Overview

México, or, more correctly *Estados Unidos Mexicanos* (the United Mexican States), is located in continental North America, where it shares a northern border with the USA, and a southern border with Belize and Guatemala, although the Mexican states of Campeche, Chiapas, Tabasco, Quintana Roo, and Yucatán, are frequently considered to be part of the Central American region. México is a federal republic comprising thirty-one autonomous states and the Federal District municipality of México City. México has a land mass of 1,964,375 square kilometres, which makes it the 5th largest nation in the Americas, and the 14th largest on the globe.

In 2012, México had a population of 114.8 million, which makes it the largest hispanophone nation, but it is also one of the most linguistically diverse countries on earth, and over sixty different indigenous languages (which are protected in law) are spoken by over six million people. México is the 11th most populous country in the world, with15 million people living in México City: the largest metropolis in the Americas and the 3rd most populous metropolitan area in the world. The particular demographic features of this large overall population have important implications for educational provision – in 2010 48.1% of the total population were aged 24 or less, and within this cohort, 29.4% were under the age of 15.

In terms of total GDP, the combination of a population of 114.8 million and GDP per capita over US$14,364 makes México the fourteenth largest economy in the world. México is the only Latin American member of the O.E.C.D. and, along with the USA and Canada, is a partner in the North American Free Trade Agreement, the largest free trade conglomerate in the world (by value) after the European Union. In 2005, Goldman Sachs identified México as the largest of the Next 11 (N-11) states which, after the BRIC nations, could greatly impact the global economy. The other N-11 countries include Bangladesh, Egypt, Indonesia, Iran, Korea, México, Nigeria, Pakistan, Philippines, Turkey and Vietnam.

For further general information see: http://es.wikipedia.org/wiki/Mexico

Education in México

Overview

The 1917 Mexican Constitution provides an overarching guarantee, under Article 3.7, that all education given by the state is free, secular, democratic and organised nationally, and that attendance at pre-school, primary and secondary levels is compulsory. Hence religious instruction is prohibited in public schools; however, religious associations are free to maintain private schools (which, unlike in some countries, receive no public funds). Proof of Mexican citizenship is required to attend public schools for free, but foreigners can attend public schools by paying a tuition fee. Education is provided by federal, state, and municipal authorities but, since 1921, all aspects of educational provision (including, artistic, sports and special education) at all levels and across all jurisdictions, has been managed and co-ordinated by the Secretaría de Educación Pública (SEP). In addition, each of the Mexican states has similar agencies which regulate and manage the education within the lower and local tiers of government. Although the majority of education is provided by the state at no cost, there are privately funded educational institutions at all levels of Mexican education. However, these private providers are also all subject to regulation by the SEP. Hence educational standards

are set by this Ministry at all levels except in "autonomous" universities chartered by the government (e.g. UNAM). Accreditation of private schools is accomplished by mandatory approval and registration with SEP.

Additionally, the 1993 Ley General De Educación, specifies, in Articles 4,5,6,7, these rights to education in more detail. Under the General Education Act, the federal government is in charge of issuing the rules for basic education and teachers' colleges, defining guidelines, plans and programmes along with local educational authorities; programming the academic calendar; and preparing and printing free books for students, as well as national planning and assessment. Local education authorities are in charge of providing services for early childhood education, basic education and special education and teachers' colleges, as well as professional training and development for the teachers of basic education. Municipalities may promote and provide any type of educational services, but in case of México City (Federal District), basic education and teachers' colleges services are provided by the SEP. In sum, educational services are provided by the federal government (SEP and other secretariats of the Executive Branch), state and municipal governments, autonomous institutions and private individuals.

Basic education (Primary and Secondary)

Basic education, from the age of 6 to 14 is freely provided in state schools for all children. In México, although some children attend pre-school from the age of 0 to six years (in children's centres, day care, preschool or kindergarten), this is not formally part of basic education. Basic education is normally divided into:

▪ *primaria*, which is primary school and comprises Basic Education grades 1-6 – it needs to be completed (as evidenced by an official certificate) to enter into lower-secondary education;
▪ and *secundaria*, which is secondary school, middle school or junior high school comprising Basic Education grades 7-9 – it needs to be completed (as evidenced by an official certificate) to enter into upper-secondary education (high school).

However, many students opt to continue with their secondary education for the remaining three years of secondary school, at the end of which they can take qualifications to gain certificates to enable them to enter higher education. The system is summarised in the following table:

Minimum age	School Year	School	
		Type	Level
2	N/A	Nursery	Maternal
3	1 de pre-escolar	Kinder /Jardin de Niños	Educación preescolar
4	2 de pre-escolar		
5	3 de pre-escolar		
6	1 de primaria	Primary school/Elementary school	Educación Básica: Primaria
7	2 de primaria		
8	3 de primaria		
9	4 de primaria		
10	5 de primaria		
11	6 de primaria		
12	1 de secundaria	Secondary school/Middle school	Educación Básica: Secundaria
13	2 de secundaria		

14	3 de secundaria	/Junior High School	
15	4 de secundaria /1 de preparatoria	High School	Preparatoria/Bachillerato/ Educación media superior
16	5 de secundaria /2 de preparatoria		
17	6 de secundaria /3 de preparatoria		

In addition, adult education is provided for people older than 15 years of age who have not studied or completed basic education. It includes: literacy, primary education, lower-secondary education and job training.

Education population and language of instruction

In 2010, the number of young people under 15 years of age (i.e. those for whom education is compulsory) was 33,056,047, which accounts for 29.4% of the population. The main language of instruction is Spanish. However, under Article 11 of the 2003 Ley General de Derechos Lingüísticos de los Pueblos Indígenas, the federal education authorities have to ensure bilingual education up to the age of 14, for indigenous linguistic groups. Additionally, there are some private schools which have adopted English (in most cases) or (in some cases) French as the language of instruction for all subjects.

Higher Education in México

The first university in México was founded in the capital by the Spanish in 1551, (thereby pre-dating Harvard, the first North American university, by almost a century), with decrees from the Spanish crown and pontifical support. Growth thereafter was relatively slow (a university was not established in Guadalajara, México's second largest city until 1791) but accelerated following self governance and national independence from Spain in 1821, which was accompanied by the development of universities, more especially the creation of the national university whose main raison d'etre was the fulfillment of national economic and social development. In 1910 the old university in the capital was re-designated as the Universidad Nacional Autónoma de México (UNAM), which is autonomous but, like all universities at the time, was state funded. However, in 1935, in order to protect academic freedom in the face of the government's desire for "socialist education", a group of students and staff at the University of Guadalajara, fought to establish an autonomous university in the city. The Autonomous University of Guadalajara is México's oldest and largest private non-for-profit university. The development of autonomous and private universities has been a dominant feature of higher education in México ever since.

Higher education in México usually follows the US education model with an at least 4-year Bachelor's degree undergraduate level (Licenciatura), and two degrees at the postgraduate level, a 2-year Master's degree (Maestría), and a 3-year Doctoral degree (Doctorado). Each of the 31 states of México has a state university, many of which are autonomous, while the Universidad Nacional Autónoma de México (UNAM) and the Instituto Politécnico Nacional lie within the Federal Capital. Currently, the higher education system in México has over 2,000 institutions, with over 5,000 campuses located throughout the country, serving more the 2,500,000 students. The higher education sector in México is extremely diverse. The publicly funded institutions comprise the following:

- Technological Institutes have a priority to train competent professionals and promote national development through plans and programmes of study relevant to the reality of each region. The NLIS comprises 257 institutions, at federal and state levels.
- Public Colleges – there are 273 public colleges in the country, which offer degree programmes in a variety of subjects.
- Intercultural universities – have programmes providing education and training at professional associate, bachelor, specialist, master's and doctoral levels. These thirteen institutions are designed to train professionals committed to economic, social and cultural development at community, regional and national, levels whose activities promote the revitalization of languages and cultures.
- Federal Public Universities – the five institutions in this group, as well as providing teaching, for a broad spectrum of programmes and research projects, are also of (generation and innovative application of knowledge), and extension and national importance and include UNAM and the IPN.
- State Public Universities – there are 43 state universities that perform the functions of teaching, research and knowledge generation, as well as extension and dissemination of national culture.
- Polytechnic Universities – there are 63 technological universities that are committed to the social and economic development of the nation, with international collaboration via the generation, application and dissemination of knowledge and culture through research and quality teaching.
- Technological Universities – offer intensive training for students completing upper secondary education, that allows them to join in a short time (after two years), to enter the job market or pursue other undergraduate training. Currently there are 79 technological universities in 26 states of the Republic.

In addition to state funded universities, there are around 1450 private universities in México. The Private Mexican Institutions of Higher Education Federation (Federación de Instituciones Mexicanas Particulares de Educación Superior, FIMPES) is a non-profit non-affiliated civil society with voluntary membership that credits private institutions of higher education that have achieved high quality standards. The nearly 170 requirements are grouped into eleven criteria for accreditation: institutional philosophy, planning and effectiveness; regulations, governance and administration, academic programmes, faculty, physical resources, financial resources and distance education. (http://www.fimpes.org.mx). If anything the variety of private provision is even greater than that of state provision; moreover, it is difficult to determine the quality and status of some of these institutions. Some, like the Instituto Tecnológico y de Estudios Superiores de Monterrey, ITESM (commonly shortened to Monterrey Institute of Technology or Monterrey Tech) are of national significance, by dint of their research, and national reach – ITESM has 31 campuses across the nation and is the largest private, multi-campus university in Latin America. Additionally, ITESM has been a pioneer in the use of new information and communication technologies, especially television, for distance education in México.

Examination of higher educational provision in México reveals the following generic trends in the last two decades:

A) **Growth in demand**. In 1990, 13.5% of the population aged 18–23 attended higher education in México. By the end of 2000, the figure had risen to 20% of this age group.

B) **Change in composition** of enrolment in the public higher educational system. In public sector higher education, expansion was derived almost exclusively from growth in the

number of technological universities. With the creation of almost 100 such institutions, the technological subsystem grew by over 60%, increasing from 20% to 36% of public higher educational supply. By contrast, the growth in the university sector was almost stationary.

C) **Greater private sector presence**. During the 1990s, the provision in private sector in higher education reached remarkable dimensions. In 1990, private higher education institutions absorbed 17.4% of the demand for first degrees. In 2003, participation rose to 32%. To reach this level, the private system grew two and a half times, increasing at a rate of almost 10% a year during the period. The expansion of private higher education was extraordinary at postgraduate level, where enrolment rose by 4.5 times in barely 10 years.

D) **Greater decentralization of supply**, and corresponding growth in provision in the lesser developed states. Towards 1990, 23% of the first degree level student population was concentrated in the Federal District of México City. By 2000, this concentration had decreased to 21.5%. In all the states (apart from Jalisco and Puebla where university student numbers fell), positive growth rates were recorded. The states with greatest growth were Aguascalientes, Baja California Sur, Campeche, Chiapas, Hidalgo, Morelos, Oaxaca, Quintana Roo, Tabasco, Tlaxcala and Yucatan; in all these states, enrolments grew two-fold or more.

E) **Switch in demand** towards professional courses associated with the service sector. Enrolment in higher education decreased in agricultural sciences, natural sciences and the exact sciences areas. The health sciences, education and humanities areas have remained constant as proportions of supply. The social and administrative sciences continued their expansion to cover practically one-half of total first degree enrolments – at present, one-third of total enrolments is concentrated in just three options: law (12.2%), accounting (11.1%) and administration (10.2%).

F) **Growth in postgraduate demand.** In 1990, national postgraduate enrolment was little over 40,000 students. By 2003, the corresponding statistic was 138,287 students enrolled in specialties, master degrees and Ph.D. This three-fold growth in enrolment was a result of progressive increases in the schooling requirements of the modern sector of the labour market and an explicit policy to strengthen the academic programmes of the higher education institutions.

G) **Gender equilibrium** in the proportion of men and women studying for first degrees. Towards the end of the 1990s, the proportion of women in higher education in México became virtually the same as that of men.

Sourced from

Secretaría de Educación Pública, (http://www.sep.gob.mx)

Subsecretaría de Educación Superior (http://www.ses.sep.gob.mx/index.jsp)

Rodríguez-Gómez, R., Casanova-Cardielo, H., (2005) "Higher Education Policies in México in the 1990s: A Critical Balance", *Higher Education Policy*, 18(1): 51-65. (http://works.bepress.com/cgi/viewcontent.cgi?article=1005&context=roberto_rodriguez)

Distance Education and E-learning in México

The development of distance education in México has a long heritage. In March 1932, the Secretary of Public Education (SEP) began the bi-weekly publication of the *El maestro rural*, magazine which provided the first correspondence courses for teachers in the rural areas of México. This was followed in 1947 by the creation of the Federal Institute for Teacher

Training, which utilised printed materials sent by mail, supplemented by radio broadcasts, and evaluations in local centres.

In the modern era, the Telesecundaria project was piloted in 1966, firstly, for students from grades 7 to 9 in rural areas, but it was then developed for national coverage. Telesecundaria uses TV programmes, supplemented by printed materials and a local facilitator; currently Telesecundaria is used in more than 14,000 schools totaling approximately 1,200,000 students.

Following this success, the government funded the development of a series of similar schools based technology projects including:

- **Red Escolar** – a computerized system of information and communication based on the Internet for México's student community, which has 4,000 units installed in more than 1,000 educational units
- **Edusat** – Educational Satellite Television Network – a closed-circuit system based on the most advanced digital technology. Its 12 video and 24 audio channels broadcast all over México and it reaches over 30,000 educational centres in the country, through receivers in secondary and technical schools and public and private universities.
- **Enciclomedia** – which has enabled the digitalization of primary education textbooks in CD-ROM format. Along with the material from the textbooks themselves, a plethora of resources, including videos, complementary information and the use of the Microsoft Encarta student encyclopaedia, are available to teachers and students.

These (and other) different initiatives were consolidated under the e-learning strand of the national "e-México" project introduced in 2000, which was designed to integrate ICT in all educational levels within México (see below).

Within universities, as early as 1955 UNAM had started producing educational television programmes (now broadcast via TeveUNAM). However distance education courses really started in earnest in 1972, when the UNAM created the Open University System (http://www.cuaed.unam.mx). Currently the system provides distance education including high school, undergraduate majors and postgraduate awards. With the growth of the use of ICT in the 1990s many universities started to offer internet based instruction. According to a survey among members of the National Association of Universities and Higher Education in 2003, 41% of Mexican colleges and universities have a distance education programme and another 50% are planning to start distance education programmes. However, the extent and type of use of ICT in higher education in México are very varied, and few universities utilise internet technologies in an integrated fashion. By 2004, only five universities were running programmes that took full advantage of ICTs in teaching. Students taking e-learning packages at these five leading e-learning universities (UNAM, University of Guadalajara, Instituto Polytechnic Nacional, ITESM (Monterrey Tech) and Universidad TecMilenio) accounted for 17.57% of the distance education cohort.

Three state-funded projects have helped to give new impetus to distance education in México in recent years: the Common Area Consortium of Distance Education (Espacio Común de Educación Superior a Distancia – ECOESAD – http://www.ecoesad.org.mx), coordinated by the UNAM; the National Distance Education System (Sistema Nacional de Educación a Distancia – SINED – https://www.sined.mx/sinedac.html), headed by ANUIES and supported

by the SEP; and the Program for Open and Distance Higher Education (Programa de Educación Superior Abierta y a Distancia – ESAD http://www.unadmexico.mx) of the SEP.

Started in 2007 by seven founding universities (later joined by a further 31 institutions), the ECOESAD initiative aims to create a consortium of public universities in order to develop distance higher education by integrating each institution's training offer and sharing it nationally. To work properly ECOESAD requires the implementation of common academic standards, quality criteria, and standards for evaluation, alongside common institutional strategies to promote ICT for interactivity, and reusability and sharing of content. Today, ECOESAD institutions offer programmes in seventy different disciplines, including, business administration, computing, economics, engineering, languages, history, information technology, law, marketing and finance , nursing, public administration, social work

The SINED project commenced a year after ECOESAD, and had the goal of coordinating and managing processes to strengthen distance education by implementing common guidelines, regulatory mechanisms and evaluation tools to certify the quality of different educational programmes. Nationally, SINED has an ambitious agenda working with higher education institutions to clarify and disseminate state policy; establish IT standards to support education; produce standards to guide educational managers in identifying and promoting the essential conditions for the effective use of technology; establish national standards for educational uses of technology that facilitate the development of education nationally; create standards for evaluating the educational use of technology via the evaluation both of student progress and the use of technology in the educational process; generate professional development standards, systems, access, and basic support services to support the effective use of technology; set standards for the accreditation of training programmes and expertise in educational technology.

The ESAD project was established in 2009, with the objective of creating opportunities that ensure quality flexible education, via the use of Information Technology and Communication (ICT) applied to education. EASD aims to achieve greater coverage across the country and take advantage of technological convergence to provide students, through a Virtual Campus, with all the content, media and tools necessary for their education. At present EASD offers 13 runs, and has a powerful technological platform with 135 access centres and local university support provided nationwide. 72,000 applicants signed up after the first and second calls and enrolment is expected to increase to 80,000 students in 2012. In the longer term, ESAD's vision is to position itself as one of the best open and distance learning higher education providers in the world, at the top level, with reputation for high quality, innovative, flexible, open to change and well able to meet the challenges and opportunities of the greater use of technology in education.

Not surprisingly, perhaps, many of the larger state public funded universities have some form of educational provision via virtual education, the following table summarises the situation in 2009.

Subject	Universities offering virtual tuition
Accountancy	BUAP, IPN, UAEMOR, UAQ, UJAT, UJED, UMICH, UNAM
Administration	UAEMOR, UAQ, UJAT, UJED, UMICH, UNAM
Administrative Computing	UAEMEX
Agronomy	UJED

Arts Education	UV
Business Administration	BUAP, UACH
Business Studies	IPN, UJAT
Communication Sciences	BUAP
Computing	UNAM
Cultural Tourism Management	UDG
Economics	UNAM
Education	UDG
History	UACH
Information Technology	UDG
International Business	IPN
International Relations	UNAM
International Trade	IPN
Journalism	UNAM
Law	BUAP, UMICH, UNAM
Librarianship	UDG
Library And Information Studies	UNAM
Management Of Organizations	UDG
Multimodal Computing	UV
Nursing	UACH, UANL
Nursing (Professionalization)	UAEH, UDG, UJED, UNAM
Nursing And Midwifery	UGTO
Pedagogy	UNAM
Philosophy	UACH
Public Administration	UNAM
Political Science	UNAM
Psychology	UJED, UNAM
Security Disaster Management	UNACH
Social Work	UJED, UNAM
Social Work (Professional)	UDG
Sociology	UNAM
Sports Science	UANL
Teaching English As A Foreign Language	UNAM
Teaching French As A Foreign Language	UNAM
Teaching Italian As A Foreign Language	UNAM
Teaching Spanish As A Foreign Language	UNAM
Tourism	IPN

Key: Benemérita **U**niversidad **A**utónoma de **P**uebla; **I**nstituto **P**olitécnico **N**acional, **U**niversidad **A**utónoma **D**el **E**stado de **MOR**elos, **U**niversidad **A**utónoma de **Q**uerétaro, **U**niversidad **J**uárez **A**utónoma de **T**abasco, **U**niversidad **J**uárez del **E**stado de **D**urango, **U**niversidad **MICH**oacana, **U**niversidad **A**utónoma de **Méx**ico, **U**niversidad **A**utónoma de **CH**ihuahua, **U**niversidad **D**e **G**uadalajara, **U**niversidad **A**utónoma de **N**uevo **L**eón, **U**niversidad **V**eracruzana, **U**niversidad **A**utónoma del **E**stado de **H**idalgo, **U**niversidad **D**e **G**uanajua**TO,** **U**niversidad **A**utónoma del **E**stado de **MEX**ico, **U**niversidad **A**utónoma de **CH**iapas

It was anticipated that the expansion of higher educational opportunities with appropriate quality standards in public institutions, through projects such as ECOESAD and SINED, will help to absorb some of the demand that was previously served by recent entrants into the higher education market in the form of low-quality private institutions. However, private universities, more especially ITESM, have also been undertaking innovative projects involving the greater use of ICT in education.

The Virtual University of the ITESM was founded in 1989 with a vision of using modern technology to extend quality higher education throughout México. It currently has 80,000 students, including students in formal degree programmes, continuing education programmes, and social development programmes. In formal degree programmes, there are 6,000 at the undergraduate level and close to 6,000 at the Master's level. The ITESM's Virtual University has become a leader in developing the new Student-Centered Collaborative Learning model for online education. This pedagogic model places the student at the centre of the educational process, which involves a path of self-guided learning. Hence the faculty member is more like a coach ("the guide at your side") who is there to help students acquire the knowledge they by operating within an intensely supportive learning environment. This learning model relies heavily on tutors maintaining communication with geographically dispersed virtual students, answering questions and encouraging collaborative learning among students. Research has shown that, with this learning model, the online students are more interested, more proactive, and achieve a better result in terms of the actual knowledge they receive.

The Virtual University started using satellite transmission of educational content in order to achieve greater opportunities for education throughout México. The rationale was to utilise ITESM's multi-campus system as satellite reception centres covering most of the country. With the arrival of the Internet during the 1990's, ITESM started working with online education through satellite transmission, reaching areas whose infrastructure made it possible. However, for the very remote geographical areas, a lack of such infrastructure became a daunting problem. Eventually, to overcome this challenging situation, ITESM established remote learning centres in previously marginalized and underserved areas of the country. More recently, in 2002 ITESM established a nation-wide system of Community Learning Centers, which currently operate in México but which have spread to Central and South America –in Ecuador, the Dominican Republic, Guatemala, Panama, Colombia, and Paraguay – and are now also present in the United States – in Arizona, Illinois, Indiana, Nebraska, New York, North Carolina, Texas, Utah, and Wisconsin. The 2,329 Community Learning Centers (http://www.centroscomunitariosdeaprendizaje.org.mx) provide education for more than 250,000 individuals.

In February 2009, the Mexican government of Felipe Calderón announced a joint venture with the UNED, (the National University of Distance Education of Spain) to establish a National University of Distance Education of México (UnADM, http://www.unadmexico.mx/). The UnADM's vision is to position itself as one of the best universities in the world of open and distance learning, innovative, flexible, open to change and able to meet the challenges and opportunities of technological progress , social needs, the challenges of the globalization of knowledge and internationalization of the economy and professions. The aims of UnADM articulate an innovative educational system that contributes to the educational development of the population via lifelong learning, upholding the principles of equity, and providing relevant programmes to enable successful international competition, via the intensive and extensive use of ICTs, backed by well-trained networks of technological and administrative staff, to provide academic programmes consistent with strengthening higher education and enhancing national economic progress. Unusually, the UnADM is planned to address the needs of groups previously excluded from higher education, such as the disabled population, vulnerable groups in society, or people in prison. By 2012, the UnADM had circa 53,000 students, and it is likely that it will play an important part in the plans of the new President, Enrique Peña Nieto, who has pledged to increase university enrolment in México by 50% by 2018, which would mean creating another 1.5 million places.

Sourced from:

Secretaría de Educación Pública, (http://www.sep.gob.mx, http://www.sep.gob.mx/wb/sep1/bol0430209)

Subsecretaría de Educación Superior (http://www.ses.sep.gob.mx/index.jsp)

Espacio Común de Educación Superior a Distancia (http://www.ecoesad.org.mx/ ECOESAD)

Internet in México

México is a major global manufacturer of ICT and consumer electronics. Data from the OECD reveals that the growth of the ICT Sector in the Mexican economy has been substantial. Consumer electronics trade is the fourth largest and second fastest growing sector of ICT trade. México, the USA and Germany are the biggest OECD exporters, and in 2008 México had by far the largest trade surplus in the consumer electronics sector, within the OECD. Between 1996 and 2008, overall OECD ICT goods trade increased by an average 6% per year, while the comparable figure for México and OCED eastern European states was 18%. México's share of ICT in total merchandise exports in 2008 was 21.1%, more than twice the OECD average of 9.9%.

Not only has ICT manufacturing increased in México, so has the purchase and use of ICT equipment. Data from the OECD shows that the number of cellular mobile phone subscribers in México is below average by international standards, but it is growing very fast. In 1994 there were 386,100 cellular phone subscribers in México; by 2007 the figure was 68,241,096 – which represents a compound annual growth rate by 1993 of 44.7%. Similarly, the proportion of households with access to a home computer is low, by European standards, but rising very fast. In 2001 11.8% of households had access to a computer; by 2011 this figure had risen to 30%. This trend is mirrored by a large increase in broadband access. In 2000 there were only 8622 broadband subscribers in México, by June 2007, the figure had risen sharply to 5,406,156 – an average yearly growth rate of 144.85%, nearly three times that of the OECD average. In 2001, only 0.3% of households had broadband access, by 2010, the figure had risen to 21.1%. In addition, more people are accessing the Internet – in 2001, 6.2% of households had internet access; by 2011, this figure had nearly quadrupled to 23.3%. Furthermore, the number of internet hosts registered under the .mx domain, rose from 41,659 in 1998 to 10,071,370 in 2008, a 73% annual growth rate, the highest in the OECD.

These growth patterns have been nurtured by the National Development Plan 2007-2012, which had the objective of enhancing the productivity and competitiveness of the Mexican economy to achieve and accelerate sustained economic growth and job creation that allow improve the quality of life of Mexicans. One of the key components in the rapid growth of the IT industry in México has been joint promotion by the private sector, the government and academia. For example, in 2008, Canieti (Cámara Nacionalde la Industria Electrónica de Telecomunicaciones y Tecnologías de la Información), Amiti (Asociación Mexicana de la Industria de Tecnologías de Información) and ANIEI (Asociación Nacional de Instituciones de Educación en Informática), backed by the Ministry of Economy and the World Bank, launched the México Federal Institute for Remote Services and Technology (MexicoFIRST), initiative with the aim of creating human capital to strengthen labour supply in México's IT sector. Working in partnership with the Oracle University, MexicoFIRST's goal is to use web-based instructional packages to train Mexican professionals to carry out activities with mid- and advanced-level complexity.

The objective is to train and certify, to international standards, at least 60,000 Mexican professionals between 2008 and 2013: an average of 12,000 people per year. With this measure, the Mexican ICT industry expects to remain as one of the five most competitive in the world.

Sourced from:

OECD *Communications Outlook 2009*
(http://www.oecd.org/sti/broadbandandtelecom/oecdcommunicationsoutlook2009.htm)

OECD *Information Technology Outlook 2010*
(http://www.oecd.org/internet/interneteconomy/oecdinformationtechnologyoutlook2010.htm)

OECD *Science, Technology and Industry Outlook 2010*
(http://www.oecd.org/sti/innovationinsciencetechnologyandindustry/oecdsciencetechnologyandindustryoutlook2010.htm)

Internet in México: *e-México*

The Internet in México has developed in four distinct phases: the introductory phase; the developmental phase; the duopoly phase; and the competitive phase. During the introductory phase, from 1989 through 1993, the first Internet connections were established along with the regional backbones. Unusually, perhaps, the growth of the Internet during this period was spurred primarily by academia – ITESM established the first direct connection to the Internet in 1989. In subsequent years, regional networks were established which connected the nations' major universities. At this time, no national backbone existed, so the regional networks could not share information and many services were duplicated. The developmental phase, from 1994-95, was lead by the combined efforts of government and academia. In 1994, the Mexican government agreed to finance the development of the first national backbone, which linked the regional academic networks, with direct connections to the USA.

The duopoly phase, from 1996-98, was marked by the efforts of industry, academia and government to develop commercial applications for the Internet. The National Technology Network was established and marketed the academic backbone for commercial applications. México's national telephone company, Telmex, began marketing backbone ISP services, and quickly dominated the industry. The competitive phase, from 1999-to date, was brought about by the desire for increased market efficiencies and the primary drivers were growing market demand, allied to industry and governmental deregulation. The first step towards this phase occurred in 1997 when Telmex lost its monopoly position as a telephone company and its duopoly position with RTN as Internet providers.

Although legal barriers to competition were removed, the development of competition in México was impeded by the fact that both Telmex and the RTN had national backbones, which potential competitors lacked. However, with the help of foreign investment, competing backbones developed quickly. By 1999, Alestra and Avantel had established themselves as strong competitors in the larger markets and smaller competitors were beginning to enter the market. The amount of bandwidth offered in México has grown tremendously, and the cost of access has gone down, while the quality of service has increased. México is now well established as one of the industry leaders in Latin America.

Hence, as the figures detailed in the section above on ICT infrastructure above demonstrate, México has widely adopted the use of the Internet, with a resultant rise in Mexican websites

and internet access. One important factor in the development was the inauguration of the North America Free Trade Agreement in 1994 with the USA and Canada, which has had a huge economic impact. Since 1993, the value of two-way U.S. trade with México has almost tripled, from $81 billion to $232 billion, growing twice as fast as U.S. trade with the rest of the world. Canada and México are now America's No. 1 and No. 2 trading partners, respectively, with Japan a distant third. The widespread use of the Internet in social media (e.g. Facebook) and economic life (e-business) by México's northern neighbour has had a catalytic impact in México, forcing it to use ICT in every sphere of activity and become more integrated in the global knowledge economy. The effects of the NAFTA agreement have been enough to propel México into the N-11 (next 11) cohort of nations, with the expectation of economic growth rates paralleling those of Brazil and China in the coming decade.

Although much of the growth in internet activity has been organic, and as a result of external global pressures, the Mexican government under President Vincente Fox also made strenuous efforts to increase the use of the internet throughout the country by a series of interlinked policy initiatives under the heading of "E-México". The $400 million National e-México System was an integrating project which brought together the interests of several levels of government, of various public entities and divisions, of the telecommunications network operators, of the chambers and associations linked to information and communications technology (ICT), as well as other organizations, with the purpose of expanding the coverage of basic services in education, health, economy, government, science, technology and industry, as well as other services for the community.

Although a third of households have access to computers, and 25% access the internet, the digital divide is still evident in México. This digital divide is a problem that becomes more severe in the less-developed areas of the country. For example, whereas in the Northeastern region over 40% of towns and cities have access to dial-up internet with a local call, in the South and Southeast portions of the country, the figure is less than 10%, which is totally consistent with the social and economic differences which pervade in the entire nation. The objective of e-México was to combat this problem via a technological system that will offer the all socio-economic and educational tools and opportunities that can be reached today through the use of ICT, in order to increase the quality of life for all Mexicans. The purposes of the National e-México System were basically social in character, since they had as their main objectives:

1. the promotion of connectivity and the production of digital content (data, sounds and images) by internet, at reasonable prices, among those individuals and families of lesser incomes, who live in rural and city communities of more than 400 inhabitants, within the country, and to foster their incorporation into the economic and social development of México, thus reducing the digital divide that, unfortunately, prevails today in México.
2. the training of the families of such communities in the use of these new information and knowledge-sharing technologies, emphasizing self-sufficiency in consulting and creating content by means of the internet to support their particular needs for education, culture, health and economic development.
3. to make available to every citizen general information regarding services provided by federal, state and city governments, in order to allow transparency and equity to exist in these services, and to reduce the time taken up in paperwork, as well as to make these processes more efficient.

The main strands of the e-México initiative were:

1) *e-Learning* – the increased provision of new options of education and training via ICT in order to stimulate learning as a means of integral development for Mexicans, promoting education for all, while respecting identity and cultural environment.
2) *e-Health* – improved standards of health and well-being of society through the integration of a technological system with social content. The system was designed to place within the reach of the entire Mexican population, general medical information that will promote human development and the development of the health institutions eliminating barriers to the access of information and the health and social security services.
3) *e-Economy* – designed to accelerate the process of development of digital economy within businesses, especially micro, small and medium size businesses (MSMBs) to increase the competitive position of the Mexican economy; as well as to develop a computer culture within society, particularly amongst consumers.
4) *e-Science, Technology and Industry* – created to integrate an information society and a knowledge economy in México, able to reach a greater level of (inter)national development through its own models and methods that will focus on the needs of Mexicans to strengthen their industry, and completely linked with the research sector in order to reach highly competitive quality standards as measured in the world markets.
5) *e-Government* – created to ensure that all Mexicans at Federal, Regional, State or City level can exercise their right to be fully informed and to have access to Government services through the Mega-network provided by the National e-México System. Likewise, the Government, through its different branches, assumes its obligation to guarantee all citizens access to information about the Government and the use of all of the various public services it offers. A major aspect of this strand of policy was to try to improve the openness of government, and thereby fight corruption.

ICT Infrastructure and Services Provision

The national telephone system Teléfonos de México (Telmex), started off as a private concern in 1947, but was then nationalised by the government in 1972, only to be converted back to a private monopoly in 1990. Consequently it has a position of market dominance, the few other providers (Alestra, Axtel, Cablecom, Megacable and Maxcom) between them accounting for less than 8% of the market. Similarly, Telcel (a subsidiary formed by Telmex to provide mobile communications) is the largest mobile operator in México, with a market share of 80% of cellular service. In the mid-1990s Telmex started operations as an Internet Service Provider and thanks to their national coverage of land lines and mobile communications, Telmex rapidly became the leading national ISP. As of 2005, Telmex holds more than 80% of the market as ISP, and is also the leader in broadband access with its brand Prodigy Infinitum.

The absence of competition in the Mexican market probably acts a brake on innovation, increased efficiency and lower costs. OECD figures show that in 2012, the average advertised broadband download speed (in kbit/s) of 5,325 for México was the lowest of all the OECD Countries (by contrast, the corresponding figures for Japan was 149,616). Similarly, the OECD's analysis of offers of Broadband pricing for residential users in the OECD area, in 2011 revealed the average price per Mbit in México to be $21.05 (US$), nearly three times the OECD average of $7.57.

Sourced from:

OECD *Internet Economy Outlook 2012* (http://www.oecd-ilibrary.org/science-and-technology/oecd-internet-economy-outlook-2012_9789264086463-en)

Marchant, Iván (2010) *The State of the Internet in Mexico* (http://www.comscore.com/Insights/Presentations_and_Whitepapers/2010/State_of_the_Internet_with_a_Focus_on_Mexico_and_Latin_America)

E-México (http://www.e-mexico.gob.mx/)

Copyright law in México

In principle, México has adequate provision in law for the protection of copyright. Hence copyright and related intellectual and author property rights are protected by the Federal Copyright Law 1996, amended May 1997 and July 2003; the Federal Copyright Law Regulations, amended May 1998 and September 2005 and the Federal Criminal Code, August 1934. Additionally there is a National Institute of Copyright (http://www.indautor.gob.mx/ingles/?navegador2='1'&valor=) with the task of strengthening and enforcing the federal framework of copyright and associated regulations. The purpose of the Federal Copyright Law is the safeguarding and promoting the cultural heritage of the Nation and the protecting the rights of authors and performers, and also those of publishers, producers and broadcasting organizations in relation of their literary or artistic works in all their forms, their performances, their publications, their phonograms or videograms or their broadcasts and also other intellectual property rights.

Article 13 of the Federal Law of Copyrights lists classes of works that are protected, as follows: literary; musical, with or without words; dramatic; dance; pictorial or drawing; sculptural and plastic character; cartoon and comic; architectural; cinematographic and other audiovisual works; radio and television programmes; computer software; photographic. Moreover the criminal law establishes punitive measures for the breach of copyright – under the Federal Criminal Code imprisonment for up to ten years and a fine of 2,000 to 20,000 days of the general minimum wage is possible.

Additionally, México is a signatory of the following International Conventions and Treaties on Copyright and Related Rights:

- Inter-American Convention on the Rights of the Author in Literary, Scientific and Artistic Works, (http://www.sep.gob.mx/work/models/sep1/Resource/cd8a1ec5-17f4-4370-b535-9d080d6fbfe1/decreto1947_1.pdf)
- Berne Convention for the Protection of Literary and Artistic Works (http://www.wipo.int/treaties/es/ip/berne/trtdocs_wo001.html)
- Universal Copyright Convention (http://portal.unesco.org/es/ev.php-URL_ID=15381&URL_DO=DO_TOPIC&URL_SECTION=201.html)
- Convention Relating to the Distribution of Programme-Carrying Signals Transmitted by Satellite, Brussels 1974 (http://www.wipo.int/treaties/es/ip/brussels/trtdocs_wo025.html)
- The Rome Convention for the Protection of Performers, Producers of Phonograms and Broadcasting Organisations (http://www.wipo.int/meetings/es/details.jsp?meeting_id=17584)
- Treaty on the International Registration of Audiovisual Works (http://www.wipo.int/treaties/es/ip/frt/trtdocs_wo004.html)

- The Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS) (http://www.wto.org/spanish/docs_s/legal_s/27-trips.pdf)
- WIPO Copyright Treaty (http://www.wipo.int/treaties/es/ip/wct/trtdocs_wo033.html)
- WIPO Performances and Phonograms Treaty (WPPT) (http://www.wipo.int/treaties/es/ip/wppt/trtdocs_wo034.html)
- Convention for the Protection of Producers of Phonograms Against Unauthorized Duplication of Their Phonograms (http://www.wipo.int/treaties/en/ip/phonograms/trtdocs_wo023.html)

However, despite such legislation, according to estimates by the International Federation of the Phonographic Industry (http://www.ifpi.org/content/library/piracy-report2006.pdf), 110 million pirated products were sold in México in 2006, with a legal market retail value of $410 million. These products included popular music and mainstream films, but also, increasingly, computer software. Additionally, internet piracy is also beginning to gaining ground – 570 million songs are downloaded illegally every year in México. More than 60 per cent of illegal downloaders accessed their music at internet cafes and at least 40 per cent of them said they downloaded music to burn onto a CD-R. Thus, México is emerging as the third largest market worldwide in the sale of music and pirate movies, behind China and Russia. Trade in pirated CDs and DVDs are has become an attractive option for sellers in the markets and streets of México.

Widespread infringement of copyright law is ingrained within Mexican society, where purchasers of pirated goods (quite frequently, wealthy middle-class citizens, like doctors or lawyers) make a distinction between what the state would consider to be legitimate (i.e. "legal") and what people involved in transnational networks of goods, people and services consider as legitimate ("licit"). Many such transnational movements are deemed illegal because they contradict the formal laws and norms of political authority, but are nevertheless widely accepted as "legitimate" in the eyes of those involved in these small scale transactions and flows. This is more especially the case when, as in México, there are quantitative and qualitative differences of scale and intent between the activities of numerous small and medium sized family enterprises producing and selling pirated movies and music, which although illegal in a formal sense, lack the systematic logic and unified purpose demonstrated by organized criminal gangs involved, for example, in the wholesale production and international distribution of illegal drugs.

The impact of this mismatch between the formal legal requirements enacted to protect copyright, and the tacit acceptance of their widespread abuse in the black and informal economies in México, on the development and use of REAs is difficult to assess. However, there is little doubt that the fact that the more the state tries to produce evidence of their efficiency against piracy, the less they appear able to do, acts to undermine the faith that participants from other states have that any agreements that they signed will be fully honoured and upheld by law in México.

Copyright law in Education

The laws of copyright in México also apply to artefacts that may be utilised in an educational context, such as books. Moreover, as has been seen, the Open Educational Resources movement is relatively new in México. However, some formal efforts have been made to recognise the need to apply flexibility to the application of copyright law, in order to make the open access of educational material possible. At the close of the meeting of the Fifth

International Conference on University Libraries "Open access: an alternative of access to scientific information" held in México City in October 2006, the following Declaration of Mexico was issued and signed by parties from México, Canada and the USA:

> Informed and aware that "guaranteeing that research results may be freely available for everyone is the best way of maximizing their usefulness" and that "open access is good for science, for the research community, and for humanity" we who sign permit ourselves to recommend to all Latin American institutions, and especially to our national governments, the adoption of Open Access policies and the inclusion of Open Access resources in the mechanisms of institutional evaluation of academic and scientific performance, as a means of stimulating the free generation of knowledge.
>
> This group promises to create and maintain a network of research, exchange, promotion, diffusion, digital preservation and formation of personnel in the technological tools required to carry out the stated mission as well as the creation of a union catalog of contributions. We invite and open the doors so that all institutions may join this effort signing this declaration.

This represents a small, but nevertheless promising, step towards greater acceptance of the need for, and development of, open educational resources in México and beyond. With competing demands for government expenditure that are not present in most other developing nations, more especially the need to address the problems of narcotics crime (which is having a corrosive effect across society), and illegal emigration to the USA, whether México will able to devote sufficient resources to benefit from the development and use of RAEs remains to be seen.

Sourced from:

Aguiar, José Carlos G. (2009), "Nuevas ilegalidades en el orden global. Piratería y la escenificación del Estado de Derecho en México", Foro Internacional, XLIX(2): 403-424 (http://www.redalyc.org/src/inicio/ArtPdfRed.jsp?iCve=59921004006)

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OER Initiatives in México (REA)

Generally, the development of open educational resources (in Spanish "recursos educativos abiertos" or REA) in México has been slow. The 2012 *Survey on Governments' Open Educational Resources Policies* commissioned by UNESCO and the Commonwealth of Learning noted (p.10) that "México has developed several ICT-related projects, including the production of digital learning resources. However, it is not clear whether these resources are shared under open licences". Moreover, México did not send a representative to the UNESCO Regional Policy Forum for Latin America in Rio, *Fostering Governmental Support for Open Educational Resources (FGSOERI)*. Previously, in 2006, the OECD undertook two cases

studies of REA at two leading Mexican universities, ITESM and the Universidad Autónoma de Guadalajara (UAG). The OECD reported that "ITESM has not developed any particular institutional policy aimed at either fostering or limiting the use of open digital content in teaching so far. And there are no expectations for change in the near future" but intimated that "A number of indications suggest that ITESM might reconsider its OER policy in the near future". Similarly, the OECD found that UAG "does not have a particular institutional policy regarding the use of open digital content in general. It seems that open resources are not used broadly within the academic community."

However it is possible that the OECD visits and case study reports, by raising the profile of OERs, had a catalytic effect on the two universities concerned, as both have been involved in REA projects in México since. Indeed it is evident that, through a series of comprehensive initiatives and projects, the ITESM has been leading the REA movement in México. Since 2008, ITESM has led or participated in a series of projects designed to develop, distribute and promote the use of REA materials, both within its own institution, and elsewhere in México. Initially, ITESM re-engineered high quality digital materials for its undergraduate and graduate programmes and courses that were produced by (inter alia) Carnegie Mellon University (Open Learning Initiative, OLI), Massachusetts Institute of Technology (OpenCourseWare, OCW), and Yale University (Open Yale Courses), and then started to share its own course materials via the OpenCourseWare Consortium. Following from this, ITESM led a project to develop an initiative called the "Knowledge Hub" (since re-named "temoa" – http://www.temoa.info) which is a specialized and collaborative search engine that enables the educational community to search a public bilingual catalogue of Open Educational Resources, to find those educational resources and materials that best meet their needs for teaching and learning.

The "Knowledge Hub for K12 Education Project" was state funded via the Corporación de Universidades para el Desarrollo del Internet (CUDI) and by the Consejo Nacional de Ciencia y Tecnología (CONACYT) of México and involved ITESM, the Universidad Regiomontana, the Comité Regional Norte de la Comisión Mexicana de Cooperación con la UNESCO, the Universidad de Montemorelos, Instituto de Investigación, Innovación y Estudios de Posgrado para Educación, (IIIEPE) and the Escuela Normal Miguel F. Martínez. The project's primary goal was to establish and enrich a catalogue of Open Educational Resources for Educación Básica (i.e. K12) for México and hispanophone nations in Latin America, and the rest of the world; within the field of innovative educational technology, operating through the work and communities of practice of K12 teachers and university faculty participants. Secondary project goals included the improvement of educational processes, university and school staff development, and improved equity of access to high quality educational resources within school at Educación Básica level. The Khub project team identified the primary barriers to access for the use of REA in México by teachers at Educación Básica level, more especially: technological infrastructure (lack of internet access, projectors and computers); legal and copyright issues (accessibility of REA in terms of licensing); content relevance of REA materials available on the Internet to the Mexican context (most REA are from other, mainly English speaking, nations); lack of REA in Spanish (language issues); computer literacy gap in Educación Básica schools; and lack of awareness, and inability to use REA at institutional level (lack of information and skills among school managers).

The success of the TEMOA initiative has led government to fund a series of inter-related collaborative projects to promote the development and use of OERs across México. These include the "Metaconector" project, promoting best practices in the use of learning objects

and open educational resources from educational repositories. Led by the ITESM, this project involved staff from Universidad de Montemorelos, the Universidad de Guadalajara and the Technological Institute of Chihuahua, and aimed to enhance the visibility of the academic and scientific production by Mexican higher education institutions through digital media, helping dissemination efforts in the market for open access educational knowledge. By this means, the project aimed to support and promote social and economic development of México and Spanish-speaking countries, by providing free access to the scientific and academic institutions of higher education and other sources of intellectual production. Software developed in the "metaconector" project enables the interconnection of different digital repositories of educational resources and materials that can be used by catalogues (infomediaries) on the Internet, in order to facilitate the task of finding, evaluating and sharing open educational resources and learning objects (OA) within the community of educational institutions. A major tangible output of this project has been the production of a freely downloadable *Reference Guide for the Use of Open Educational Resources and Learning Objects* (http://www.cudi.mx/convocatorias/2010_abril/proyecto_04/Guia_Final.pdf).

Similarly in 2010 CUDI and CONACYT funded a project looking at the use of open and mobile educational in the training of educational researchers. The research team comprised staff from ITESM, Instituto Tecnológico de Sonora, Universidad de Guadalajara, Universidad Autónoma de Guadalajara, Universidad Autónoma de Yucatán, and the Universidad de Montemorelos. The project's objective was to create a pool of open educational resources and resources for mobile learning, for educational research and the training of researchers, which is freely available via a web-site, where these resources are free and licenses exist for use, reuse and distribution, throughout México, Latin America and the rest of the world. The project's operational objectives, supported by Internet 2, were to integrate the use of technology in the training of teachers and researchers, build applications for educational innovations and form academic networks and knowledge sharing national and international networks that uses the Internet 2, as a means of communication and advanced services.

In addition to these national REA projects, there have been a growing series of institution developments by individual universities, more especially information repositories that allow open access to publications that facilitate the research process. For example ITESM has created *Develop, Learn, Reuse* (http://catedra.ruv.itesm.mx); Universidad de Guadalajara has developed the *Resource Center for Teaching and Learning* (http://www.crea.udg.mx/index.jsp); and UNAM has a *Podcast* website (http://podcast.unam.mx) and has several online journals with open access, such as: Boletín de la Sociedad Botánica de México, Revista de Economía Mexicana, Revista de la Sociedad Química de México, Revista Técnica Pecuaria en México, and Revista Veterinaria México. Similarly, IPN has an important online journal Revista Morfismos, which focuses on mathematical issues. Additionally, the Latin American Institute for Educational Communication (ILCE) has created a Documentation Centre for Latin America (CEDAL: see at: http://cedal.ilce.edu.mx/stx.asp?id=2203), which offers more than 37,000 materials for consultation, use and reuse.

In 2012, a very useful summary of the development and use of REA in México over the last decade was published The authors undertook a literature review of publications in the period 2002-2012 in Mexico focusing first, on the micro state of knowledge of REA, via four indicators: generation, dissemination, strategic recognition and production of REA, and second at the macro level looking at the national open access movement in México, with

reference to four indicators: production, sharing, dissemination and mobilization of knowledge.

Taking these parameters in turn, the study found as follows with respect to the micro (institutional) level:

Knowledge generation – generating information about the open education movement has been limited, largely due to ignorance on the part of teachers, institutions and organizations on the issue

Dissemination of knowledge – currently the spread of open educational movement in México is small compared to the situation in other countries. A main challenge has been access to information to transform the educational context and gain a better perspective of the diversity of information.

Recognition of knowledge – using REA is a new topic in México, and so there have been few initiatives and programmes, which means that recognition of the knowledge that has been generated so far is a difficult undertaking, as there is little information about the numbers and content of papers on REA presented at national and international conferences

Strategies to produce knowledge – in México, few institutions have created portals, databases and information repositories for open access to publications that facilitate the research process, with ITESM, the Universidad de Guadalajara and the UNAM, the most active institutions

Examining the Open Educational Movement at macro national level the study found:

Production of Knowledge – in recent years, México has given impetus to the creation of REA to share with the general public which has led to the creation of books, papers, journal articles and theses about open education movement, both nationally and internationally Share.

Sharing of Knowledge – the Open Source Initiative has established a series of requirements to share knowledge without violating the rights of authors, so sharing knowledge creates the potential to reduce errors in future research, reduce the time to reach potential outcomes and set new paradigms on form of research. To benefit from this, México needs to create a new vision on the creation and use of existing educational materials to improve educational practices.

Dissemination of Knowledge – in México, the creation of laws to spread the open education movement is a limiting factor for the production of REA.

Mobilization of Knowledge – the lack of information on the part of teachers and researchers in the country limited the mobilization information regarding the open education movement, and this has been reflected in the low production of materials that have been developed concerning REA, such as journal articles

The overarching conclusion was that the production of academic outputs on the subject of the Open Educational Movement, between 2002 and 2012, has been low: 73 academic productions, spread over 12 graduate theses, 3 books, 16 journal articles, 32 papers and 10 databases. This compares poorly with the volume of outputs produced in other advanced countries identified in the field, such as the United States, Spain and England, where they exceed 2000 items. In essence, although México has now become a member of the Open Educational Movement, and has actively started to develop REA, it is still far behind other nations, and needs to catch up.

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