the country. The newly renamed Royal and National University of Mexico was caught in the crossfire and closed by liberals (for the first of several times) in 1833; at the time, the Congress declared the institution «useless, unreformable and pernicious»[22]. In its place, the government created six public higher education institutions. The university reopened the following year, only to be closed again in 1857, 1861 and 1865 — this time for good. The Emperor Maximiliano, who ruled Mexico from 1864 to 1867, opened numerous professional schools in its stead.

With the restauration of the Republic in 1867, then-President Benito Juárez created a system of national educational institutions, including a national high school and an astronomical observatory. Throughout the century, numerous secondary and tertiary institutions were created to cultivate science, technology, humanities and art[23].

[18] DE IBARROLA, 1986.
[19] BECERRA LÓPEZ, 1963.
[20] GREDIAGA KURI, 2011.
[21] DE IBARROLA, 1986.
[22] GREDIAGA KURI, 2011: 9-10.
[23] RODRÍGUEZ-GÓMEZ, 2008.

In sum, the post-independence period was characterized by the alternating closures of the national university and the opening of specialized institutions. However, more than a concerted policy, the lack of institutional stability was a result of political tensions, widespread poverty and the low level of education characteristic of Latin American countries during their first century as independent republics[24].

Throughout the 19th century, there were also numerous efforts to systematize teacher training in the country. The first teachers' college (known as *normales* in Mexico) was founded in 1823, and between 1849 and 1882 the government created numerous *normales* in different states. In 1887, the government inaugurated the National School for Teachers, which offered the equivalent of a high school degree. However, it wasn't until nearly 100 years later, in 1984, that the system would be elevated to the tertiary level[25].

Starting in 1877, the politician and educational reformer Justo Sierra began pushing for the creation of a national university with a modern (positivist) vision that would oversee the training of professionals and scientists at the service of the nation. However, those calls were largely ignored until 1910, when Sierra, now in the role of public education minister, inaugurated the National University of Mexico. It was one of the last acts of the 31-year dictator-ship of Porfirio Díaz (1882-1910), a period of relative economic and political stability and autocratic government known as the *porfiriato*. The new university (in reality, a reincarnation of the defunct Pontifical and Royal University of Mexico) was created through the union of the national schools of medicine, engineers, jurisprudence and architecture, as well as the national high school and the newly created National School of Higher Studies. Unlike its colonial predecessor, the university was charged with training critical thinkers. «The founders of the old university said 'the truth is given, teach it'; we say: 'truth is in the process of being defined, search for it'»[26].

The outbreak of the Mexican Revolution (1910-1917)[27] several months later, however, delayed those goals for a virtually a decade. By the end of the conflict, which left more than 1 million people dead, the university was relaunched at the service of the post-revolutionary governments[28]. That entailed a new focus on the social mission of the university, including promoting literacy throughout the country through student volunteers and extension programs[29]. In 1921, the government of President Álvaro Obregón created the Public Education Secretariat (SEP) and named José Vasconcelos, one of Mexico's leading educational reformists, as its first head.

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[24] GREDIAGA KURI, 2011.
[25] DE IBARROLA, 1986.
[26] SIERRA *apud* DE IBARROLA, 1986.
[27] There is considerable dispute regarding the end date of the Mexican Revolution. Many historians consider the war to have finished in 1917, when the country enacted a new constitution, and others, in 1920, when a majority of the fighting came to an end.
[28] RODRÍGUEZ-GÓMEZ, 2008.
[29] PALLÁN FIGUEROA & RODRÍGUEZ-GÓMEZ, 2011.

In the 1920s, the university created the first postgraduate programs under the National School of Higher Studies and established criteria for revalidating university degrees obtained abroad — the first efforts in Mexico toward the internationalization of higher education. Also during the decade, the various Literary and Scientific Institutes were transformed into the first wave of state universities, along the lines of the University of Guadalajara. In 1925, total higher education enrollment was a mere 16,218, up from 9,984 in 1907[30].

In 1929, the university won limited autonomy from the government and defined its primary mission as that of training future professionals at the service of the nation, and, in second place, conducting scientific research. That hierarchy of purpose — which followed the Napoleonic model of the university as a training ground for professionals and the bureaucratic elite — would have longterm implications for Mexico's efforts to develop a modern scientific research system. Similarly, a majority of professors were part-time, a trend that continues today, despite efforts starting in the 1970s to modernize and strengthen the academic profession[31]. In contrast, the University of São Paulo (1934), Brazil's leading university, was modeled after the German research universities, paving the way for the country's current regional dominance in S&T[32].

By the early 1930s, however, the national university entered into a period of open conflict with the government, and within the institution itself, over academic freedom. President Abelardo Rodríguez, a left-leaning former businessman, advocated for a constitutional reform that would require the teaching of socialist principles at all educational institutions. The reform, which was finally approved in 1934 under Rodríguez's successor, Lázaro Cárdenas, sparked a major debate within the university over the role of higher education. While the university council voted in favor of adopting a «socialist education», the plan was never implemented due to major opposition from students and faculty.

Also in 1933, the government issued a new statute (*ley orgánica*) granting full autonomy to the university, but at a significant price. The institution would no longer carry the title of «National» and would essentially become a private entity. The government transferred a sole installment of 10 million pesos, which would cover overhead for a few years, after which the university would rely on fees from students. «For the next 11 years, the university languished amid poverty and intestine conflicts, which intensified until 1944, when the system collapsed»[33]. The government reestablished minimal financial support in 1937, as part of a new system of federal funding for all public HEIs. However, it wasn't until 1944, with the adoption of a new *ley orgánica*, that

[30] SEP, 2018.
[31] GREDIAGA KURY, 2011.
[32] LLOYD, 2013.
[33] PALLÁN FIGUEROA & RODRÍGUEZ-GÓMEZ, 2011.

the institution regained its status and — and title — as the National Autonomous University of Mexico[34].

In 1935, President Cárdenas established the National Council of Higher Education and Scientific Research and, two years later, he created the National Polytechnic Institute (IPN); the latter was charged with overseeing technical training in Mexico, particularly for the newly nationalized petroleum industry. Cárdenas also promoted the decentralization of higher education through support for state universities and proposed a national system of regional technological institutes — a goal that would finally materialize in 1948 with the creation of the first Regional Technological Institutes under the administrative control of the National Polytechnic Institute. In addition, Cárdenas implemented mandatory, unpaid «social service» internships as prerequisites to graduation for all university students — a requirement that was first implemented by the UNAM's medical school and later became universal for all HEIs in Mexico. The system, which is in keeping with the Latin American tradition of public «statebuilding institutions»[35], is still in place today.

For most of the first half of the 20th century, the National University was the main (and virtually the only) institution offering graduate studies. An exception was the College of Mexico, founded in 1940 by exiled intellectuals from the Spanish Civil War (1936-1939). The institution, which initially only offered graduate degrees, is today one of the country's leading social science and humanities research centers.

MEXICAN HIGHER EDUCATION 1950-2017

In 1950, Mexico had just 23 higher education institutions (HEIs): two federal universities (the UNAM and the IPN); 12 state-run universities; three regional technological institutes; and 6 private universities[36]. Total enrollment was roughly 30,000[37] students[38].

Starting in the decade, however, Mexico embarked on the first major expansion of higher education with the creation of 10 new public state universities and seven more in the 1960s, all of them located in the state capitals. In addition, there was a major increase in the number of regional technological institutes, many of which opened in cities and municipalities with growing demand for industrial and agricultural production. During the 1970s — the final decade of the «Mexican miracle», in which annual economic growth topped 6% — the government dramatically increased spending on higher education and created another 10 state universities, often through the fusion or

[34] DE IBARROLA, 1986.
[35] ORDORIKA & PUSSER, 2007.
[36] ORDORIKA *et al.*, 2017.
[37] Enrollment statistics for the first half of the 20th century in Mexico are in reality estimates, since they do not include all HEI institutions at the time. Many scholars put the total enrollment in 1950 at about 50,000 (ORDORIKA *et al.*, 2017).
[38] SEP, 2018.

consolidation of existing institutions[39]. In addition, the government created the National Pedagogical University in 1978 to oversee teacher training in the country. By the end of the decade, total tertiary enrollment had surpassed 800,000 students — 26 times the number of students in 1950[40].

Most of the initial growth in the higher education system was in the public sector, while private higher education accounted for a limited share of enrollment for much of the last century. This was largely due to the onerous and highly centralized government licensing process for private HEIs. While the first private institutions were founded in the 1910s, they did not obtain government recognition for another two decades[41]. Similarly, most of the country's leading private institutions were created by presidential decree. An exception is the Autonomous University of Guadalajara[42], the country's first private university, which was founded in 1935 with support from local businessmen in opposition to the socialist agenda of then-President Cárdenas (1934-1940).

The 1970s was also a crucial decade for the development of scientific research in Mexico. In 1971, the government created the National Council for Science and Technology (Conacyt), a semi-autonomous agency charged with overseeing S&T policy, funding postgraduate scholarships (both in Mexico and abroad) and a significant portion of research in the sector. In 1978, the Congress approved the Higher Education Coordination Law and reformed the structure of the Public Education Secretariat, paving the way for the creation of the under-secretariats of Higher Education and Scientific Research (SESIC, later SES) and Education and Technological Research (SEIT)[43].

In the early 1980s, however, plummeting world oil prices sparked a major debt crisis in Mexico and in much of Latin America. During the so-called «lost decade», governments in the region were forced to slash public spending on education and other areas. In an effort to staunch a potential «brain drain» in Mexican higher education, the government created the National System of Researchers (SNI) in 1984, under the control of Conacyt. The system provides sizable monthly bonuses (in reality, extra salaries) to academics with demonstrated research capacities.

The «merit-pay» system, which was initially conceived as a temporary measure to compensate for a major reduction in wages during the decade, has grown from an initial 1,200 members to more than 25,000 today. Nonetheless, SNI members still represent a tiny elite (6%) of the nearly 400,000 university professors in Mexico[44]. Further-more, the monthly bonuses, which can as much as double researchers' salaries, are conditioned by

[39] PALLÁN FIGUEROA & RODRÍGUEZ-GÓMEZ, 2011.
[40] SEP, 2018.
[41] RODRÍGUEZ-GÓMEZ & ORDORIKA, 2012.
[42] In particular, the founders of the UAG opposed the implementation of Marxist teachings at the public University of Guadalajara under Cárdenas.
[43] PALLÁN FIGUEROA & RODRÍGUEZ-GÓMEZ, 2011.
[44] ORDORIKA *et al.*, 2017.

adherence to strict research quotas — a publish or perish dynamic which has implications for academic autonomy.

Initially, the SNI and other government scientific stimulus programs were restricted to employees of the public sector. However, the 1980s was a period of opportunity for the private sector. The government relaxed controls on private HEIs in a bid to compensate for major budget cuts for education and the resulting constraints on public universities. The decentralization of the education system starting in 1991 fueled the expansion of the private sector by increasing the number of licensing entities, a process which was further simplified in the late 1990s. In addition to the Public Education Secretariat and the public universities, state governments were now empowered to issue licenses for academic programs (known as RVOEs, for their Spanish acronym) to private universities. The result was a surge in the number of new private institutions, many of very low quality. Between 1985 and 2000, the share of private-sector enrollment nearly doubled, from 16% to 31%[45].

At the same time, the government adopted a series of strategies designed to improve the quality of teaching and research in the public institutions. Two programs launched in 1993 (SUPERA) and 1996 (PROMEP) provided funding for professors at the technological institutes and public universities, respectively, to earn graduate degrees (both in Mexico and abroad). Those who completed their studies (preferably at the PhD level) could apply for a growing number of fulltime positions at the pubic HEIs. As a result, demand for graduate studies increased in both the public and private sectors and enrollment at the level skyrocketed 169% during the decade[46].

Also during the 1990s, Mexico adopted the first evaluation systems for higher education, as part of a broader international push for quality controls in the sector. In 1991, the government, in conjunction with the National Association for Universities and Higher Education Institutions (ANUIES), created the Interinstitutional Committees for the Evaluation of Higher Education (CIEES), which rank tertiary programs and make recommendations for their improvement (or closure). Two years later, the National Center for Higher Education Evaluation (Ceneval) was founded to develop and administer exams for students entering and leaving higher education. Then, in 2000, the government launched the Accrediting Council for Higher Education (COPAES), which extended the evaluation system to the private sector.

The new emphasis on accountability and transparency was accompanied by a push to decentralize key government services and devolve power to the state and local levels. Such policies formed part of the trend in New Public Management, which sought to

[45] MARTÍNEZ ROMO, [s.d.].
[46] GREDIAGA KURY, 2011.

incorporate private-sector strategies into public administration, and which was adopted by governments in the developing the world starting in the 1990s[47].

Of particular importance in Mexico was the creation, starting in 1991, of a new system of «extraordinary» or competitive funds for institutions to promote areas such as structural reform, expansion in the enrollment, educational quality, etc. The first such program was the Fund for the Modernization of Higher Education (FOMES), and starting in 2000 the government dramatically increased the scope and number of such funds.

While previously institutional budgets depended largely on the size of enrollment and the universities' negotiating power in Congress, the institutions would now compete for a significant share of their budget through earmarked funds. The strategy was designed to stimulate innovation, boost the quality of teaching and research, and instill a new culture of institutional planning. However, it has been criticized for limiting university autonomy, inflating institutional bureaucracy — including creating a new and powerful group of managerial technocrats — and heightening inequalities among institutions[48].

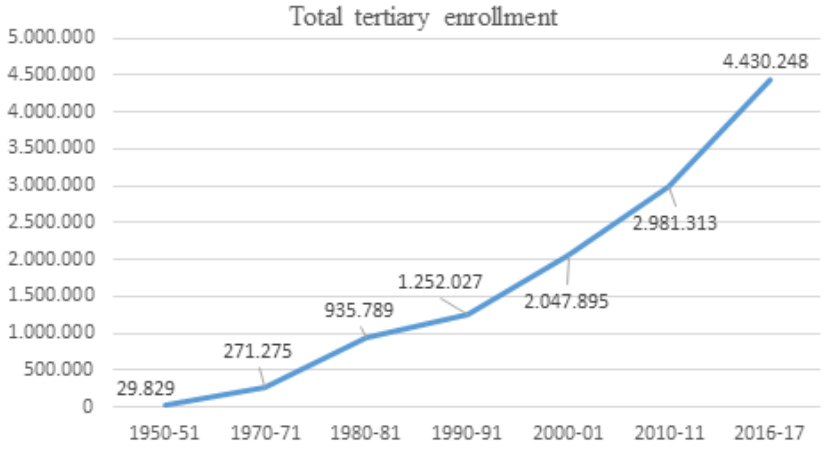
Meanwhile, throughout the 1990s and into the 2000s, hundreds of tiny HEIs catering to lower income students opened throughout the country. President Vicente Fox (2000-2006), whose election ended 71 years of one-party rule in Mexico, sought to stem the proliferation of low-quality institutions, known as «junk universities» or *universidades patito* in Mexico. His government pushed for new common academic criteria among the federal government and the states in issuing RVOEs, and by 2004, all 31 states and the capital had an agreement of this kind in place. The government also encouraged public universities to stiffen their standards for issuing RVOEs. As a result, some 201 programs lost their licenses during the Fox period[49]. Since then, the share of private enrollment has remained virtually constant at about 32%[50].

Nonetheless, the government crackdown on «junk universities» may actually have facilitated the growth of the largest private institutions, as part of a broader diversification of the country's higher education system. Starting in the 2000s, for-profit education providers — most of them based in the United States — began acquiring majority ownership of existing private universities in Mexico. Within a few years, these institutions began opening dozens of branch campuses throughout Mexico. The largest of these, the University of the Valley of Mexico (UVM), which forms part of U.S.-based Laureate International Universities, currently operates more than 35 campuses throughout the country and enrolls more than 60,000 students at the tertiary level (the UVM also operates a system of high schools)[51].

[47] MOCTEZUMA BARRAGÁN & ROEMER, 2017.
[48] ACOSTA SILVA, 2009; ORDORIKA *et al.*, 2017.
[49] RODRÍGUEZ-GÓMEZ & ORDORIKA, 2012.
[50] ACOSTA SILVA, 2013; ANUIES, 2017.
[51] ExECUM, 2018; LAUREATE INTERNATIONAL UNIVERSITIES, 2018.

Together, such trends have contributed to the steady growth in Mexican higher education starting in the 1950s, with the largest change occurring during the 1970s and significant expansion since 2000. However, as previously mentioned, overall enrollment is relatively low compared to other Latin American countries with similar levels of development. Argentina, the regional leader, reported gross enrollment of 80% (2012 figures), Chile, 79%, Uruguay, 63%, and Colombia and Costa Rica, 48%[52]. In addition, much of the recent expansion in the system has occurred in the technological sector, and by 2010, 20% of all tertiary enrollments were in engineering programs — one of the highest proportions in the world. However, the low level of many of those programs, particularly in the recently created technological and polytechnic universities, has resulted in high levels of unemployment among engineering graduates, despite an ongoing shortage of qualified engineers in Mexican industry[53].

Graph 1. Mexican higher education expansion 1950-2017



Source: Secretaría de Educación Pública, SEP, 2018

THE HIGHER EDUCATION SYSTEM TODAY

Following several decades of expansion, tertiary enrollment in Mexico reached 4,430,248 for the 2016-2017 academic year. Fifty percent of those students were women and 667,569 were enrolled in distance education programs — a sector that has experienced enormous growth over the past decade[54]. In addition, there were 395,878 professors in the higher education system, of which only a quarter (24.2%) were employed full-time and just 12% held PhDs in 2015[55].

[52] WORLD BANK, 2015.
[53] RODRÍGUEZ-GÓMEZ, 2012.
[54] ANUIES, 2017.
[55] ExECUM, 2018.

The system offers five types of degrees: Superior University Technical degree (TSU), terminal degrees of two or more years; bachelor's (*licenciatura*) degrees from technological institutions, universities, and teachers' colleges (*normales*); Specialty (*especialidad*), primarily for medical doctors; Master's; and PhD. In 2016-2017, enrollment at those levels was divided as follows:

Table 1. Higher Education enrollments 2016-2017

	TSU	Licencia-tura (Univ. & Technol.)	Licencia-tura (Normales)	Specialty	Masters	PhD	Total HE enroll-ment
Public traditional	167,477	2,288,191	80,478	30,930	65,702	23,202	2,655,980
Private traditional	4,074	969,824	13,763	17,817	93,730	7,491	1,106,699
Total traditional	171,551	3,258,015	94,241	48,747	159,432	30,693	**3,762,679**
Public distance	6,766	261,273		1,750	17,946	748	288,483
Private distance	978	303,315		4,768	62,018	8,007	379,086
Total distance	7,744	564,588		6,518	79,964	8,755	667,569
Total	**179,295**	**3,822,603**	**94,241**	**55,265**	**239,396**	**39,448**	**4,430,248**

Source: Author's elaboration based on data from the *Anuarios Estadísticos de Educación Superior*, ANUIES, 2017

It is worth noting that the public sector is dominant in all levels of traditional (on-campus) education, with the exception of the master's level, where the private sector accounts for 59% of enrollments. In general, the ratio of public to private in traditional higher education is 71:29. However, in the case of distance education, the private sector is dominant, accounting for 57% of enrollments at all levels except TSU. With regard to teachers' education, the private sector has made major inroads in recent years (previously, virtually all teachers were trained at public *normales*). However, in 2013, the Mexican Congress reformed the constitution to allow any holder of an undergraduate degree in education or related areas to apply to teach in the public school system.

THE STRUCTURE OF THE SYSTEM

The federal Public Education Secretariat (SEP) oversees all levels of education in Mexico, including tertiary institutions, which fall under the Undersecretariat for Higher Education (SES). The SES divides institutions into the following subsystems (with some

variations): Federal Universities, State Universities, State Universities with Solidarity Support, Technological Universities, Polytechnic Universities, Intercultural Universities, Technological Institutes, Other Public HEIs, Public Teachers' Colleges, Conacyt Research Centers, and Private Higher Education Institutions. The following section provides brief details on each subsystem.

Federal Universities

The six institutions in this group are entirely funded by the federal government. They include the UNAM and the National Polytechnic Institute (IPN), the Autonomous Metropolitan University (UAM), the National Pedagogic University (UPN) — all located in the capital — and two agricultural schools, the Autonomous University of Chapingo, on the northern outskirts of the capital, and the Antonio Narro Autonomous Agrarian University, in northern Coahuila state. All but the IPN and the UPN are autonomous institutions, while the UNAM, the IPN and Chapingo run their own high school systems. In recent years, the institutions have also expanded their reach beyond Mexico City, and in 2016-2017, they operated 31 academic units at the tertiary level in 18 states and the capital[56].

As a group (see Table 2), the federal universities account for 10% of undergraduate enrollment, 13% of graduate students, 17% of professors with PhDs, and 28% of members of the National Researchers System (SNI)[57]. Along with the centers run by Conacyt, these universities conduct a majority of scientific research in Mexico; the UNAM and IPN alone were responsible for 41% of articles registered in the ISI Web of Science in 2015[58].

Demand for entrance to the UNAM, UAM and IPN is extremely high, with tens of thousands of students turned away each year. The UNAM guarantees access to graduates of its high school system with a minimum grade point average, and those students make up roughly two-thirds of its 192,000 undergraduates. The acceptance rate for applicants in the open pool, however, was just 9% in 2017[59]. Similarly, the UAM accepts about 14% of applicants and the IPN, 25%[60].

State Universities

There are 34 state-run universities in Mexico (roughly one institution per state), many of which were created out of existing religious and civil schools founded during the colonial and early republican eras. With the exception of the University of Quintana Roo, all hold autonomous status, allowing them extensive control over admissions policies, curriculum, faculty hiring and financial management; although this latter area

[56] MENDOZA ROJAS, 2018.
[57] ExECUM, 2018.
[58] ExECUM, 2018.
[59] TELEVISA VERACRUZ, 2017.
[60] *Oferta de la SGP no es solución para estudiantes rechazados: MAGS.* «El Porvenir» (17 July 2017).

has been restricted by the introduction of competitive funding mechanisms. The state universities receive anywhere from 10% to 50% of their funding the federal government, with the rest coming from the state governments.

The largest of these institutions are the University of Guadalajara and the Autonomous University of Nuevo León (both with more than 100,000 students in 2015) and the Autonomous Universities of Sinaloa and Puebla (with about 78,000 and 70,000, respectively)[61]. This group is responsible for 27% of total tertiary enrollment and 39% in the public sector, as well as 16% of graduate students in Mexico (Table 2). The state universities produced 34% of articles indexed by the ISI Web of Science in 2015 and employed 21% of professors and 33% of SNI members[62].

State Universities with Solidarity Support

With the exception of the Chiapas University of Science and Art (1944), a majority of these institutions were created over the past decade in order to satisfy unmet demand at the traditional state universities. Most offer specialized programs and admissions requirements tend to be lax. In keeping with the decentralizing trend in Mexican public administration, the institutions receive equal funding from the state and federal governments. The institutions are concentrated in 10 states[63], and in 2016-2017 they had a total enrollment of 66,841 undergraduates and 1,248 graduate students, accounting for just 1.6% and 0.3% of students at those levels, respectively (Table 2).

Technological Universities

The first technological universities were created in the 1990s as part of a government policy to diversify higher education and train workers for the industrial sector. The system was modeled after the French Instituts Universitaires de Technologie[64]. While initially the technological universities only offered short-term TSU degrees, as of 2009 students may enroll in undergraduate professional and engineering programs. As with the newest group of state universities, the federal government provides initial start-up costs, and then equally divides the operating costs with the state governments.

In 2016-2017, after a period of extraordinary growth in the subsector, there were 117 technological universities in all 32 states, with the exception of the capital (which became its own state in 2016)[65]. Total enrollment in the system was 241,668, of which 162,794 were earning a TSU degree — equivalent to 90% of national enrollment at this level — and 78,874 a bachelor's degree (*licenciatura*). A number of these universities

[61] ExECUM, 2018.
[62] ExECUM, 2018.
[63] SEP, 2017.
[64] MENDOZA ROJAS, 2018.
[65] SEP, 2017.

have opened in marginalized areas, including indigenous communities, a sector that has been particularly excluded from Mexican higher education.

Polytechnic Universities

The first polytechnic universities were created in 2002 and there are now 62 such institutions in 26 states[66]. The institutions offer more specialized and higher-level degrees than the technological universities, while they differ from the technological institutes (described below) in that they follow a curriculum based on competencies and are more oriented toward the needs of local industries (at least according to their university mission statements). The polytechnic universities offer four certificate options: technical professional, professional associate, bachelor's or engineering. About two-thirds of the campuses offer graduate programs; however, 99% of the 92,785 students enrolled in 2016-2017 were at the undergraduate level (Table 2).

As a whole, this subsystem represents just 2.1% of Mexican tertiary enrollment and 3.3% of the public system. However, for much of the past decade, it was the fastest growing sector, with a 656% increase in enrollment since 2006, most of it during the early part of the period.

Intercultural Universities

The first intercultural universities opened in Mexico at the beginning of the 2000s as part of a broader indigenous rights movement in the country. While members of Mexico's more than 60 indigenous groups comprise roughly 10% of the population (some 12 million people), they have historically had little access to higher education. At the beginning of this century, the number of indigenous students was estimated at about 1% of total higher education enrollment[67]. However, the National Education Program 2001-2006 called for expanding the educational offerings in «traditionally marginalized regions» of Mexico, including indigenous communities. In 2001, the government created the General Coordinator for Intercultural and Bilingual Education (CGEIB) to promote the incorporation of an intercultural focus within the national education system.

The first intercultural university opened in northern Sinaloa state in 2001 (although it did not gain federal recognition until 2007)[68]. As of 2016-2017, there were 11 officially recognized intercultural institutions, located in areas with large indigenous populations. In 2016-2017, the universities enrolled a total of 14,784 students, of which just 73 were at the graduate level. The figure includes the Veracruzana Indigenous University, which forms part of the Veracruzana University, one of Mexico's leading state institutions of higher education.

[66] MENDOZA ROJAS, 2018.
[67] SCHMELKES, 2003.
[68] TORRES MEJÍA, 2013.

Despite the focus on interculturality and cultural exchange, a majority of the students come from indigenous communities, while mestizo students are scarce in most institutions. The same is not true of the professors, however, due to the dearth of indigenous Mexicans holding graduate degrees[69]. The institutions offer a range of undergraduate and graduate programs in areas such as: language and culture, sustainable development, community management, community health, and law with a focus on indigenous affairs, among others.

Technological Institutes

The subsystem of technological institutes dates back to the industrialization period of the 1940s, with the first institution created in 1949. In 1959, the institutes were incorporated under the umbrella of the National Polytechnic Institute and, since 2014, they form part of the National Technological Institute of Mexico. The institutions are in turn divided into two groups: federal technological institutes (solely federally funded) and decentralized technological institutes (funded 50:50 by the federal and state governments).

The subsystem is among the largest in Mexico, with 260 institutes and 581,468 students in 2016-2017, all but 1% of whom were earning undergraduate engineering degrees. In general, the institutes cater to low-income students.

Other Public HEIs

In addition to the groups previously mentioned, there are also a variety of other public higher education institutions in Mexico. These include the College of Mexico, the National School of Anthropology, and the National Institute of Fine Arts, several military universities, among other specialized institutions. Also in this group is the Open and Distance University of Mexico and the Digital University of Mexico State, both of which were created during the past decade to promote distance education in the public sector. In total, these institutions enrolled 273,136 students in 2016-2017.

Public Teachers' Colleges

As previously mentioned, the first teachers colleges were created in the 19th century as part of a nationwide literacy campaign in Mexico. For more than a century, the institutions came under control of the federal government. However, as part of the decentralizing push enshrined in the 1992 National Accord for the Modernization of Basic Education, the *normales* were transferred to state control. In 2016-2017, there were 239 public teachers colleges in Mexico, enrolling a total of 83,586 students.

[69] TORRES MEJÍA, 2013.

Conacyt Research Centers

The National Council for Science and Technology (Conacyt) operates 27 research centers throughout Mexico, which also offer a wide range of programs at the graduate (mostly) and undergraduate level. The first 15 centers were created in 1976, 5 years after Conacyt was founded. The centers are divided into three subsystems: Natural and Exact Sciences (10 centers); Social Sciences and Humanities (8); and Technological Development and Services (8)[70]. They had a total enrollment of 4,571 — 410 undergraduates and 4,161 graduate students — and 1,980 professors in 2015[71]. Although the centers' researchers only represent 0.5% of Mexican academics and 8% of SNI members, they produced 15% of all papers indexed in the ISI Web of Science in 2015[72].

Private Higher Education Institutions

Private HEIs range greatly in terms of size, quality and funding mechanisms. The oldest and most prestigious are the Monterrey Institute of Technology and Superior Studies, the Autonomous Technological Institute of Mexico (ITAM) and the Catholic-run institutions, such as the Ibero-American University. Admissions to even the top private universities are fairly open, restricted primarily by the students' ability to pay, but graduation standards are much more rigorous. The most expensive private institutions charge upwards of US$10,000 a year[73].

In recent years, for-profit institutions run by international and Mexican conglomerates have made major headway in the country. As previously discussed, there are also hundreds of tiny institutions, known in Mexico as *patito* or «junk universities», due to their questionable quality. Many of these charge as little as US$1,200 per year.

In all, private HEIs enrolled 1,495,785 students, equivalent to 32% of total enrollment at the tertiary level in 2016-2017. That figure includes the 14,655 students at private teachers colleges; that system is expected to decline following the 2013 law making all university graduates in relevant fields eligible to apply for teaching positions in the public education system.

[70] CONACYT, 2018.
[71] ANUIES, 2017; ExECUM, 2018.
[72] ExECUM, 2018; MENDOZA ROJAS, 2018.
[73] UNIVERSIA, 2017.

Table 2. Number of institutions and enrollment by level and subsystem, 2016-2017

Sub-system	#HEIs	Enrollment							
		TSU		Undergraduate		Postgraduate		Total	
		enrollment	female	enrollment	female	enrollment	female	enrollment	female
Federal Universities	6	0	0%	389,552	48%	42,487	49%	432,039	48%
Public State Universities	34	4,030	51%	1,093,930	53%	54,723	50%	1,152,683	53%
Public State Universities with Government Support	22	0	0%	66,841	55%	1,248	51%	68,089	55%
Technological Universities	113	162,794	40%	78,874	40%	20	10%	241,688	40%
Polytechnic Universities	62	0	0%	91,634	39%	1,151	39%	92,785	39%
Intercultural Universities[73]	10	0	0%	14,345	55%	73	48%	14,418	55%
Federal Technological Institutes	126	97	1%	336,635	36%	3,701	41%	340,433	36%
Decentralized Technological Institutes	134	153	39%	239,985	39%	897	35%	241,035	39%
Other Public Institutes	235	7,169	41%	237,258	53%	28,709	58%	273,136	53%
Public Teachers Colleges	239	0	0%	80,478	73%	3,108	69%	83,586	73%
Conacyt Research Centers	24	0	0%	410	46%	4,161	43%	4,571	43%
Total Public HEIS	**1,005**	**174,243**	**40%**	**2,629,942**	**48%**	**140,278**	**51%**	**2,944,463**	**48%**
Private Teachers Colleges	187	0	0%	13,763	79%	892	70%	14,655	78%
Private HEIs	1,953	5,052	48%	1,273,139	54%	192,939	57%	1,471,130	54%
Total Private	**2,140**	**5,052**	**48%**	**1,286,902**	**54%**	**193,831**	**57%**	**1,485,785**	**54%**
TOTAL	**3,145**	**179,295**	**40%**	**3,916,844**	**50%**	**334,109**	**54%**	**4,430,248**	**50%**

Source: MENDOZA ROJAS, 2018, using data from the SEP, Formatos 911, 2016-2017

[74] Does not include the Veracruzana Intercultural University, which had a total of 366 undergraduate students in 2016--2017 and which forms part of the state-run Veracruzana University.

UNIVERSITY FINANCING

In recent years, Mexican spending on higher education (both public and private) has averaged 1.3% of GDP, equivalent to roughly 277 billion pesos in 2015 (about US$16 billion in that year's exchange rate)[75]. Of that, public higher education spending was about 164 billion pesos (US$9.5 billion), a 40%-increase from 2006 figures. The largest increases during the past decade occurred between 2013 and 2014, before falling slightly in 2015.

Table 3. Mexican public higher education spending (millions of pesos, 2016)

Year	Federal HE spending[75]	State-level HE spending[76]	Total HE spending
2006	73,958.70	24,663.10	98,621.80
2007	82,437.23	26,985.19	109,422.42
2008	91,744.71	28,861.10	120,605.81
2009	100,724.07	30,261.01	130,985.08
2010	104,144.74	33,835.12	137,979.86
2011	106,917.74	31,917.80	138,835.54
2012	109,287.25	33,226.40	142,513.65
2013	114,881.49	34,746.60	149,628.09
2014	124,100.38	43,134.53	167,234.91
2015	125,719.86	38,360.00	164,079.86
2016	125,875.34	not available	

Source: Adaptation based on ORDORIKA *et al.*, 2017

In reality, funding for public universities is highly variable from year to year, complicating long-term strategic planning by the institutions. Funds are distributed through two separate mechanisms: fixed federal and state funding (*fondos ordinarios*), which the institutions must negotiate on a yearly basis with the federal and state congresses; and, since 1991, a system of competitive funds (*fondos extraodinarios*), which are tied to more than a dozen different specific programs and are the result of a competitive bidding process. As a result, the overall budgets of public institutions are highly variable and depend largely on the institutions' bargaining power and their strategic management capacity (in the case of the competitive funds).

In the case of the state-run universities, the proportion of federal and state funding varies significantly. For instance, while the University of Guadalajara receives an equal

[75] OECD, 2015; WORLD BANK, 2018.

[76] Federal Budget approved for higher education.

[77] Figure reported by the Questionnaire on State Education Financing (*Cuestionario sobre Financiamiento Educativo Estatal*). Source: Dirección General de Planeación y Programación de la SEP. Note: the figure for 2015 corresponds to the authorized federal budget, and for all other years, to the actual spending.

share from both levels of government, the Autonomous University of Nuevo León, whose main campus is in the country's industrial capital of Monterrey, is funded 76% by the federal government and 24% by the state[78]. Such variability stems from agreements negotiated between the federal and local levels at specific moments in history. On average, the 34 state universities receive twice as much funding from the federal government as from the states — a legacy of Mexico's highly centralized education system[79].

INTERNATIONALIZATION

The internationalization of higher education — in terms of student and faculty ex-change — is still a nascent process in Mexico, as in a majority of Latin American countries. This is due to a number of factors: the rigid curriculum, a lack of foreign language fluency among students and researchers, the dearth of funding for faculty and student exchange, the lack of international visibility of a majority of the region's HEIs, and high levels of violence (or perceptions of violence) in many countries. In the Mexican case, the last factor has had perhaps the biggest chilling effect on international academic exchange, if not on research collaboration. In 2006, then-President Felipe Calderón declared war on the Mexican drug cartels, triggering a major spike in the country's homicide rate. Almost immediately, US institutions began canceling study abroad programs with Mexican institutions; as a result, the number of American students in Mexico plummeted from a record high of 10,022 in 2005-2006 to 4,167 in 2010-2010[80].

International mobility among faculty is also extremely limited, despite the fact that a significant share of university professors — and SNI members in particular — earned their graduate degrees abroad. According to the most recent survey of Mexican academics, conducted in 2007-2008 as part of the international project *The Changing Academic Profession*, 46% of SNI members and 25% of other full-time professors held PhDs from foreign universities, although for the latter group a minority of total professors had a terminal degree[81]. In addition, just 35% of full-time professors surveyed reported collaborating with international colleagues and only 6% had taught a class in a foreign university in the previous year (50% of them in the United States or Spain).

Nonetheless, the Mexican government has made a major effort in recent years to increase the level of international exchange, particularly with the country's biggest trading partner: the United States. In 2013, the presidents of the two countries announced the Bilateral Forum for Higher Education (FOBESII), which sought to bring to 50,000 the number of US students in Mexico and 100,000 the number of Mexican

[78] ExECUM, 2018.
[79] ExECUM, 2018; ORDORIKA *et al*., 2017.
[80] IIE, 2006; IIE, 2010.
[81] CAP, [s.d.].

students in the United States over the next few years. The program formed part of then-US President Barack Obama's 100,000 Strong in the Americas program, which sought to dramatically expand the share of Latin American students studying in the United States[82]. Since then, dozens of universities on both sides of the border have signed collaboration agreements for research, and faculty and student exchange. As a result, the number of Mexican students in the US reached 16,835 in 2016-2017, up from 13,063 in 2005-2006, making Mexico the 9th largest place of origin for foreign students in the United States[83]. Similarly, the number of Americans studying in Mexico increased nearly 10% last year to reach 5,178; still, Mexico still lags far behind Costa Rica, which attracted 9,233 American students in that year.

Diplomatic relations between the two countries have soured since US President Donald Trump took office in January 2016, vowing to erect a wall along the shared border with Mexico and renegotiate or terminate the North American Free Trade Agreement (NAFTA). However, academic partnerships, which depend largely on negotiations between individual institutions, have continued to grow[84].

EQUITY AND ACCESS

Despite major gains in tertiary enrollment and the creation of new institutional types catering to disadvantaged groups, the Mexican higher education system remains highly inequitable and stratified along class and regional lines. While the government has expanded access for low-income and indigenous students, huge disparities remain. In addition, there are significant gaps in terms of funding and enrollment rates between richer and poorer states, urban and rural areas, and among institutional types.

Variations in higher education enrollment tend to mirror income disparities among states. For example, Chiapas ranks at the bottom of Mexico's 32 states, both terms of the share of the population living in poverty (75%) and its ranking on the country's human development index; at 0.667 it is on a par with the African nation of Gabon[85]. The state also has the lowest tertiary enrollment rate, 14.8%[86]. In contrast, Mexico City has a poverty rate of 28.5% and a human development index of 0.83, on par with Andorra[87]. Gross tertiary enrollment in the capital is 60%, higher than most European nations[88].

A similar gap exists between urban and rural areas. In 2012, just 23% of all municipalities offered some form of tertiary education. In Oaxaca state, which has the largest indigenous population and is among the poorest entities, HEIs were concentrated in

[82] GOBIERNO DE MÉXICO, 2017.
[83] IIE, 2006; IIE, 2017.
[84] GOBIERNO DE MÉXICO, 2017.
[85] PNUD, 2015; CESOP, 2013.
[86] ORDORIKA *et al.*, 2017.
[87] PNUD, 2015; CESOP, 2013.
[88] ORDORIKA *et al.*, 2017.

just 5% of municipalities. In contrast, in Baja California state, along the border with the United States, every municipality had at least one HEI institution. The educational offerings also varied greatly depending on the type of locality. Despite the decades-long process of decentralization, a majority of the public universities are still located in the state capitals. Meanwhile, in many small cities, the only options available to students are technological institutions, teachers' colleges, private institutions of dubious quality and, increasingly, distance education programs[89].

The share of students eligible to attend college also varies significantly by region and socioeconomic condition. This is largely due to a shortage of spots at the public high schools, particularly in poorer rural areas[90]. A 2011 constitutional amendment made secondary education mandatory and ordered the government to assure full coverage by the 2021-2022 academic year. However, in 2014-2015, gross enrollment at the level was just 72% and net enrollment (by age) was around 50%[91].

Similarly, students in the top income brackets are far more likely to attend university than their poorer peers, although the gap is closing slightly. According to the National Surveys of Income and Household Spending[92], in 2000 just 2.76% of college-age students in the bottom income quintile were enrolled in higher education, compared with 63.5% in the top quintile. In 2010 the enrollment rate among the bottom quintile of the population had reached 14.4% and the top quintile hit 78.4%. Nonetheless, a large share of those students are enrolled in the technological and private sectors, since competition has become increasingly fierce at the top institutions.

The federal government has attempted to address some of the inequalities through compensatory funding programs for poorer institutions and regions. In 2001, the government of Vicente Fox created a national scholarship program for higher education known as Pronabes, granting the first 44,000 scholarships to low-income students. By 2011, the number of scholarships had more than quadrupled, and the government created an additional funding program, bringing the total number of scholarships in that year to 813,000[93]. However, like other government funding programs, Pronabes has disproportionately benefited residents of the capital and neighboring Mexico State.

INEQUALITIES AMONG FACULTY

Despite efforts to open new public research centers throughout the country, the country's scientific research system remains heavily centralized in the capital. In

[89] ORDORIKA & RODRÍGUEZ-GÓMEZ, 2012.
[90] ORDORIKA & RODRÍGUEZ-GÓMEZ, 2012.
[91] SEP, 2015.
[92] Household surveys tend to yield higher estimates of school attendance than data on the educational system, as families often report part-time or sporadic students as being enrolled in college. However, the Education Secretariat does not provide data on tertiary enrollment by income bracket (INEGI, 2000; INEGI, 2010).
[93] VILLA LEVER, 2013.

addition, a small share of researchers at top universities receive a majority of research funding, while many state universities and a majority of private ones — not to mention the technological sector and the teachers' colleges — conduct virtually no research.

One of the best indicators of the distribution of S&T capacities and investment in Mexico is the National System of Researchers. While the system also has members in private universities and research institutes, the vast majority of SNI members work in a handful of public universities, with the three main universities in the capital accounting for nearly 30% of the total[94]. The system has four levels, with monthly bonuses ranging from 6,800 pesos (USD$360) for candidates to 31,900 pesos ($USD1,680) for level-III researchers in 2017[95]. Given the low base salaries of Mexican academics, SNI members earned twice the salary of non-members, according to the results of the 2008 *Changing Academic Profession* survey[96]. The result is a highly stratified system of teachers and researchers, with the latter considered more valuable, and among academics at different types of institutions[97]. The concentration of top-ranked SNI members (level III) in the capital is particularly noteworthy, as these academics command the largest share of research funding; the UNAM alone accounted for 41% of all researchers at that level in 2015[98].

The heavy concentration of research centers in the federal capital and a few states also has implications for regional technological development. For example, two institutions — the National Petroleum Institute and the UNAM — have produced nearly half all the patents issued to higher education institutions in Mexico[99].

CONCLUSIONS

More than 470 years since the first university was founded in the former Aztec capital, Mexican higher education has grown into a highly diversified system, with more than 3,000 institutions. The country also has the second largest enrollment in Latin America, with over 4,4 million students, a majority of which attend free or virtually free public institutions. However, as discussed in this chapter, the system faces major challenges, including: the low level of funding for research in science and technology, the heavy degree of centralization (both administrative and geographic), and persistent inequalities among income groups, faculty, institutions and regions.

Through the creation of new institutional types over the past two decades, the government has moved to decentralize and democratize Mexican higher education, while making the system more responsive to industry demands. However, the dearth

[94] ExECUM, 2018.
[95] OLIVARES ALONSO, 2017.
[96] CAP, [s.d.].
[97] ORDORIKA, 2004; BENSIMON & ORDORIKA, 2006.
[98] ExECUM, 2018.
[99] ExECUM, 2018.

of funding for research — despite successive laws mandating 1% of GDP go towards S&T — threatens the country's ability to compete in the globalized knowledge economy.

While Mexico has steadily increased its production of articles in indexed journals over the past decade — from 7,344 in 2007 to 15,006 in 2015[100] — the country's share of total articles on a global level is in decline, due to the acceleration of academic production in Brazil, India, China and other developing countries. Similarly, the number of patents granted to Mexican higher education institutions is also extremely low: the UNAM, for instance, registered a total of 251 patents between 1991 and 2015, compared to the more than 1,000 registered by the State University of Campinas, in Brazil, the current top--ranked institution in Latin America[101].

There is also a need for more research on the different subsystems comprising Mexican higher education — particularly the technological universities, the polytechnic universities and the intercultural universities, which are the newest and fastest growing components of the system. Little is known, for instance, about how graduates of those universities fare in the job market compared with their counterparts at traditional universities — which themselves face high levels of unemployment; according to one recent study, two-fifths of Mexican college graduates under 30 are either unemployed or work in the informal economy[102].

The challenges facing the system are a reflection of broader underlying problems in Mexico: in particular, persistent socioeconomic inequalities and the lack (or minimal presence) of a knowledge-based economy. In that context, the recent expansion of the public higher education sector is a step in the right direction. Mexican higher education is also noteworthy for its public service orientation, which contrasts with the pro-market focus of many of the region's higher education systems. But major difficulties remain. The ability of the higher education system to respond and adapt to the demands in the 21.st century will have major implications for the country's future development.

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[100] RICYT, 2017; ExECUM, 2018.
[101] ExECUM, 2018; MARTINS, 2017; THE, 2018.
[102] FARIZA & CAMHAJI, 2017.

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