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Mexico
Mexico's Competitiveness: Reaching Its Potential
Programmatic AAA Phase 2

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Colombia and Mexico Country Managament Unit
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Currency Unit Peso
10.89 Pesos = US$1

WEIGHTS AND MEASURES
Metric System

ABBREVIATIONS AND ACRONYMS

AAA	Analytic and Advisory Activities
ADSL	Asymmetric Digital Subscriber Line
AGA	General Customs Administration *(Administración General de Aduanas)*
ANCE	National Association of Certification and Standardization (*Asociación Nacional de Normalización y Certificación*)
APEC	Asia-Pacific Economic Cooperation
API	Integral Port Administration *(Administraciones Portuarias Integrales)*
APL	Adaptable Program Loan
APLAC	Asia-Pacific Laboratory Accreditation Cooperation
AVANCE	Program of High Value Added in Businesses with Knowledge and Businessmen (*Programa de Alto Valor Agregado en Negocios con Conocimiento y Empresarios*)
BEE	Business Enabling Environment
CCD	Digital Community Centers (*Centros Comunitarios Digitales*)
CCE	Business Coordination Council *(Consejo Coordinador Empresarial)*
CEC	Center for Studies on Competitiveness *(Centro de Estudios para la Competitividad)*
CEESP	Center for Private Sector Economic Studies (*Centro de Estudios Económicos del Sector Privado*)
CENAM	National Metrology Center (*Centro Nacional de Metrología)*
CENEVAL	Nacional Higher Education Evaluation Center (*Centro Nacional de Evaluación para la Educación Superior*)
CFAA	Country Financial Accountability Assessment
CFC	Federal Competition Commission (*Comisión Federal de Competencia*)
CFE	Federal Electricity Commission *(Comisión Federal de Electricidad)*
CGE	Computable general equilibrium
CIMO	Comprehensive Quality and Modernization Program *(Calidad Integral y Modernización)*
CIPI	Intersecretarial Industrial Policy Commission *(Comisión Intersecretarial de Política Industrial)*
COFEMER	Federal Regulatory Improvement Commission (*Comisión Federal de Mejora Regulatoria*)
COFETEL	Federal Telecommunications Commission *(Comisión Federal de Telecomunicaciones)*
COFUPRO	Nacional Cordination Office of the Produce Foundations (*Coordinadora Nacional de la Fundaciones Produce)*
COMTRADE	United Nations Commodity Trade Statistics Database
CONACYT	National Science and Technology Council (*Consejo Nacional de Ciencia y Tecnología*)
CONEVyT	National Council of Education for Life and Work *(Consejo Nacional de Educación para la Vida y el Trabajo*
CPS	Country Partnership Strategy

CRE	Energy Regulatory Commission *(Comisión Reguladora de Energía)*
CUSTA	US-Canada Free Trade Agreement
DGN	General Standards Directorate (*Dirección General de Normas*)
DOF	Official Gazette *(Diario Oficial)*
DPL	Development Policy Loan
EIA	Energy Information Administration (U.S. Department of Energy)
EMA	Mexican Accreditation Entity (*Entidad Mexicana de Acreditación)*
ENESTYC	National Survey of Employment, Wages, Technology and Training
ENIGH	Mexico's National Household Income and Expenditure Survey (*Encuesta Nacional de Ingresos y Gastos de los Hogares*)
FAO	Food and Agriculture Organization
FCST	Telecommunications Social Access Fund (*Fondo de Cobertura Social de las Telecomunicaciones*)
FDI	Foreign Direct Investment
FIAS	Foreign Investment Advisory Service
FM	Financial management
FTA	Free Trade Agreement
FUMIAF	Mexican Foundation for Agricultural and Forestal Research *(Fundacion Mexicana para la Investigacion Agropecuaria y Forestal)*
FY	Fiscal Year
GATS	General Agreement on Trade in Services
GATT	General Agreement on Tariffs and Trade
GDP	Gross Domestic Product
GEF	Global Environment Facility
GNI	Gross National Income
GOM	Government of Mexico
IAF	International Accreditation Forum
IBRD	International Bank for Reconstruction and Development
ICA	Investment Climate Assessment
ICT	Information and communications technology
IDA	International Development Association
IDB	Inter-American Development Bank
IEC	International Electrotechnical Commission
IFAI	Federal Institute of Access to Public Information *(Instituto Federal de Acceso a la Información Pública)*
IFC	International Finance Corporation
ILAC	International Laboratory Accreditation Cooperation
IMF	International Monetary Fund
IMCO	Mexican Competitiveness Institute (*Instituto Mexicano para la Competitividad*)
INEA	National Institute of Adult Education *(Instituto Nacional para la Educación de los Adultos)*
INEGI	National Institute of Statistics, Geography and Informatics (*Instituto Nacional de Estadística, Geografía e Informática*)
IICA	Inter-American Institute for Cooperation of Agriculture
IMSS	Mexican Social Security Institute (*Instituto Mexicano del Seguro Social*)
INIFAP	National Institute of Forestry, Agriculture, and Livestock Research *(Instituto Nacional de Investigaciones Forestales, Agrícolas y Pecuarias)*
ININ	National Nuclear Research Institute (*Instituto Nacional de Investigaciones Nucleares*)
IPER	Infrastructure Public Expenditure Review
ISO	International Standards Organization
ITAM	*Instituto Tecnológico Autónomo de México*
ITU	International Telecommunications Union
JICA	Japan International Cooperation Agency
LAC	Latin America and Caribbean Countries

LDP	Letter of Development Policy
LFC	Central Light and Power *(Luz y Fuerza Centro)*
LFPA	Federal Administrative Procedures Law *(Ley Federal de Procedimiento Administrativo)*
LIC	Labor Intermediation Center
LPG	Liquid Petroleum Gas
LSPEE	Electric Energy Public Service Law *(Ley del Servicio Público de Energía Eléctrica)*
MBTU	Million British thermal units
MDGs	Millennium Development Goals
M&E	Monitoring and Evaluation
MFN	Most favored nation
MRA	Mutual Recognition Arrangement
MTEF	Medium-Term Expenditure Framework
NAFTA	North American Free Trade Agreement
NOMs	Official Mexican Norms (*Normas Oficiales Mexicanas)*
NRI	Networked Readiness Index
OECD	Organization for Economic Cooperation and Development
OTRI	Overall Trade Restrictiveness Index
PAC	Training Support Program *(Programa de Apoyo a la Capacitación)*
PECyT	Special Plan for Science and Technology (*Programa Especial de Ciencia y Tecnología*)
PEMEX	Mexican Petroleum (*Petroleos Mexicanos*)
PER	Public Expenditure Review
PIDIREGAS	Infrastructure projects with deferred expenditure recording (*Proyectos de Infraestructura Diferidos en el Registro del Gasto*)
PISA	Programme for International Student Assessment
PITEX	Temporary Import Program for Exporters *(Programa de Importación Temporal para Producir Artículos de Exportación)*
PRODESCA	Program to Develop Capacity in Rural Areas (*Programas de Desarrollo de Capacidades en el Medio Rural*)
PROFECO	Federal Consumer Protection Agency *(Procuradería Federal del Consumidor)*
PROSEC	Sectoral Promotion Programs *(Programas de Promoción Sectorial)*
PRONASOL	National Solidarity Program (Programa Nacional de Solidaridad)
PROSENER	Energy Sector Program 2001–2006 *(Programa Sectorial de Energía 2001-2006)*
R&D	Research and Development
RBP	Regulatory Betterment Program
RIA	Regulatory Impact Assessment
RFTS	Federal Registry of Procedures and Services *(Registro Federal de Trámites y Servicios)*
SAGARPA	Secretariat of Agriculture, Livestock, Rural Development, Fisheries, and Food *(Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación)*
SARE	Rapid Business Opening System *(Sistema de Apertura Rápida de Empresas)*
SCT	Secretariat of Communications and Transport (*Secretaría de Comunicaciones y Transportes*)
SE	Secretariat of Economy (*Secretaría de Economía*)
SECTUR	Secretariat of Tourism (*Secretaría de Turismo*)
SEDESOL	Secretariat of Social Development (*Secretaría de Desarrollo Social*)
SEGOB	Secretariat of Government (*Secretaría de Gobernación*)
SEMARNAT	Secretariat of the Environment and Natural Resources *(Secretaría de Medio Ambiente y Recursos Naturales)*
SENASICA	National Health, Innocuousness, and Food Quality Service (*Servicio Nacional de Sanidad, Inocuidad, y Calidad Agroalimentaria)*
SENER	Secretariat of Energy (*Secretaría de Energía*)
SEP	Secretariat of Public Education (*Secretaría de Educación Pública)*

SFP	Secretariat of Civil Service *(Secretaría de Función Pública)*
SHCP	Secretariat of Finance and Public Credit *(Secretaría de Hacienda y Crédito Público)*
SME	Small and medium enterprise
SICEX	Comprehensive Foreign Trade System *(Sistema Integral de Comercio Exterior)*
SNI	National Researchers System (*Sistema Nacional de Investigadores*)
SNIE	National Business Incubation System (*Sistema Nacional de Incubación de Empresas*)
SOE	State-owned enterprise
SPS	Sanitary and Phytosanitary
SS	Secretariat of Health (*Secretaría de Salud)*
SSP	Secretariat of Public Security (*Secretaría de Seguridad Pública*)
S&T	Science and Technology
STPS	Secretariat of Labor and Social Security *(Secretaría del Trabajo y Previsión Social)*
TA	Technical assistance
TFP	Total factor productivity
TRQ	Tariff rate quota
UNDP	United Nations Development Program
USAID	United States Agency for International Development
USD	United States Dollars
USDA	United States Department of Agriculture
WACC	Weighted average cost of capital
WBI	World Bank Institute
WDI	World Development Indicators (World Bank)
WEF	World Economic Forum
WTO	World Trade Organization

Vice President:	Pamela Cox
Country Director:	Isabel M. Guerrero
Sector Director:	Makhtar Diop
Task Team Leader:	Jose Luis Guasch
Co-Task Team Leader:	Keta Ruiz

PREFACE

In 2003, the Government of Mexico (GOM) declared increasing country competitiveness to be a key priority of the Fox Administration. This was a response to modest growth, employment, export, and competitiveness indicators; it also signaled concerns about the country's ability to respond to the pressures induced by advancing globalization, such as competition from China and the end of the textile quota system in 2005. Within its ongoing dialogue with the World Bank, the GOM requested assistance to develop a strategy and an implementation agenda for the overall improvement of country competitiveness. In particular, the GOM requested assistance in identifying the agenda and producing well-focused analytical pieces on key issues to address and facilitate the implementation of that agenda.

Responding to that request, the World Bank agreed to cast its assistance in the form of Programmatic Analytic and Advisory Activities (AAA), the first phase of which was in the form of non-lending technical assistance (TA). This allowed for the provision of just-in-time analytical and technical support, as requested by the GOM.[1] Pre-programmatic assistance started in fiscal year 2004 (FY04) and helped define the GOM's Competitiveness Agenda 2004–2006 (see Annex 2 for a description of the pre-programmatic work).

The AAA (FY05–08) was structured in three phases (see Annex 1). The first formal phase (FY05) supported the design and implementation of the Mexican Competitiveness Agenda through separate pieces of analytical work at the request of the Government. It has also included advocacy presentations and advisory assistance through briefings and background information on relevant competitiveness themes. The first phase of the AAA led to a $300 million Competitiveness Development Policy Loan (DPL) from the World Bank to Mexico. The first DPL was approved in March 2006 and provides tangible support to several areas of the GOM's Competitiveness Agenda. The DPL highlights numerous recent actions that the GOM has taken to improve competitiveness, as well as future plans that will form part of the second and third DPLs planned for FY08 and FY09.

This report concludes Phase 2 of the AAA (FY06). It aims to bring the key policy messages into the public sphere and provide the incoming Mexican administration (which takes office in December 2006) with a sound analysis of competitiveness constraints. This is critical given that improving competitiveness is a long-term challenge for the next *sexenio*, and future efforts will build on important steps already taken by the Fox administration. This report is based on what was learned from Phase 1 of the AAA and the first DPL, as well as additional pieces of analytical work conducted as part of Phase 2 and achievements of the Fox administration to date. The background studies from Phases 1 and 2 can be found at www.worldbank.org.mx.

Initially, a Phase 3 of the AAA (FY07–08) was planned to deal in depth with specific issues of interest to the next administration. However, given that the World Bank will be engaged in competitiveness dialogue with the next administration vis-à-vis the second and third phases of the DPL, the programmatic AAA will close with this report.

[1] The AAA was proposed in the Country Partnership Strategy of the World Bank Group with the United Mexican States, Report No. 28141-ME, April 15, 2004.

MEXICO'S COMPETITIVENESS: REACHING ITS POTENTIAL
PROGRAMMATIC AAA PHASE 2

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Background Studies

Several background studies and exercises were undertaken for this report. Descriptions have been compiled in a single volume and can be accessed at www.worldbank.org.mx. The studies cover:

- Diagnosis, monitoring, and measuring results: IMCO Country and State level analyses
- SME support programs
- Quality infrastructure
- Impact of draft labor law reform on Doing Business indicators
- Logistics costs for 3 export products
- Logistics/transport indicators
- Tariff reform
- Trade facilitation reform and competitiveness
- Energy priorities
- ICT and telecommunications
- Competitiveness challenges in the agriculture sector

The World Bank expresses its profound thanks to the Government of Mexico for its collaboration and contributions to the preparatory activities and Phases 1 and 2 of the AAA. The Bank is especially grateful for support received from the Office of Public Policy of the Presidency and the Subsecretariat of Industry. The Bank would also like to thank all those who were consulted during this process, including representatives of academic institutions, especially IMCO, the private sector, and others. This report was prepared by a team consisting of Jose Luis Guasch (Task Team Leader), Keta Ruiz (Co-Task Team Leader), Thomas Haven, Jose Maria Caballero, Yurie Tanimichi Hoberg, John S. Wilson, Isidro Soloaga, Isabel Sanchez Garcia, Robert G. Stephens, Benjamin Herzberg, Jose Barbero, Gabriela Elizondo Azuela, and Anna Maria Sant'Anna. The team benefited from comments from peer reviewers: William Maloney, Shahid Yusuf, Axel Peuker, Al Watkins, Charles Feinstein, Uma Subramanian, William Martin, John Panzer, Mark Dutz, and Dina Umali-Deininger.

EXECUTIVE SUMMARY

MEXICO'S COMPETITIVENESS: REACHING ITS POTENTIAL

1. **Can Mexico compete?** This question has dogged Mexico in recent years thanks to moderate growth and productivity numbers, a declining share of the U.S. import market, and increasing competition from lower-wage economies such as China. The objective of this report is to inform policy makers, the private sector, and the public at large about competitiveness priorities and shortcomings in Mexico, and to point the way forward on improving competitiveness. The report highlights constraints to competitiveness and identifies key high impact interventions to maximize Mexico's potential for efficiency, generate jobs, and move the country to a more innovation-driven stage of development. It draws on a series of focused analytical pieces that were conducted for Phases 1 and 2 of the Programmatic Analytical and Advisory Activities (AAA), as well as extensive World Bank work on competitiveness issues in Mexico and beyond.[2] The report also recognizes that the Fox administration has taken important steps that have laid a solid foundation for future efforts. Yet, improving competitiveness is a long-term challenge that the next administration will face over the coming years.

2. The key policy messages that arise from this work are the following:

I. To secure strong job creation and significant poverty reduction in Mexico, increasing competitiveness should be a priority and business as usual will not work.

II. Mexico needs to maximize its efficiency potential by a) encouraging competition between firms, b) facilitating trade and reducing logistic costs, c) improving business regulation and the investment climate, d) strengthening the energy sector, and e) improving the ICT (information and communications technology) and telecommunications sector. Special emphasis is needed to improve and transform the agriculture sector.

III. To advance to the innovation-driven stage of development, Mexico needs to boost innovation and strengthen quality, education, and training (Box 1).

IV. Competitiveness priorities differ at the sub-national level and active reform at this level is necessary.

V. Competitiveness improvements could allow Mexico to double its GDP per capita in ten years, as a number of countries have recently done.

These messages are addressed in the following five sections of the Executive Summary. Section VI highlights selected recent actions that the Government of Mexico has taken to improve competitiveness, as well as planned future actions. It also summarizes the objectives for moving forward covered in the other five sections.

Box 1: Stages of Development: Factor-, Efficiency-, and Innovation-Driven

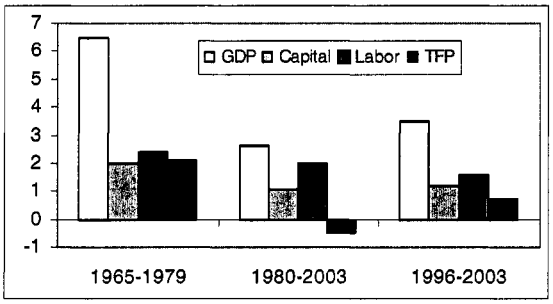
The efficiency and innovation-driven stage concepts come from the World Economic Forum (2005a), where Mexico is classified as being in the efficiency-driven stage along with Argentina, Brazil, and Chile, for example. At the efficiency-driven stage, firms increase productivity by adopting efficient production practices. Among the countries in the first stage—the "factor-driven stage"—where firms compete on price by taking advantage of cheap capital, labor, and energy factors, are China, India, and Bolivia. At the innovation-driven stage, firms need to produce innovative products using sophisticated production methods, e.g., Finland, Germany, and Japan.

[2] Annex 1 and Annex 2 and the background studies contain descriptions of the World Bank's assistance program to increase Mexico's competitiveness.

I. MAKING COMPETITIVENESS A PRIORITY; BUSINESS AS USUAL WILL NOT WORK

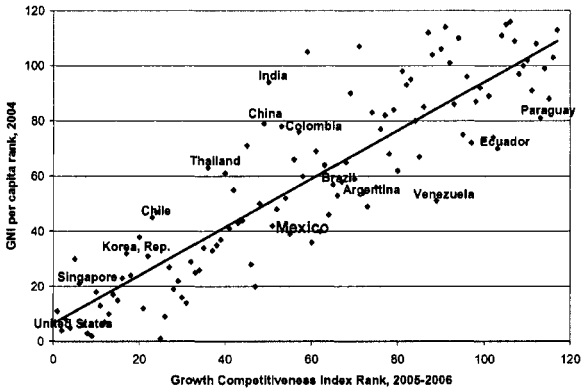
3. **Growth and productivity improvements in Mexico have been modest in recent years.** Over the last decade, Mexico has benefited from a relatively stable economy and has avoided the pattern of financial crises that have plagued many of its past political cycles, thanks in large part to prudent fiscal and monetary policies. Despite this stability, structural economic constraints have held back growth and therefore poverty reduction. Growth rates have been particularly low over the last decade when compared with countries of similar income in East Asia. While real GDP per capita in Mexico only grew at an annual rate of 1.2 percent between 1994 and 2004, it grew at 7.7 percent in China, and at 5.9 percent on average in the East Asia and Pacific region. Productivity growth rates have also been lackluster. The share of growth attributable to total factor productivity (TFP) was negative on average between 1980 and 2003, although there has been a slight increase in recent years (Figure 1).

Figure 1: GDP Growth in Mexico and its Components in %:Growth Accounting, 1960-2003 (Contributions to GDP Growth in Percent)



Note: Numbers are for real GDP growth (not GDP per capita).
Source: Faal (2005).

Figure 2 : Competitiveness versus GNI per Capita Rankings



Note: Lower-ranking numbers are better.
Source: World Economic Forum (2005a) and World Bank, World Development Indicators.

4. **Given the productivity numbers, it is not surprising that comprehensive competitiveness measures show Mexico to be weak—underperforming—relative to per capita income and not improving.**[3] The World Economic Forum's 2005–2006 *Global Competitiveness Report* gives Mexico a rank of 55 out of 117 countries, down from 48 in 2004.[4] In comparison, Mexico's gross national income (GNI) per capita rank within that same sample of countries is 39. While this gap between income and competitiveness rankings is not atypical for Latin America, it indicates that Mexico is falling well short of its potential. In contrast, Chile, India, China, and other East Asian economies enjoy competitiveness rankings that exceed their income placing (Figure 2). The World Bank's *Doing Business in 2006* reports similar findings. Mexico ranked 73 (out of 155 countries) on the publication's "Ease of Doing Business" scale, compared with an income per capita rank of 38.

[3] Competitiveness is broadly defined as the "collection of factors, policies and institutions which determine the level of productivity of a country and that, therefore, determine the level of prosperity that can be attained by an economy." World Economic Forum (2005), p.xiii.

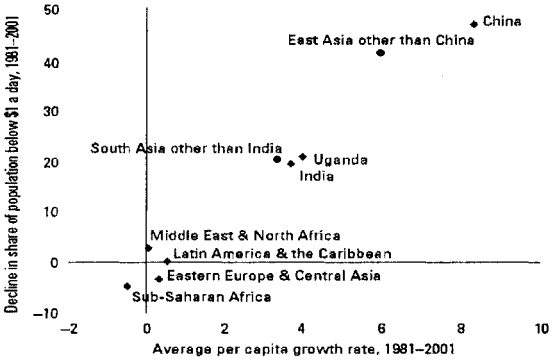
[4] This ranking is for the Growth Competitiveness Index. Two countries (Qatar and Kuwait) that were not ranked in 2004 placed ahead of Mexico in 2005, accounting for a small part of Mexico's fall.

5. **An often used (albeit imperfect) proxy for competitiveness is export performance. On this basis, the weak competitiveness of Mexico's economy would be reflected in the reduction in its share of U.S. imports.** Mexico is highly dependent on the U.S. economy, which absorbs 88 percent of its total exports. After experiencing an export boom in the 1990s thanks to NAFTA, Mexico has been losing U.S. market share, particularly to China. Mexico's share of U.S. imports fell from a high of 11.6 percent in 2002 to 10.2 percent in 2005. During that same time period, the Chinese share went from 10.8 percent to 14.6 percent.

6. **Lagging competitiveness, and hence growth, has meant lost opportunities for poverty reduction.** Nearly all the countries that have had long term success in reducing poverty have done so with higher rates of economic growth (left panel of Figure 3).[5] This association is also true for Mexico, where poverty reduction has tracked growth in GDP per capita over the last decade (right panel of Figure 3). Nonetheless, after experiencing robust GDP per capita growth following the 1994 Tequila Crisis, income levels have been more or less stagnant since 2000. The recent growth slowdown has meant a significant loss of opportunities for poverty reduction, although programs such as *Oportunidades* have helped offset this trend.[6] For Mexico to breakout of its low-growth trajectory and cut poverty, it will have to boost growth and improve its productivity and competitiveness.

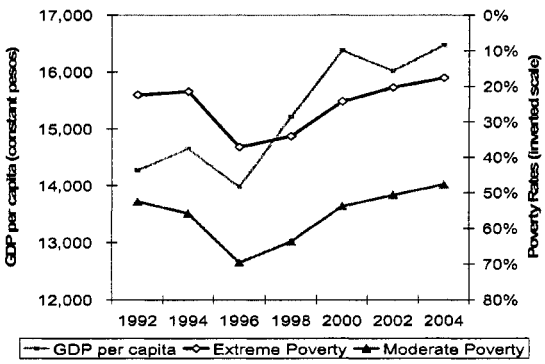
Figure 3: Poverty reduction is closely associated with growth

World



Source: World Bank (2004a)

Mexico



Source: Mexico ENIGH and World Bank, World Development Indicators; World Bank calculations

7. **Aware of its predicament, the Government of Mexico (GOM) in 2003 declared increasing country competitiveness to be a key priority of the Fox Administration.** This was a response to the modest indicators of growth, employment generation, export, and competitiveness; it was also a response to concerns about the country's ability to respond to the pressures imposed by advancing globalization, such as competition from China and the end of the textile quota system in 2005. The GOM has made progress in some fronts, but much more is needed if Mexico is to go beyond sound macroeconomic management and stability and achieve higher growth and productivity.

8. **An impact study conducted by the Mexican Competitiveness Institute (IMCO), as well as other studies, identified major priority areas.** The IMCO (2005a) study develops a model to assess Mexico's competitiveness and establishes priorities among themes in terms of impact on investment

[5] World Bank (2004a).

[6] For a complete analysis of poverty reduction in Mexico, see World Bank (2004c).

(gross capital formation) per worker.[7] From that model, point elasticities are estimated, giving the impact on investment per worker of a ten percent improvement in the respective independent variables (Table 1). As shown, the high-impact themes are the competition environment, taxes and tax regulations, regulatory and investment climate, education and innovation, trade facilitation, transport and logistics, corruption, finance, and energy. These impact estimates provide guidelines for priorities to be tackled in order to increase Mexico's competitiveness. They are also supported by two other relatively comprehensive reports: a **Competitiveness Focus Groups** report and the **World Economic Forum's (WEF)** ***Global Competitiveness Report 2005–2006***. Finally, the identified priority areas are validated by analyzing competitiveness constraints through a **growth diagnostic framework** (Hausmann, Rodrik, and Velasco, 2004).

Table 1: Constraints to Competitiveness[8]

Subject areas	Impact on investment per worker of a 10 percent improvement in the variables behind each subject area
1) Competition environment	7.5 %
2) Taxes and tax regulations	7.1 %
3) Regulatory and investment climate	6.8 %
4) Education	6.0 %
5) Trade facilitation and transport / logistics	5.8 %
6) Corruption	4.7 %
7) Innovation	3.8 %
8) Finance	3.6 %
9) Energy	2.7 %
10) Labor market	1.9 %
11) Macroeconomic environment	1.0 %

Note: The percentages are point elasticities, which reflect the impact on investment per worker of a 10 percent improvement in the variables behind each subject area.
Source: World Bank extrapolation of IMCO subcomponent elasticities.

II. MAXIMIZING MEXICO'S EFFICIENCY POTENTIAL

9. For Mexico to compete in what the World Economic Forum (2005a) calls the efficiency-driven stage of development, Mexico needs to develop more efficient production processes and reduce costs throughout the economy. To reduce costs and improve productivity, Mexico should focus on a) encouraging competition between firms; b) facilitating trade and reducing logistic costs; c) improving business regulation and the investment climate; d) strengthening the energy sector; and e) improving the ICT and telecommunications sector.[9] These are all high impact areas, as shown in Table 1. Mexican

[7] Phase 1 of this AAA supported in part the IMCO study, which is described in more detail in the background studies for this report (see www.worldbank.org.mx).
[8] It should be noted that the impact numbers in Table 1 are for single effects or isolated improvements in each category. A broad package of reforms across most of the high-impact categories could have a positive bundling effect. In other words, the interaction between the individual variables should create an overall impact that is substantially larger than the sum of the individual improvements.
[9] The topic of taxes is not a subject analyzed in this report since it is the subject of another World Bank report, the Mexico CEM: Challenges and Prospects for Tax Reform. Likewise, the topics of education, corruption, and finance

authorities are supporting improvements in most of these areas,[10] but further progress is necessary. It is also important to address inefficiencies in the agriculture sector. Each of these areas is discussed in the following subsections.

A. Improvements in Mexico's Competition Policy Are Needed, Particularly to Facilitate Enforcement and Serve as an Effective Deterrent to Anticompetitive Practices

10. **Greater competition leads to efficiency gains.** Competition, and the benefits it brings with respect to lower prices, greater variety, and the development of new products, is crucial for markets to work well and for increasing the wellbeing of a society. Policies that enhance competition are expected to bring not only static improvements in efficiency, especially in disciplining monopolies, but also dynamic improvements in efficiency, through improvements in productivity and innovation. Recent empirical research indicates that regulation that lowers entry barriers and state control increases productivity and technological innovation, stimulates business investment, and increases long-run employment rates.[11].Therefore, reforms to enhance competition could have significant effects on growth. A study of the effect of pro-competitive regulatory reform in several industries in the United States found that annual welfare gains in that part of GDP that was affected by reform were more than 7 percent, with 90 percent of the benefits flowing to consumers.[12] Increasing competitive pressure can increase the probability of firm innovation by more than 50 percent.[13]

11. **Studies show competition deficiencies in Mexico.** For instance, according to a recent governance survey, the two largest market obstacles to business development identified by firms in Mexico are monopolies, private or public.[14] The Global Competition Review 2003 ranking of competition regimes in 25 countries places Mexico near the bottom with a score of 2.25, in a rating from 0–5; this places it only above Greece (2.0) and Argentina (1.5).

12. **To improve the effectiveness of competition policy in Mexico, actions are needed that will do the following:**

- Remove the constraints on statutory authority and judicial review processes and allow for preventive measures;
- Enhance the collaboration by the Federal Competition Commission (CFC) with different regulatory agencies and states through harmonization agreements or/and align jurisdiction;
- Improve the deterrent effects of the existing Federal Law on Competition Policy, by improving level and collection of sanctions; and
- Increase public support for competition policy.

13. **The amendments to the Federal Law on Economic Competition have been a great advance, but the associated regulation and its application are important.** The amendments—that reform 25 articles, repeal 1, and add 11 more—were approved in April 2006 and went into effect on June 29, 2006.

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are addressed elsewhere through a parallel AAA on Education; an Institutional and Governance Review, and finance AAA, including an FSAP (Financial Sector Assessment Program).

[10] Some of these improvements are being supported by Bank operations such as the MX Competitiveness DPL and the MX Finance and Growth DPL series.

[11] Nicoletti and Scarpetta (2003) Nicoletti and Scarpetta (2004).

[12] OECD (2002).

[13] World Bank (2004a).

[14] CEESP (2005)..

The amendments are designed to increase the effectiveness of detecting and sanctioning monopoly practices. They classify new anticompetitive actions, increase fines and expand the capacity of the CFC to divest the assets of firms that engage in anti-competitive practices, in cases where they have not complied with previous orders; undertake verification visits; implement leniency programs; and order preventative measures. To make the amendments concrete, the corresponding regulation needs to be issued, which is expected to occur by the end of December 2006. Training and diffusion efforts will then be necessary to support the implementation and application of the amended law.

Box 2: Competition: Selected Evidence and Effects

- A study of the effect of pro-competitive regulatory reform in several industries in the United States found that annual welfare gains in affected sectors were more than 7%, with 90% of the benefits flowing to consumers (OECD).
- Increasing competitive pressure can increase the probability of firm innovation by more than 50% (World Bank, 2004a).
- According to a survey of Mexican firms, the two largest obstacles to business development are government monopolies and private monopolies (CEESP, 2005).

B. Mexico's Trade Environment Has Been Transformed but More Should Be Done to Facilitate Trade and Reduce Logistics Costs

14. **The trade and investment environment in Mexico has been transformed over the past two decades.** This is in part due to the 1994 launch of the North American Free Trade Agreement (NAFTA) with the United States and Canada, and, more recently, trade agreements with the European Union, Japan, and others. Growing competitive pressures from countries such as China have also generated policy reform measures to lower trade transactions costs. The engine of export-led expansion in the second half of the 1990s, however, has slowed down in recent years. And while exports have begun to diversify away from petroleum and related products, Mexico still remains heavily dependent on a single market—the United States.

15. **Domestic reforms can have a large impact.** Hanson and Robertson (2005) suggest that internal conditions in Mexico associated with its ability to expand export-supply capabilities—areas directly related to trade costs and facilitation—are a more important factor in limiting the country's export growth than China's expanded trade into the United States. Soloaga, Wilson, and Mejía (2006) find that trade facilitation reforms in Mexico could increase exports by US$29.3 billion, equivalent to 21 percent of total Mexican manufacturing exports.

16. **Logistic costs are particularly high in Mexico.** They are estimated at over 20 percent of product value, while the OECD average is 9 percent.[15] A pilot survey of a new Logistics Perception Index, aimed at measuring operators' perceptions of countries' logistics environments, gives Mexico a score of 3.6 (7 being the best and 1 the worst), lower than other Latin American countries like Argentina (4.5) and Brazil (3.8).[16] Recent analyses by the government and the private sector, both of whom were concerned about Mexico's potential disadvantage vis-à-vis its competitors, also highlighted considerable logistics weaknesses.

17. **Key actions to facilitate trade and reduce logistics costs include the following:**

[15] Guasch (2004).

[16] The LPI is a World Bank initiative implemented with the support of the Turku School of Economics and Business Administration, Finland. A pilot survey was carried out in 2003.

- **Further lowering tariffs and non-tariff barriers and reducing the dispersion of tariff rates (consolidation at a few levels).** Lowering trade barriers offers gains for consumers and allows firms to acquire lower cost inputs. The simplification or harmonization of tariffs would make more productive chains viable.[17] This is particularly important given the need to continue to diversify exports beyond oil and the major export destination, which continues to be the United States.
- **Expanded use of information technology and reduced regulation can help lower trade costs.** Making trade procedures and documentation available electronically will reduce the time and costs for firms to conduct business abroad.
- **Key internal corridors and logistics centers could be improved,** as manufacturers face high costs to deliver their products from/to the border, ports, or airports; access to those facilitates is already fairly congested. Elevated transport costs, times, and incidence of delays have also led businesses to maintain high inventory levels.
- **Enhancing customs efficiency.** The lack of flexibility in working hours and locations for product clearance adds delays and costs. The customs administration would also benefit from a modernization of its infrastructure, including better use of information technology in ports, airports, and at land border crossings.
- **Strengthening the organization of firms' supply-chains.** Manufacturing companies, especially SMEs, often incur higher costs due to a lack of skills in modern supply-chain management techniques. This involves, through business development services and logistic assistance, rethinking the complete supply chain from material and services sourcing to the use of specialized distribution companies to deliver the end product to the client.

Box 3: Trade Facilitation and Logistics: Selected Evidence and Effects

- Trade facilitation reforms in Mexico could increase exports by $29.3 billion, equivalent to 21 percent of total Mexican manufacturing exports (Soloaga, Wilson, and Mejía, 2006).
- Despite the gains from NAFTA, Mexico has been losing export market share within the United States in recent years. Of the top ten types of Mexican imports in the United States, only two—petroleum and total agricultural products—gained market share between 2001 and 2005 (U.S. Dept. of Commerce).
- Export-supply capabilities were more of a constraining factor than import-demand conditions in the United States for Mexican exports (Hanson and Robertson, 2005).
- Reducing logistics costs from over 20% to 12% in Mexico would have a significant impact on economic activity and job creation (Guasch, 2004; Guasch and Kogan, 2003).
- Mexico spends almost double what the United States does on transport as a percentage of GDP (IMCO, 2005a based on INEGI).

C. Mexico Has Made Far-Reaching Regulatory Improvements but Firms Still Face Pervasive Red Tape

18. **Mexico needs to reduce its regulatory burden to improve productivity**. Several studies demonstrate how the regulatory burden in Mexico is still hindering business growth.[18] The OECD, in its most recent review[19] of the effect of product market regulations on investment and growth found that when regulation is restrictive, productivity growth is generally below the OECD average. The OECD

[17] Currently, in some sectors it is more profitable to import final goods under preferential treatment than to import the inputs and raw materials in order to produce those same goods domestically.
[18] See Cotis (2005), World Bank (2006a), and IMCO (2005 a and b).
[19] "Indicators of Product Market Regulation", OECD, 2003

also estimates that if those sectors that lag in terms of productivity were to modernize their regulatory framework and align it on best practice, then productivity could increase by as much as 10 percent.[20]

19. **The World Bank's *Doing Business* and IMCO have shown that regulation is a drag on the Mexican economy.** Compared to other countries in Latin America, Mexico clearly lags behind in: a) time and cost to open a business; b) time and cost to obtain a license; c) cost of hiring; and d) cost of tax compliance (World Bank, *Doing Business* database). The Mexican Institute for Competitiveness (IMCO) produced its own benchmarking report in 2005, which concludes that the cost of the regulatory burden currently represents 15 percent of Mexico's GDP, while the benefits from regulatory improvement could yield a 5–10 percent increase in GDP.

20. **Regulatory reforms to boost competitiveness include the following:**

(i) Elimination or improvement of procedures that impose unnecessary large burdens on entrepreneurs (starting a business, licensing, registering property, employment regulation, contractual enforcement, tax regulation);

(ii) Streamlining of business interaction with government in order to reduce uncertainty and improve implementation efficiency.

Industry sectors that are key to Mexican competitiveness and under specific competitive threat from foreign markets could benefit from a thorough review of administrative barriers in order to identify where action can be taken to reduce cost. Such sectors and issues could include foreign trade, manufacturing, property, finance, norms and standards, transport and telecommunications, energy, and labor among others. For each sector or issue, reduction of time, procedures, and costs of fulfillment would help improve competitiveness. The Federal Regulatory Improvement Commission (COFEMER) can lead these efforts, but it can exercise its full powers only if it enjoys broad support.

21. **Other important actions to improve regulation include the following:**

- Strengthening public consultation;
- Better harmonization of regulation between the different levels of jurisdiction;
- Expanding the implementation of the Rapid Business Opening System (SARE) to reduce the time and cost of business opening regulations; creating a system to measure the SARE's effectiveness and monitor its implementation;
- Reinforcing the Regulatory Impact Assessment (RIA) process in federal institutions, as well as creating a monitoring and evaluation framework for RIAs;
- Increasing cooperation with sub-national jurisdictions and the private sector to keep improving regulations at all levels.

Box 4: Regulation: Selected Evidence and Effects

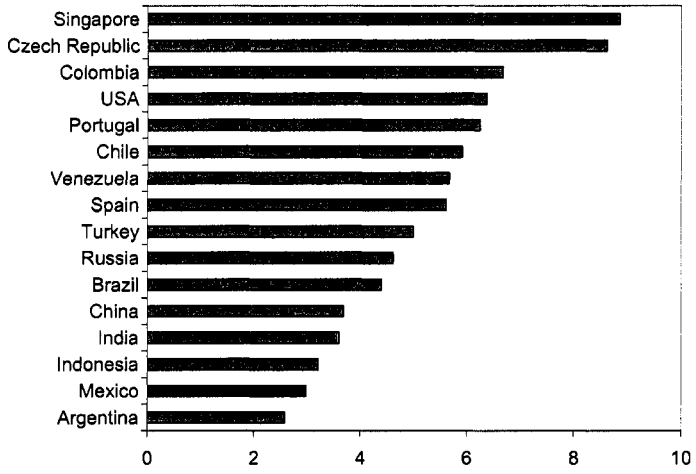
- Modernizing regulatory frameworks could increase productivity by as much as 10% in lagging sectors (Cotis, 2005).
- Starting a business takes 58 days in Mexico, compared with 5 days in the United States. Dealing with licenses takes 222 days at a cost of 159% of income per capita, while it only takes 70 days in the United States at a cost of 17% of per capita income (World Bank, *Doing Business* database).
- The cost of the regulatory burden in Mexico is 15% of GDP (IMCO, 2005a).

[20] "Economic Policy Reforms: Going for Growth and the case of Mexico", Jean-Philippe Cotis, Chief Economist, OECD, 2005

D. MEXICO'S ENERGY SECTOR NEEDS TO STRENGTHEN ITS PERFORMANCE

22. **An efficient energy supply at competitive prices is a major driver of economic growth and productivity, yet Mexican prices and performance have been somewhat inadequate.** Both energy and non-energy businesses' investment decisions are based on expectations about energy prices and service quality levels. And unfortunately, expectations of Mexican businesspeople are quite low: business opinion surveys give Mexico the lowest rank of any OECD country in terms of energy infrastructure adequacy and efficiency (Figure 4). Natural gas, electricity, and fuel oil prices have seen dramatic increases in recent years and are among the highest in the world. High electricity costs are compounded by fluctuations in frequency and voltage, resulting in effective costs that are 10-60 percent higher than those of U.S. counterparts. When annual interruptions are compared with Latin American privatized distribution companies, the performance of Mexico's National Electric Company (CFE) is limited. Furthermore, electricity subsidies are highly regressive and amount to about 1.1 percent of GDP.

Figure 4: Energy Infrastructure Adequacy and Efficiency (2005)



Note: Scores (between 0 and 10) are based on business survey responses to the question: "Is the energy infrastructure adequate and efficient?" The highest value indicates the most positive perception.
Source: IMD World Competitiveness Online.

23. **Mexico needs to implement a number of strategic measures to ensure the long term sustainability and competitiveness of the energy sector.** In the hydrocarbons sector, about US$130 billion is estimated to be required in the period 2004–2012 to restore reserves rate and minimize imports through activities in exploration and production, refining, petrochemicals, and others.[21] Likewise, the electricity sector needs an important amount of resources to finance additional capacity and modernize interconnected infrastructure. The growing dependence on fuel imports and the gradual deterioration of energy infrastructure calls for the implementation of a number of far-reaching strategic measures, which may include the following:

- **Lower fiscal dependence on oil revenue.** Ways need to be found to lower the country's fiscal and budgetary dependence on oil revenues and allow for autonomous enterprise management in hydrocarbons and electricity. One way is to strengthen other sectors of the economy so they can act as a substitute for Mexican Petroleum (PEMEX) budgetary support. The high leakage factor of

[21] Acevedo (2004).

subsidies (64 percent of value in electricity) is highly regressive and increases the fiscal burden. Private sector participation can also help minimize the fiscal burden and financing needs of the hydrocarbons and electricity industries. Increased transparency of sector performance is key to inducing improved performance.

- **Initiate national dialogue.** A structured national dialogue should include relevant stakeholders and expert analysts to review the options that could ensure the long term sustainability of the energy sector (e.g., national expert committee). In parallel, strengthen the capacity of political parties, senate and congress members, and the civil society to analyze energy sector bottlenecks.
- **Modernize the energy sector and reduce dependence on fuel imports**. Strategies should include a) the implementation of a sound program of investments and capital expenditures; b) fuel diversification measures; c) taking advantage of private sector investment interests; and the promotion of strategic partnerships that bring additional sources of capital; d) design and implementation of innovative legal and financial instruments to lower risks associated with fuel price, fuel availability, and other (e.g., innovative covenants in power purchase agreements, phasing out of PIDIREGAS (infrastructure projects with deferred expenditure recording), fuel price hedging, fixed price coverage with reference price or cap); and e) implementation of a program to improve service quality and performance to international levels.
- **Strengthen policy and regulatory frameworks**. New investments will require the consolidation of policies and regulatory frameworks that increase long term certainty levels for all participants in different segments of the hydrocarbons and electricity supply chains.

Box 5: Energy: Selected Evidence and Effects

- Inadequate investments in energy infrastructure have had a significant impact on TFP growth in Mexican manufacturing (Casteñeda Sabido, 2003).
- The quality of the electricity service is poor compared to other countries. Service interruptions and voltage fluctuations affect the overall productivity levels of industries and prevent the installation of modern electronic equipment (World Bank, 2005d; IMCO, 2005a; and others).

E. Mexico Lags on ICT and Telecom, and More Competition is Needed

24. **Despite impressive ICT growth during the 1990s, Mexican investment in ICT lags behind other Latin American and OECD countries.** Mexico's level of ICT expenditure as a share of the overall economy (3.1 percent) is significantly below OECD countries such as Japan (7.4 percent), US (8.8 percent) and New Zealand (10 percent). It is also nearly half that of Chile and Brazil's rates of 6.7 percent and 6.9 percent respectively. As a growing number of studies have found,[22] countries with higher levels of investment in ICTs experience higher economic and social development growth.

25. **The ICT sector faces a number of issues, including the following:**

- Network readiness needs to be improved.
- Fixed line growth has not kept pace with comparable countries.
- There is a digital divide between urban and rural areas and between states—with Southern states particularly falling behind.

[22] See OECD (2004c), "ICTs and Economic Growth in Developing Countries."

- More competition is needed. Telmex, the incumbent, dominates the long distance, local, and cellular telecommunications markets. It provides service to over half of all dial-up internet accounts and over a third of high-speed internet access accounts. Telmex's net profit margins and earnings per share from continuing operations are more than twice that of its closest rival.
- Telephone charges are high in Mexico compared to Latin America, especially local loop prices for businesses.
- Mexico's ICT regulatory framework is weak and regulators have been reluctant to take action on controversial issues. COFETEL lacks adequate enforcement powers and independence.

26. **Private sector provision of ICT infrastructure needs to be expanded.** Although current government programs provide important contributions towards the development of a knowledge economy, they do not adequately address the most important challenge: that of dramatically increasing and expanding private sector provision of ICT infrastructure in Mexico. To do so would require a level playing field, elimination of entry barriers, healthy competition, and increased access to ICT services. The following are some recommendations to facilitate these tasks:

- **Create a level playing field through institutional changes.** Rebuilding the credibility, effectiveness, independence, and transparency of COFETEL is necessary.
- **Eliminate entry barriers and foster competition.** The licensing regime for new entrants should be simplified and streamlined. Requirements to register contracts with COFETEL for all but the incumbent should be eliminated. Legacy voice-centric regulations should be eliminated and automatic review of regulations should be required.
- **Promote equity and increase access.** Broadband deployment should be fostered and local loop costs reduced through competition. The universal access program should be strengthened. The government should undertake a consensus-building campaign on the priorities for universal access and cross-subsidies issues should be addressed.

Box 6: ICT and Telecommunications: Selected Evidence and Effects

- Countries with higher levels of investment in ICTs experience higher economic and social development growth (OECD, 2004c).
- Mexico's level of ICT expenditure (3.1%) as a share of GDP is substantially lower than Latin American countries such as Chile (6.7%), Brazil's (6.9%), Argentina (5.7%), and Peru (6.9%) (World Bank World Development Indicators, 2003).
- Business telephone charges (factoring in installation costs, monthly fees, and per minute rates) in Mexico are over 3 times greater than charges in Argentina and 4 times greater than charges in Brazil.

F. Agriculture Faces Great Challenges in Both Domestic and International Markets

27. **Agricultural performance has been lagging since the 1980s,** compared to the Mexican economy as a whole and to major regional competitors. This is despite consistently high subsides, drastic domestic reforms, and the advent of NAFTA. Mexico is still the largest provider of fresh fruits and vegetables to the United States, with 56 percent market share, but is facing share erosion in most of its 24 top export crops, losing market share to South and Central American competitors. Diversification to non-U.S. markets is minimal despite the signing by Mexico of 12 free trade agreements (FTAs) other than NAFTA.

28. **Mexican agriculture faces great competitive challenges.** As NAFTA tariff exemptions expire in 2008, Mexican producers will face renewed competition in products like maize, sugar, powder milk, and beans, while transitory support programs, like Procampo, will be discontinued, at least in principle. Also, as the United States signs FTAs with other regions and countries giving them preferential treatment, Mexico will face increasingly tougher competition in its most important export market.

29. **Key to further export growth is not so much market access as removing internal constraints.** Policy recommendations to boost exports often focus on issues limiting access to foreign markets. Mexico, however, has already quite successfully tackled market access through its aggressive bilateral negotiation strategy. For Mexico, then, further export growth requires enhancing competitiveness through increased productivity in the production and marketing chains. Efforts should include the following:

- **Targeted promotion to diversify and expand Mexican export markets.** Targeted assistance instruments could include export credit guarantee programs, export incentive programs for specific high priority products and markets, market research assistance, product and market specific export counseling, and assistance with documentation and other export requirements.
- **Improvement in irrigation**. This is not limited to just hydraulic infrastructure but also includes institutional strengthening to improve the technical, administrative, and financial management capacities of the water sector to improve irrigation efficiency. Since water scarcity is a great problem in major agricultural areas, and agriculture is the dominant user of water, water saving techniques need to be encouraged to raise water productivity.
- **Increased public investments in trade-related transport infrastructure.** Particular targets would include the following: additional bridges, access roads, and rail lines to cross the border; additional commercial inspection facilities; the modernization and expansion of Mexican port facilities; updating and expansion of intermodal transportation facilities; improved highways to handle the rapidly growing truck traffic; and speedier customs clearance procedures.
- **Increased public investments in agricultural research and extension.** Critically needed are investments in research and extension to adapt and disseminate technologies developed in other countries; also critical is the generation of new technologies adapted to the conditions of Mexican resource endowments, particularly for small and medium-sized agricultural and agribusiness firms.
- **An enhanced market intelligence system.** In Mexico the generation and flow of information needed by agricultural producers and agribusinesses is not keeping pace with the growth of globalization. Although much has been done to enhance market information, a large segment of Mexican agricultural producers and agribusinesses still lack access to critically needed information to manage their risks and make sound production and marketing decisions.
- **A better functioning land market.** Despite important reforms since 1992, legal restrictions on *ejido*[23] and community lands still interfere with land allocation and transfers, and in low value areas transactions involving outsiders are still scarce.
- **A more efficient and effective National Health and Food Quality Service (SENASICA).** Additional and stable resources to support the operations of SENASICA would greatly improve Mexico's effectiveness in responding to food safety and sanitary and phytosanitary (SPS) problems,[24] and prevent hazards more effectively.

[23] An *ejido* is a land-owning peasant community or the land owned collectively by the members of such a community.

[24] Sanitary (human and animal health) and phytosanitary (plant health) measures ensure that food is safe for consumers and prevent the spread of pests or diseases among animals and plants.

Box 7: Agriculture: Selected Evidence and Effects

- Agriculture as a share of the total Mexican economy shrank from over 8% in the pre-NAFTA era to 5% in 2004.
- Out of the top 24 export agricultural commodities from Mexico to the United States, only 9 are increasing market share. The rest are losing market share to competitors.
- Negative net trade balance (exports minus imports) for agriculture deepened from $211 million in 1991/93 to $1.3 billion in 2001/03.

III. MOVING TOWARD THE INNOVATION-DRIVEN STAGE OF DEVELOPMENT

30. If Mexico wants to advance beyond competing solely based on efficiency and move to the innovation-driven stage of development, it needs to invest more and more effectively in a) innovation; b) quality; and c) education and training. Improvements in these areas are being supported by Bank operations,[25] but further progress is necessary. Such progress will allow Mexico to engage in higher value-added activities that are based on innovative products and processes, placing the country on a more equal footing with its OECD brethren and allowing it to achieve faster growth in order to secure strong job creation and significant poverty reduction.

A. INCREASED INNOVATION AND TECHNOLOGY DEVELOPMENT AND BETTER LINKS TO THE PRIVATE SECTOR ARE ESSENTIAL FOR PRODUCTIVITY INCREASES AND FASTER GROWTH

31. **Innovation is a major driver of economic growth and productivity.** Roughly half of cross-country differences in per capita income and growth are driven by differences in total factor productivity (TFP), generally attributed to technological development and innovative capacity.[26] These should be understood in a broad sense, referring not only to the ability to engage in research and development (R&D) activities, which eventually may or may not be transformed into new outputs, but also to the efficient use of modern operating technologies and to the adoption and adaptation of new ones.

32. **The Mexican innovation system performs below par compared with economies of its income level, and it has a low ability to translate investments into innovation.** Private investment in R&D, both as a proportion of GDP and as a percentage of total national R&D expenditures, is very low. Other indicators linked to innovation such as licensing expenditures, patent count, and so on are also low given its level of GDP per capita.

33. **Several steps need to be taken to develop a coherent innovation system with stronger and more credible institutions, a more active role for the private sector, and stronger academic-industry linkages.** Efforts should focus on the following:

- **Institutional strengthening.** The strengthening of funding mechanisms and incentives for the National Innovation System across all areas and levels of government should be continued. Even though there has been some progress through the creation of the sectoral and mixed funds, synergies and complementarities need to be further exploited. Promoting the effective development of national and international knowledge networks is also needed.

[25] The MX Competitiveness DPL I, the MX Innovation for Competitiveness APL I, MX Basic Education APL III, MX Education Quality APL and MX Tertiary Education APL I, .
[26] Hall and Jones (1999), Dollar and Wolf (1997).

- **Educated and incentive driven increases in funding.** Programs should be scaled up through consolidation and funding, particularly those that emphasize technology upgrading and development; formation of the venture capital industry through programs such as those recently launched by CONACYT should be speeded up. The pace of scaling up and speeding up should be based on performance results. Programs that support demand need to be complemented by the strengthening of the regional infrastructure that provides technological services.

- **Monitoring and Evaluation program.** The portfolio of programs aimed at the consolidation and reallocation of funding should be reassessed in order to strengthen their effectiveness, coherence, alignment with objectives, and rationale. It is key that all such reassessment should be based on proper evaluation.

- **Facilitating interactions between R&D institutions and industry**. Although the Program of High Value-Added in Businesses with Knowledge and Businessmen (AVANCE) and the consortia programs can be viewed as entry points for facilitating such interactions, more efforts are needed. To make science more relevant to industry requires providing more funding to enhance such links. It will also require a review of the intellectual property rights system and the establishment of a framework for public institutions to reward staff for success in productive research.

- **Strengthening state-level sub-systems for innovation.** This can be done by improving the design and implementation of decentralized funds; emphasizing the roles played by the state-level science and technology councils; developing capacity at state level and in the economic development agencies; and expanding the collaborative R&D networks in order to establish regional innovation clusters.

- **Supporting internationalization policies.** Projects to strengthen the integration of Mexican innovations into the global system should be financed; and successful Mexicans working abroad should be engaged in an international knowledge network.

Box 8: Innovation: Selected Evidence and Effects

- Roughly half of cross-country differences in per capita income and growth are driven by differences in total factor productivity (TFP), generally attributed to technological development and innovative capacity (Hall and Jones, 1999; Dollar and Wolf, 1997).
- Calculations suggest a social return on R&D of 60% in Mexico (Lederman and Maloney, 2003a).
- Mexican firms invest a little above 0.1% of GDP in R&D, compared with 1.5% in the OECD area.

B. Pressing Improvements to Mexico's Quality System are Needed

34. **Quality systems contribute to economic development in a number of ways**. Standards, which are at the heart of quality systems, lower transaction costs since they communicate reliable and consistent information regarding the characteristics and quality of products and processes to consumers. By allowing consumers to differentiate products of different quality, they reduce asymmetric information and promote the creation of high-quality markets. They also enhance competition by allowing easy comparison of products and services conforming to a given standard. Standards embody technology and act as a channel for technology transfer for the institutions and firms that adopt them. This raises national productivity and competitiveness.

35. **Mexico's quality system presents many deficiencies.** Mexico's quality system, composed of a standardization system, a metrology institute, a national accreditation system, certification, testing, and inspection bodies and calibration labs, needs a major overhaul as listed below:

- **Mexico needs to further develop its metrology and calibration services, which serve as a public good.** Since the costs to develop high-level metrology services significantly outweigh the income received from providing such services in Mexico, public funding is necessary. So far, the National Metrology Center (CENAM) has developed a robust set of measurement standards, but there are some gaps. Meanwhile, low-level metrology services can be attractive to the private sector, which has developed a high geographic concentration of testing labs and inspection bodies around Mexico City, Prices for conformity evaluation services are relatively high.

- **Mexico needs to solve many problems with its institutional framework for defining and presenting standards.** Standards that require physical or chemical measurements frequently do not include adequate consideration of measurement characteristics needed to produce the required level of confidence. As a result, the standards can become non-viable. Consultative committees and standardization bodies do not have strong enough ties to science and technology institutions. A mechanism to conduct cost/benefit analyses of standards has not been developed and therefore the mandatory review of standards every five years often occurs without any information about the impact of standards.

- **Mexico's accreditation system needs to reduce costs, possibly through increased competition.** Mexico's market size and subsidies to the Mexican Accreditation Entity (EMA) have discouraged the emergence of competitors and led to high prices. Furthermore, the EMA's mix of public and private origins has led to a complex governance structure and slow decision-making.

- **Other problems:** To minimize technical barriers to trade, national conformity assessment procedures should be harmonized across countries. The EMA also faces challenges related to international recognition, domestic promotion, and meeting domestic demand.

Box 9: Quality: Selected Evidence and Effects

- A study on Germany found that standards contributed to about 0.9 percentage points out of an average overall growth rate of 3.3% in the period 1960–1990 (Jungmittag, Blind, and Grupp, 1999).
- Adopting 100 additional British standards raised the UK export to import trade ratio by about 14% (Swann, Temple, and Shurmer, 1996).

C. Better Education Quality, Expanded Adult Education Programs, and Improved Training Programs are Needed

36. **Quality needs to be at the top of the education agenda**. Enrollment is low in secondary and tertiary education and the system produces students with poor skills. Hence, quality and relevance become an important factor for keeping children in school at the secondary and tertiary levels and linking education more closely to the job market.

37. **School autonomy, accountability, and assessment need to be promoted**. Mexico needs to continue efforts to move decision-making to the schools. Parental involvement is required to help make schools accountable, and performance needs to be assessed and fed back into the system at the school level.

38. **Private financing is needed to overcome the gap in tertiary education**. Expansion through public investment is fiscally unsustainable in Mexico given that taxes are only 11 percent of GDP. Public financing needs to be redirected to provide financial aid to poor students and the broad availability of (income-contingent) student loans would facilitate increased private investment in tertiary education.

39. **More resources are needed to continue the expansion of adult education.** The National Institute of Adult Education (INEA) offers secondary education certificates programs.[27] INEA students come from poor and vulnerable groups, such as women, youth, and indigenous peoples. In order to expand program coverage, INEA would need additional fiscal resources, improved internal efficiency, and the introduction of incentives to increase effective demand. The government is already pursuing some of these initiatives, but more needs to be done.

40. **Small and medium enterprises (SMEs) comprise a huge part of the Mexican economy, and worker skills and training play a key role in their success.** SMEs make up 99 percent of enterprises in Mexico, employ 64 percent of the workforce, and account for over 40 percent of GDP. These firms face many difficulties, perform below the level of their larger counterparts, and rarely export their goods and services. An assessment by the Secretariat of Economy (SE) identified lack of access to financing and skills as the main weakness of SMEs. The mortality rate of SMEs is high—200,000 SME are created every year but only 70,000 (35 percent) survive two years later. The firms that fail report lack of training and expertise in their workforces as key reasons for their failure.

41. **Impact evaluations of SME training programs are needed.** The historical proliferation of SMEs support services in Mexico and the absence of reliable information on their effectiveness, suggests that it is necessary to take stock and formulate a new and comprehensive strategy for supporting SMEs before considering program expansion. To collect the necessary data, federal funds should be allocated to expand the ENESTYC (National Survey of Employment, Wages, Technology, and Training) training module that covers not only manufacturing but also services and commerce sectors. Once this comprehensive database is available, rigorous cost-benefit analyses of the larger training programs for SMEs could be carried out. The results of these evaluations would provide the basis for a national training policy for SME workers and provide incentives for private sector worker training investments.

Box 10: Education and Training: Selected Evidence and Effects

- Less than 1% of Mexican students perform at the highest level of international student assessments (PISA Level 5) in either reading or math, while more than half perform at Level 1 or less in both (PISA, 2003). These numbers are quite low given Mexico's income levels.
- In 2000, 24% of Mexican adults lacked secondary education, even though they had completed primary schooling.
- Complete secondary education increases the probability of being employed in the formal sector by 13% for men and 10% for women, while hourly wages increase by almost 64% for men and 65% for women (World Bank, 2004e).
- Only 35% of new SMEs survive more than 2 years, and the firms that fail report lack of training and expertise as key reasons for their failure (Secretariat of the Economy-Mexico, 2001).

IV. ADDRESSING SUB-NATIONAL DIFFERENCES

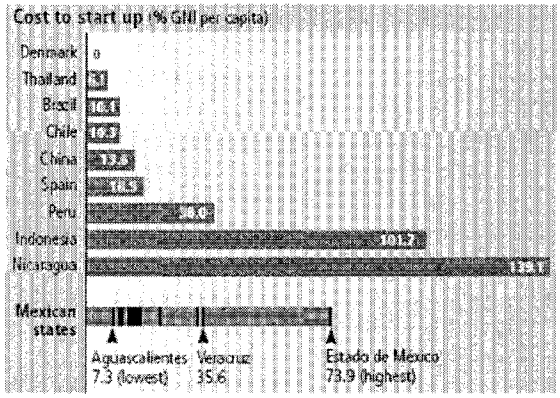
42. **There are substantial differences in competitiveness across states in Mexico**. Although competitiveness is usually analyzed at the national level, it is important to recognize that there is a wide

[27] Secondary education certificates are considered the equivalent of a secondary education.

variety in the competitiveness levels of different cities and states. Studies by the World Bank's Foreign Investment Advisory Service (FIAS)/Doing Business and IMCO highlight these differences, suggesting regional priorities for reforms. Sub-national analysis is particularly relevant given that state and local governments have jurisdiction over many investment climate reforms, including procedures to open a business, register property, and enforce contracts.

43. **When ranked globally on the cost of starting a business, Mexican states vary significantly** (Figure 5). Aguascalientes is the least costly—7.3 percent of state income per capita—and still it ranks 33rd globally in cost to startup. Jalisco follows, costing 10.9 percent, at 52nd place, behind Gabarone (Botswana) and Santiago (Chile). Estado de México ranks lowest at 127th place—far behind Lima (Peru) and Guatemala City. However, it is less expensive to start a business in any of the Mexican states than in Jakarta or Managua.

Figure 5: Business Start-Up Cost in Mexico and other selected economies



Source: *Doing Business* database

44. **According to the Mexican Competitiveness Institute (IMCO), the possibilities for improvement are substantial, but vary across states.**[28] A 10 percent improvement in each of IMCO's competitiveness factors would result in an increase in investment per worker of 89 percent on average. However, this average masks considerable variation across states: the state with the maximum gain would experience an 841 percent increase in investment, while the state with the minimum gain would only see a 12 percent gain. Surprisingly, it is not always the worst ranked states that stand to gain the most.

45. **Benchmarking at the sub-national level can spur competition and generate needed reforms.** Mexico City and the 12 states, of the sample, vary dramatically on Doing Business indicators, with Aguascalientes outperforming the rest (Table 2). But a big gap remains between Mexico's best and the ease of doing business in Bangkok or Johannesburg. Similarly, IMCO showed a large variation in investment and competitiveness factors across states. States may look for best practices within Mexico—for example, by introducing online procedures to register businesses or property as in Aguascalientes—while also aiming for the pace and nature of reform in countries like Colombia, Vietnam, or Georgia. Establishing benchmarks at the sub-national level allows reformers to focus on the main constraints to economic growth. Pressure to reform can come from contrasting how different localities implement identical national level regulations. Much of the inefficiency is in local administrative procedures, which

[28] IMCO's work was supported by this AAA and mirrors analysis by IMCO at the national level (described in the background studies for this AAA report). The study measures over 100 indicators in the 10 areas considered key to competitiveness.

can be changed by a governor or a mayor. And as the news about reforms spreads, there is increased interest to replicate success stories.

Table 2: Doing business in Mexico: where is it easiest?

1 Aguascalientes (Easiest)	8 San Luis Potosí
2 Guanajuato	9 Coahuila
3 Chihuahua	10 Mexico City
4 Jalisco	11 Estado de México
5 Nuevo León	12 Puebla
6 Veracruz	13 Querétaro (Most difficult)
7 Yucatán	

Source: *Doing Business* database.

Box 11: Sub-national Competitiveness: Selected Evidence and Effects

- Aguascalientes ranks 33rd globally in the costs to start a business, while the Estado de Mexico ranks 127th (World Bank, Doing Business database).
- The impact on investment per worker of a 10% improvement in competitiveness variables ranges from 841% to 12%, depending on the Mexican state (IMCO, 2006a).

V. DOUBLING MEXICO'S PER CAPITA INCOME IN 10 YEARS

46. **Competitiveness improvements could allow Mexico to double its income in ten years, as a number of countries have recently done.** As shown in Table 3, the time necessary for countries to double their income has been steadily decreasing. Particularly impressive has been the fast growers since World War II—for example Japan, China, Thailand, Botswana, Ireland, and Chile.

Table 3: Time to Double Income

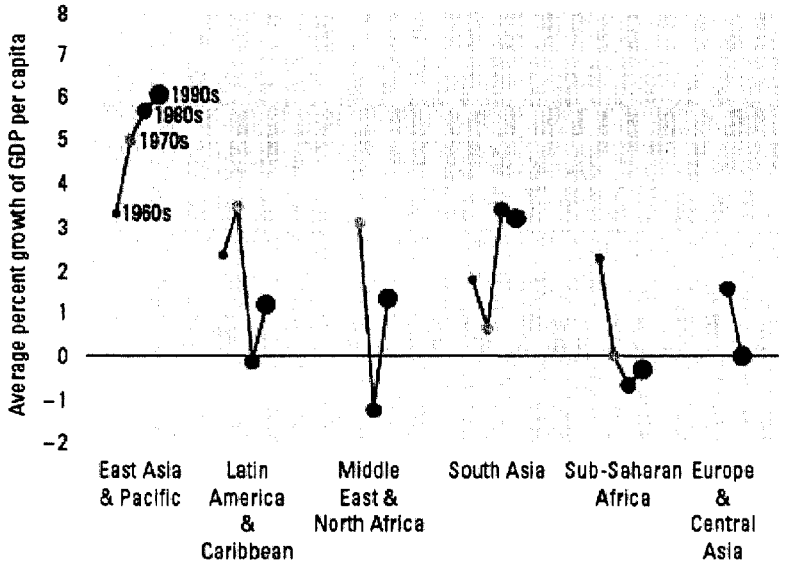
Pre-industrial	350 years
Britain (1780-1830)	175 years
Britain in 19th century	65 years
Fast growers since WWII (Japan, China, Thailand, Botswana, Ireland, Chile…)	10 years or less

Source: World Bank (2005j).

47. In order to double GDP per capita over a decade, annual GDP per capita growth rates of at least 7 percent are necessary. Figure 6 shows that the East Asian and Pacific region nearly attained this rate during the 1980s and 1990s, posting average GDP per capita growth rates of close to 6 percent. Meanwhile, Latin America has lagged substantially behind the East Asian performance, and Mexico is no exception.[29] Yet, the fact that other countries have recently doubled their incomes provides grounds for optimism that Mexico can do the same. However, to do so it is necessary to continue boldly addressing competitiveness constraints in Mexico.

[29] Real average GDP per capita growth rates for Mexico were 0.5 percent, 0.6 percent, and 0.2 percent greater than Latin American averages during the 1970s, 80s, and 90s respectively (World Bank, World Development Indicators).

Figure 6: Average Growth of GDP per Capita



Note: Data for the Europe and Central Asia Region begin in the 1980s.
Source: World Bank, World Development Indicators (as reported in World Bank, 2004a).

48. **Doubling per capita income can have a tremendous impact on poverty.** Evidence shows that countries experiencing higher rates of economic growth can be expected to reduce poverty faster (see left panel of Figure 3). For example, over the 1981–2000 period, China's poverty rate fell from more than 50 percent to about 8 percent, thanks to an impressive per capita growth rate of almost 8.5 percent a year. Similarly, between 1993 and 2002 Vietnam cut its poverty rate in half, from about 58 percent to about 29 percent, by growing at almost 6 percent a year.[30]

49. In technical terms, cross-country analysis has demonstrated that the average total elasticity of poverty with respect to economic growth is -2.4. This implies that, without controlling for any characteristics of the country, 1 percentage point growth in a country's mean income can be expected to reduce the incidence of poverty in that country by about 2.4 percentage points.[31] There is evidence that relatively high income inequality in Mexico—in 2002 the Gini index was 0.49—could cause the country's true elasticity of poverty with respect to growth to be closer to -1.6 or -1.7.[32] Even based on the lower inequality-adjusted elasticity, doubling per capita income could theoretically eliminate poverty

[30] Perry and others (2006).
[31] World Bank (2005g) based on an updated Ravallion and Chen (1997).
[32] This is the author's calculation based on Lopez and Servén's (2005) growth elasticity of poverty estimates, as cited in Perry et al (2006). The Lopez and Servén formula determines growth elasticity according to a country's per capita income, poverty line, and Gini coefficient. For Mexico, the author used the following 2004 data: Rural moderate poverty line per capita (US$ per month) $90; urban moderate poverty line per capita (US$ per month) $135; GNI per capita (US$ per month) $564; rural population (% of total) 24%; urban population (% of total) 76%; total population 103,795,200; share of rural population in moderate poverty 57%; share of urban population in moderate poverty 42%. This data enabled us to calculate a national moderate poverty line of $121 per capita per month (this number is weighted by rural and urban shares). Hence, GNI per capita / poverty line = 4.6. According to the Lopez and Servén table, this would equate to a growth elasticity of poverty between -1.6 and -1.7. Data sources include World Bank, World Development Indicators (population and GNI data); World Bank (2005k) for poverty data; World Bank (2005g) for the Gini coefficient.

altogether. Although this is probably unlikely, it is clear that large growth gains from increased competitiveness would lead to plummeting poverty rates.

VI. BUILDING ON PROGRESS TO DATE

50. **The Government of Mexico has recognized that competitiveness is a top priority, and as a result, numerous positive steps have been taken to date.** These actions have often been part of Mexico's Competitiveness Agenda 2004–2006 (which this AAA helped define and implement). Many prior and planned future actions are also supported by the Competitiveness Development Policy Loan (DPL), which was an offshoot of this AAA and approved in March 2006. The left side of Table 4 details some examples of prior and planned actions of the Government of Mexico in areas of the DPL that coincide with the themes of this AAA. The right side of the table contains a summary of the objectives for moving forward that are covered by this AAA report.

Table 4: Selected GOM Actions and Objectives for Moving Forward

	SELECTED PRIOR AND FUTURE ACTIONS SUPPORTED BY THE COMPETITIVENESS DPL	OBJECTIVES FOR MOVING FORWARD
MAXIMIZING EFFICIENCY		
Competition	▪ Establish Cooperation Agreements in 15 states and with COFEMER, CRE, and PROFECO (Done); ▪ Approve the proposed amendments to the Federal Law on Economic Competition by the Congress (Anticipated).	▪ Increase the effectiveness of detecting and sanctioning monopoly practices. and allow for preventive measures; ▪ Enhance the CFC's collaboration with different regulatory agencies and states through harmonization agreements and/or align jurisdiction; ▪ Improve the deterrent effects of the existing Federal Law on Competition Policy, by improving level and collection of sanctions; ▪ Increase public support for competition policy; ▪ Develop and approve the regulation corresponding to the amendments to the Federal Law on Competition Policy.
Trade Facilitation and Logistics	▪ Reduce tariffs between 3 and 10 points on more than 9,000 tariff lines in the Mexican tariff schedule (Done); ▪ Simplify requirements for exporters to import inputs (Done); ▪ Implement "Operation Paperless" for operation reports, import license applications, etc., and include other agencies in the program (Ongoing); ▪ Modernize and improve port inspections and customs facilities and procedures (Ongoing).	▪ Lower tariffs and non-tariff barriers further and reduce the dispersion of tariff rates (consolidation at a few levels); ▪ Expand use of information technology and reduce regulation to help lower trade costs; ▪ Improve key internal corridors and logistics centers ▪ Enhance customs efficiency; ▪ Strengthen the organization of firms' supply-chains
Regulation	▪ Implement the SARE (Rapid Business Opening System) in 85 municipalities (Done), plus 15 more (Planned); ▪ Evaluate 355 Regulatory Impact Assessments (RIAs) in 2005 (Done); ▪ Design instruments and a methodology to measure the performance of the SAREs and of the RIAs (Planned).	▪ Eliminate or improve procedures that impose unnecessary large burdens on entrepreneurs; ▪ Streamline business interaction with government, so as to reduce uncertainty and implementation efficiency issues; ▪ Strengthen public consultation; ▪ Better harmonize regulation between the different jurisdiction levels; ▪ Expand the implementation of the SARE, and create a system to measure the SARE's effectiveness and monitor its implementation; ▪ Reinforce the RIA process in federal institutions, as well as create a monitoring and evaluation framework for RIAs; ▪ Increase cooperation with sub-national jurisdictions and the private sector to keep improving regulations at all levels.

	SELECTED PRIOR AND FUTURE ACTIONS SUPPORTED BY THE COMPETITIVENESS DPL	OBJECTIVES FOR MOVING FORWARD
Energy	▪ Issue a status report on quality and performance indicators for the electricity sector (Done); ▪ Establish a program for the evaluation of performance indicators for PEMEX (Done). ▪ Publish cost, management, quality of service indicators for the electricity sector and performance indicators for PEMEX (Planned); ▪ Publish agreement by SENER with regulatory accounting elements (Planned).	▪ Lower fiscal dependence on oil revenue; ▪ Initiate national dialogue; ▪ Modernize the energy sector and reduce dependence on fuel imports, including: ▪ a sound program of investments and capital expenditures; fuel diversification strategies; ▪ taking advantage of private sector investment interests; ▪ innovative instruments to lower fuel price and availability risks, and; ▪ a program to improve service quality and performance to international levels; ▪ Strengthen policy and regulatory frameworks.
ICT and Telecom		▪ Expand private sector provision of ICT infrastructure; ▪ Create a level playing field through institutional changes; ▪ Eliminate entry barriers and foster competition; ▪ Promote equity and increase access.
Agriculture		▪ Target promotion activities to diversify and expand Mexican export markets; ▪ Improve irrigation; ▪ Increase public investments in trade-related transport infrastructure; ▪ Increase public investments in agricultural research and extension; ▪ Enhance the market intelligence system; ▪ Improve the functioning of the land market; ▪ Make SENASICA more efficient and effective.
MOVING TOWARD THE INNOVATION-DRIVEN STAGE OF DEVELOPMENT		
Innovation	▪ Launch and operate Program AVANCE to promote technological innovation (Done); ▪ Create a National Business Incubation System (SNIE) and Acceleration Program (Done); ▪ Initiate programs to improve linkages between the science community and businesses (Planned); ▪ Build consortia and technology networks program (public-private partnerships) (Planned).	▪ Strengthen institutions; ▪ Increase funding in an educated and incentive-driven manner; ▪ Implement monitoring and evaluation programs; ▪ Facilitate interactions between R&D institutions and industry; ▪ Strengthen state-level innovation sub-systems; ▪ Support internationalization policies.

	SELECTED PRIOR AND FUTURE ACTIONS SUPPORTED BY THE COMPETITIVENESS DPL	OBJECTIVES FOR MOVING FORWARD
Quality		▪ Further develop metrology and calibration services; ▪ Solve problems related to the standards institutional framework; ▪ Reduce costs within the accreditation system, possibly through increased competition.
Education and Training	▪ Contract a study to evaluate the impact of the PAC training program (Done) and implement the study's recommendations (Planned); ▪ Issue 200,000 secondary education certificates during 2005 to out-of-school population (Done).	▪ Ensure that education quality is at the top of the education agenda; ▪ Promote school autonomy, accountability, and assessment; ▪ Encourage private financing to overcome the gap in tertiary education; ▪ Increase resources necessary to continue the expansion of adult education; ▪ Implement impact evaluations of SME training programs.
Sub-national	See Competition and Regulation sections above: ▪ Establish Cooperation Agreements in 15 states and with COFEMER, CRE, and PROFECO (Done); ▪ Implement the SARE (Rapid Business Opening System) in 85 municipalities (Done), plus 15 more (Planned).	▪ Continue benchmarking at the sub-national level to identify region-specific constraints; ▪ Focus on removal of such constraints, which could fall in the above subject areas or others.

I. MAKING COMPETITIVENESS A PRIORITY; BUSINESS AS USUAL WILL NOT WORK

1. **Can Mexico compete?** This question has dogged Mexico in recent years thanks to modest growth and productivity numbers, a declining share of the U.S. import market, and increasing competition from lower-wage economies such as China. The objective of this report is to inform policy makers, the private sector, and the public at large about competitiveness priorities and shortcomings in Mexico, and to point out the way forward on improving competitiveness. The report highlights constraints to competitiveness and identifies key high impact areas of action aimed at maximizing Mexico's efficiency potential, generating jobs, and moving the country to a more innovation-driven stage of development. The report draws on a series of focused analytical pieces conducted for Phases 1 and 2 of the Programmatic Analytical and Advisory Activities (AAA); it is also based on extensive World Bank evidence and expertise on competitiveness issues in Mexico and beyond.[33] The report also recognizes that the Fox administration has taken important steps that have laid a solid foundation for future efforts. Yet, improving competitiveness is a long-term challenge that the next administration will face over the coming years.

2. The key policy messages that arise from this work are as follows:

I. To secure strong job creation and significant poverty reduction in Mexico, increasing competitiveness should be a priority and business as usual will not work. Competitiveness improvements could allow Mexico to double its GDP per capita in ten years, as a number of countries have recently done.

II. Mexico needs to maximize its efficiency potential by a) encouraging competition between firms, b) facilitating trade and reducing logistic costs, c) improving business regulation and the investment climate, d) strengthening the energy sector, and e) improving the information and communications technology (ICT) and telecommunications sector. Special emphasis is needed to improve and transform the agriculture sector.

III. To advance to the innovation-driven stage of development, Mexico needs to boost innovation and strengthen quality, education, and training (Box 12).

IV. Competitiveness priorities differ at the sub-national level and active reform at this level is necessary.

Box 12: Stages of Development: Factor-, Efficiency-, and Innovation-Driven

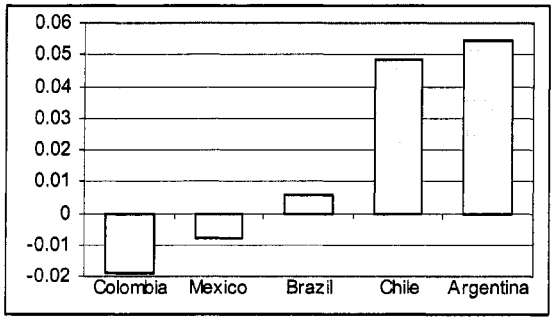
The efficiency and innovation-driven stage concepts come from the World Economic Forum (WEF 2005a), where Mexico is classified as being in the efficiency-driven stage along with Argentina, Brazil, and Chile, for example. At the efficiency-driven stage, firms increase productivity by adopting efficient production practices. Among the countries in the first stage—the "factor-driven stage"—where firms compete on price by taking advantage of cheap capital, labor, and energy factors, are China, India, and Bolivia. At the innovation-driven stage, firms need to produce innovative products using sophisticated production methods (e.g., Finland, Germany, and Japan).

[33] Annex 1, Annex 2, and the background studies contain descriptions of the World Bank's program to increase Mexico's competitiveness.

STRONG MACROECONOMIC MANAGEMENT BUT RELATIVELY LOW GROWTH

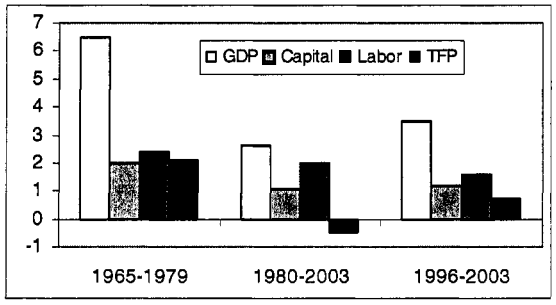
3. **Mexico has shown lackluster growth and productivity performance in recent years.** Over the last decade, Mexico has benefited from a relatively stable economy and has avoided the pattern of financial crises that have plagued many of its past political cycles, thanks in large part to prudent fiscal and monetary policies. Despite this stability, structural economic constraints have held back growth and therefore poverty reduction. Growth rates have been particularly low over the last decade when compared with countries at similar income levels in East Asia. While real GDP per capita in Mexico only grew at an annual rate of 1.2 percent between 1994 and 2004, it grew at 7.7 percent in China, and at 5.9 percent on average in the East Asia and Pacific region. Productivity growth rates have also been modest. Annual labor productivity growth was negative in Mexico between 1990 and 2004 (Figure 7), in sharp contrast to strong positive growth rates in Chile and Argentina. The share of growth attributable to total factor productivity was also negative on average between 1980 and 2003, although there has been a slight increase since 1996 (Figure 8).

Figure 7: Annual Labor Productivity Growth, Early 1990s to Early 2000s



Note: Argentina: 1991–2001; Brazil: 1990–2002; Chile: 1990–2003; Colombia: 1996–2000; Mexico:1990–2004.
Source: Multiple, compiled by World Bank (2005c).

Figure 8: Growth Accounting in Mexico, 1960–2003 (Contributions to GDP Growth in percent)

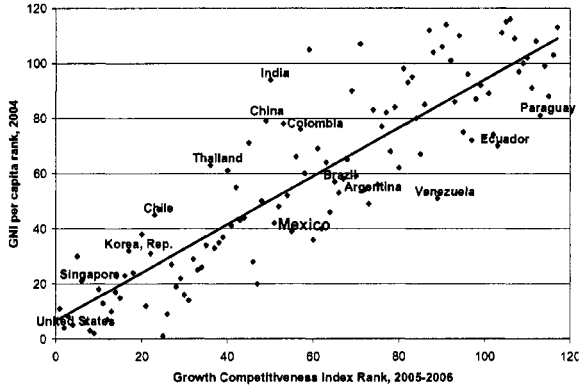


Note: Numbers are for real GDP growth (not GDP per capita).
Source: Faal (2005).

4. **Given the productivity numbers, it is not surprising that comprehensive competitiveness measures show Mexico to be weak—underperforming—relative to per capita income and not improving** [34] The World Economic Forum's 2005–2006 *Global Competitiveness Report* gives Mexico a rank of 55 out of 117 countries, down from 48 in 2004.[35] In comparison, Mexico's gross national income (GNI) per capita rank within that same sample of countries is 39. Although this gap between income and competitiveness rankings is not atypical for Latin America, it indicates that Mexico is falling well short of its potential. In contrast, Chile, India, China, and other East Asian economies enjoy competitiveness rankings that exceed their income placing (Figure 9). The World Bank's *Doing Business in 2006* reports similar findings. Mexico ranked 73 (out of 155 countries) on the publication's "Ease of Doing Business" scale, compared with an income per capita rank of 38.

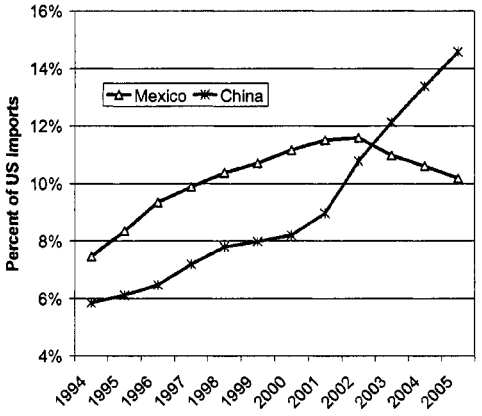
[34] Competitiveness is broadly defined as the "collection of factors, policies, and institutions which determine the level of productivity of a country and that, therefore, determine the level of prosperity that can be attained by an economy" (World Economic Forum 2005, p.xiii.).
[35] This ranking is for the Growth Competitiveness Index. Two countries (Qatar and Kuwait) that were not ranked in 2004 placed ahead of Mexico in 2005, accounting for a small part of Mexico's fall.

Figure 9 : Competitiveness versus GNI per Capita Rankings



Note: Lower-ranking numbers are better.
Source: World Economic Forum (2005) and World Bank, World Development Indicators.

Figure 10: Share of U.S. imports, Mexico versus China



Source: US Census Bureau, Foreign Trade Statistics.

5. **An often used (albeit imperfect) proxy for competition is export performance. On this basis, the weak competitiveness of Mexico's economy would be reflected in the reduction in its share of exports to the United States.** Mexico is highly dependent on the U.S. economy, which absorbs 88 percent of its total exports. After experiencing an export boom in the 1990s thanks to NAFTA, Mexico has been losing U.S. market share, particularly to China (Figure 10). Mexico's share of U.S. imports fell from a high of 11.6 percent in 2002 to 10.2 percent in 2005. During that same time period, the Chinese share went from 10.8 percent to 14.6 percent. According to the governor of the *Banco de México*, lost competitiveness has caused the economy to lose an additional US$30 billion in exports to the United States and has restrained economic growth. Particularly worrying is the fact that Mexico is losing U.S. market share in heavy goods such as furniture and household appliances, in which it should have a transport cost advantage due to its proximity to U.S. markets. While one concern is that Mexico suffers from high labor costs, this is not the whole story. A recent World Bank analysis of the computers and peripherals market found that while labor accounted for 4 percent of costs in China, it only accounted for 3 percent in Mexico. In non-leather apparel, labor accounted for 15 percent of costs in China and 20 percent in Mexico. Clearly, there are other factors impeding Mexican competitiveness.

6. **The Mexican Competitiveness Institute (IMCO) has also shown that the country is lagging.** Out of 45 economies that IMCO defines as Mexico's competitors, the country ranks in the bottom third at number 31, behind Brazil and Thailand among others. IMCO considers ten separate features to be critical to a country's competitiveness, measured as the ability of a country to attract and retain investment, local and foreign. Of those, Mexico falls particularly short on governance and legal system indicators, foundational or "precursor" sectors (transport, telecommunications, and financial services), efficient factor markets (capital, labor, and energy), human capital (education, knowledge, and innovation), and environmental sustainability. Simulations by IMCO show that if Mexico were to improve by 10 percent in all the ten features critical for competitiveness, investment could increase by as much as 60 percent. Among the ten features, five (efficient government, trade and international relations, human capital, infrastructure and governance, and legal system indicators) account for 70 percent of this increase.[36]

[36] IMCO (2005b).

7. **Reforms are needed to encourage investment.** Mexico's savings rate, at about 19 percent of GDP, is on par with the rest of Latin America, but is insufficient to provide the investment needed to boost long-term growth (Table 5). Countries that have been able to break out of low growth paths in the early stages of development, such as East Asia and Chile, typically have done so with higher rates of investment in fixed capital formation.

Table 5: Savings, Investment, and the Current Account (as percent of GDP, average 2000–2004)

	Gross national savings	Gross fixed capital formation	Current account balance
Argentina	19.2	15.0	2.4
Chile	21.4	21.6	-0.8
Mexico	**19.4**	**19.9**	**-2.0**
China	42.2	40.7	2.4
Korea	31.7	29.8	2.2
Thailand	30.3	23.5	5.7
USA	16.1	19.0	-4.6
LAC	**19.3**	**18.7**	

Note: 2004 data is missing for some countries.
Source: World Bank, World Development Indicators

8. **Aware of this predicament, the Government of Mexico (GOM) in 2003 declared increasing country competitiveness to be a key priority of the Fox Administration.** This was a response to the modest growth, employment generation, export, and competitiveness indicators as well as concerns about the country's ability to respond to the pressures imposed by advancing globalization, such as competition from China and the end of the textile quota system in 2005. The GOM has made progress in some fronts, but much more is needed if Mexico is to go beyond sound macroeconomic management and stability and achieve higher growth and productivity.

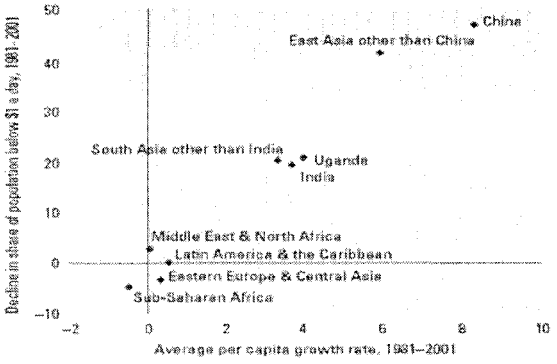
PROGRESS IN REDUCING POVERTY AND INEQUALITY, BUT NOT ENOUGH

9. **Competitiveness is important for growth and, hence, poverty reduction.** Nearly all the countries that have had long term success in reducing poverty have done so with higher rates of economic growth (left panel of Figure 11).[37] This association is also true for Mexico, where poverty reduction has tracked growth in GDP per capita over the last decade (right panel of Figure 11). Nonetheless, after experiencing robust GDP per capita growth following the 1994 Tequila Crisis, income levels have been more or less stagnant since 2000. The recent growth slowdown has meant significant lost poverty reduction opportunities, although programs such as *Oportunidades* have helped offset this trend.[38] For Mexico to breakout of its low-growth trajectory and cut poverty, it will have to boost growth and improve its productivity and competitiveness

[37] World Bank (2004a).
[38] For a complete analysis of poverty reduction in Mexico, see World Bank (2004c).

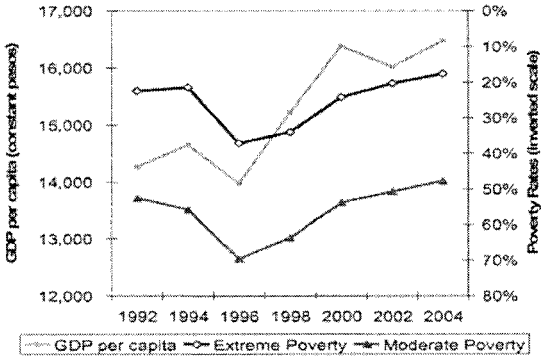
Figure 11: Poverty reduction is closely associated with growth

World



Source: World Bank (2004a)

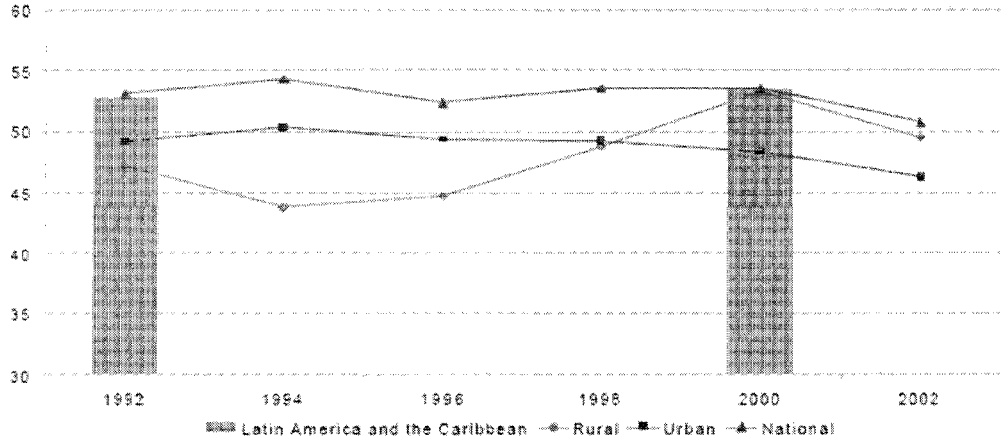
Mexico



Source: Mexico ENIGH and World Bank, World Development Indicators; World Bank calculations

10. **Mexico has made progress in many human development indicators and in the reduction of extreme poverty, but poverty and inequality remain serious issues.** Income per capita (GNI per capita) is US$6,790, among the highest in Latin America; life expectancy at birth has risen to 74 years; the under-five mortality rate dropped from 44.2 to 25 per thousand between 1990 and 2003; about 89 percent of the population has access to clean water; and the literacy rate is over 97 percent. However, despite important achievements in health and education and some progress in extreme poverty reduction over the last five years, low and inequitable growth has kept poverty rates high. The percentage of people living in extreme poverty was reduced from 24.2 percent in 2000 to 17.3 percent in 2005. Still, the Gini coefficient has hovered between 50 and 55, on par with Latin American averages (Figure 12). According to 2004 data, 47.7 percent of the country's population is poor. The richest ten percent of the population earns over 40 percent of total income, while the poorest ten percent earns only 1.1 percent.

Figure 12: Trends in Inequality (Gini Coefficient Based on Income)



Note: The Latin American averages are unweighted, there is little difference if weighted averages are used.
Source: World Bank (2004c).

ANALYTICAL UNDERPINNINGS IDENTIFY PRIORITIES

11. **An impact study conducted by the Mexican Competitiveness Institute (IMCO) identified competitiveness priority areas.** The IMCO (2005) study, which was part of Phase 1 of this AAA, develops a model to assess Mexico's competitiveness; it establishes priorities among themes in respect of their effect on investment (gross capital formation) per worker. From that model, point elasticities are estimated, giving the impact on investment per worker of a ten percent improvement in the respective independent variables (Table 6). As shown, the high-impact themes are the competition environment, taxes and tax regulations, regulatory and investment climate, education and innovation, trade facilitation, transport and logistics, corruption, finance, and energy. These impact estimates provide guidelines for priorities to be tackled in order to increase Mexico's competitiveness. In consequence, this AAA (and the Mexican Competitiveness Agenda) analyzes issues in most of those themes and provides recommendations for moving forward.

Table 6: Constraints to Competitiveness

Subject areas	Impact on investment per worker of a 10 percent improvement in the variables behind each subject area
12) Competition environment	7.5 %
13) Taxes and tax regulations	7.1 %
14) Regulatory and investment climate	6.8 %
15) Education	6.0 %
16) Trade facilitation and transport / logistics	5.8 %
17) Corruption	4.7 %
18) Innovation	3.8 %
19) Finance	3.6 %
20) Energy	2.7 %
21) Labor market	1.9 %
22) Macroeconomic environment	1.0 %

Note: The percentages are point elasticities that reflect the impact on investment per worker of a 10 percent improvement in the variables behind each subject area.
Source: World Bank extrapolation of IMCO subcomponent elasticities.

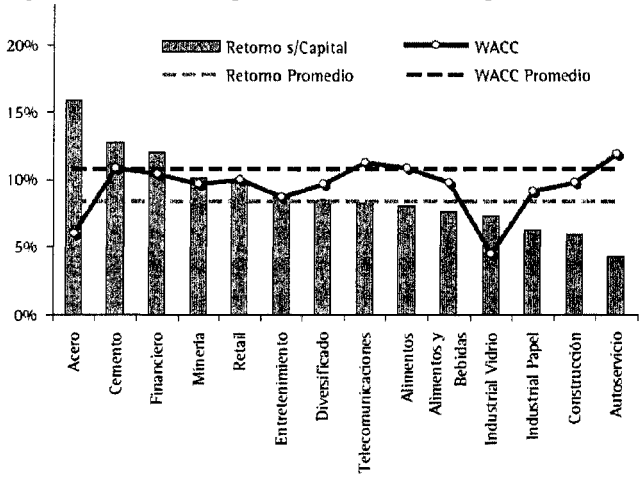
12. It should be noted that the impact numbers in Table 6 are for single effects or isolated improvements in each category. A broad package of reforms across most of the high-impact categories could have a positive bundling effect. In other words, **the interaction between the individual variables should create an overall effect that is substantially larger than the sum of the individual improvements (super additive effects).**

13. **The conclusions of the impact elasticity calculations are supported by two other relatively comprehensive (albeit "softer") reports**: a Competitiveness Focus Groups report and the World Economic Forum's (WEF) *Global Competitiveness Report 2005–2006*. The focus groups report is a World Bank report based on the written and verbal responses of over 90 business people in Mexico from a range of economic sectors in 2003. The WEF report contains information about the most problematic factors for doing business in Mexico. These sources are "soft" in the sense that they are based mostly on subjective evaluations of entrepreneurs, while the IMCO analysis is "hard" in the sense that, by and large, it uses hard factual data and provides quantitative estimates of impact. It is reassuring that the correlation between the hard and soft studies is quite high (over 80 percent).

14. **Similar conclusions regarding obstacles to competitiveness in Mexico are derived through a "growth diagnostic" conceptual framework.** This framework, developed by Hausmann, Rodrik, and Velasco (2004), aims to identify the binding constraints to growth. Although the diagnostic has not been comprehensively applied to Mexico, it does provide guidelines. The framework is based on the drivers of investment and uses a decision tree to first ask whether growth is constrained by low returns on investment, the high cost of finance (both local and international), or both. The cost of finance (reflected particularly in very limited access) is a key issue in Mexico, considering that the share of credit to the private sector as a percentage of GDP is about 17 percent, while it is 63 percent in Chile, 98 percent in Korea, and over 100 percent in many East Asian countries. This issue is addressed separately through a separate report on the financial sector.

15. Turning to the returns on capital, an analysis by IMCO shows that low returns are a large part of the story. Based on an analysis of the 33 largest companies on the Mexican stock market (BMV), IMCO found that, on average, profits did not cover the cost of capital (Figure 71). Specifically, only 6 of 14 sectors had returns that exceeded their cost of capital. Moreover even in absolute terms, the returns to capital appear low. They are in the 5–12 percent range, which is similar to the yield on government bonds in Mexico. The growth diagnosis framework provides guidance into the critical issues that are keeping those returns so low. And this AAA supports measures that ought to improve the returns to capital.

Figure 13: Cost of Capital and Returns on Capital in Mexico



Note: WACC stands for Weighted Average Cost of Capital. *Promedio* means average. The data includes the 33 companies that compose the main Mexican stock market (*Bolsa Mexicana de Valores*) index (IPC).
Source: IMCO (2005a)

16. **The growth diagnostic framework goes on to identify a number of possible drivers to low private returns on domestic investment. They include the following**: a) high micro or macro risks; b) lack of innovation and R&D; c) large externalities, spillovers, or coordination failures; d) high tax rates and/or inefficient tax structure; and e) insufficient infrastructure, high transport, energy, telecommunications or shipping costs (see **Annex 4** for a diagram of the framework). The macro environment has been stable in Mexico for the last decade, making it unlikely to be a binding constraint. Micro risks, such as from corruption and crime, could potentially be binding constraints. Indeed, they came up in competitiveness focus groups held in Mexico and the World Economic Forum's executive opinion survey. However, they are not covered in this AAA since there is another Bank analysis of this

subject.[39] Other micro risks, such as property rights and judicial reform (contractual enforcement, are handled through two other Bank instruments. Lack of R&D / innovation is certainly an issue in Mexico and is addressed by this AAA. Tax rates and regulations are seen as a constraint with significant impact, but the issue has also been looked into in another Bank analysis.[40] Constraints associated with infrastructure and transport and shipping costs are addressed in the logistics, trade facilitation, and energy components of this AAA

17. In consequence, Mexico needs to take action on various fronts: innovation and technology development, quality, training, investment climate, trade and trade facilitation, logistics, energy, ICT and telecoms, and agriculture. These subject areas, as shown, are the result both of extensive analytical work that the Bank has done for Mexico over the past two years and of other complementary studies done outside the Bank, in addition to the above-mentioned studies. Selected findings in each of the priority areas are shown in Table 7. The points are discussed in more detail in the policy area descriptions in Section III. This evidence complements the IMCO impact elasticities shown in Table 6. Detailed analytical underpinnings are provided in **Annex 3**.

Table 7: Analytical Underpinnings—Selected Evidence

Innovation and Technology Development	• Roughly half of cross-country differences in per capita income and growth are driven by differences in total factor productivity (TFP), generally attributed to technological development and innovative capacity (Hall and Jones, 1999; Dollar and Wolf, 1997). • Calculations suggest a social return on R&D of 60% in Mexico (Lederman and Maloney, 2003a). • Mexican firms invest a little above 0.1% of GDP in R&D, compared with 1.5% in the OECD area.
Quality	• A study on Germany found that standards contributed to about 0.9 percentage points out of an average overall growth rate of 3.3% in the period 1960–1990 (Jungmittag, Blind, and Grupp, 1999). • Adopting 100 additional British standards raised the UK's export to import trade ratio by about 14% (Swann, 1996).
Education and Training	• Less than 1% of Mexican students perform at the highest level of international student assessments (Programme for International Student Assessment [PISA] Level 5) in either reading or math, while more than half perform at Level 1 or less in both (OECD, 2003a). These numbers are quite low given Mexico's income levels. • In 2000, 24% of Mexican adults lacked secondary education, even though they had completed primary schooling. • Receiving a secondary education certificate leads to higher employability and higher wages (World Bank, 2004e). • Lack of access to financing and skills are the main weaknesses of Mexican small and medium enterprises (SMEs). Only 35% of new SMEs survive more than 2 years, and the firms that fail report lack of training and expertise as key reasons for their failure (Secretariat of Economy—Mexico, 2001).
Investment Climate: Regulation	• Modernizing regulatory frameworks could increase productivity by as much as 10 % in lagging sectors (Cotis, 2005). • Starting a business takes 58 days in Mexico, compared with 5 days in the United States. Dealing with licenses takes 222 days at a cost of 159% of income per capita, while it only takes 70 days in the United States at a cost of 17% of per capita income (World Bank, *Doing Business* database). • The cost of the regulatory burden in Mexico is 15% of GDP (IMCO, 2005a).
Competition	• A study of the impact of pro-competitive regulatory reform in several industries in the United States found that annual welfare gains in affected sectors were more than 7%, with 90% of the

[39] The Mexico Institutional and Governance Review.
[40] The Mexico CEM: Challenges and Prospects for Tax Reform.

	benefits flowing to consumers (OECD). • Increasing competitive pressure can increase the probability of firm innovation by more than 50% (World Bank, 2004a). • According to a survey of Mexican firms, the two largest obstacles to business development are government monopolies and private monopolies (CEESP, 2005).
Trade and Trade Facilitation **Logistics**	• Trade facilitation reforms in Mexico could increase exports by $29.3 billion, equivalent to 21 percent of total Mexican manufacturing exports (Soloaga, Wilson, and Mejía, 2006). • Mexico's global exports would have been about 25% lower without NAFTA, and FDI would have been about 40% less. Also, the amount of time required for Mexican manufacturers to adopt U.S. technological innovations was cut in half with NAFTA (Lederman, Maloney, and Serven, 2003). • Despite the gains from NAFTA, Mexico has been losing export market share within the United States in recent years. Of the top ten types of Mexican imports in the United States, only two—petroleum and total agricultural products—gained market share between 2001 and 2005 (U.S. Dept. of Commerce, see Table 33). • Export-supply capabilities in Mexico were more of a constraining factor for Mexican exports than import-demand conditions in the U.S. (Hanson and Robertson, 2005). • Logistics costs in Mexico are estimated to be 20%, while the OECD average is 9%. A reduction to 12% in Mexico would have a significant impact on economic activity and job creation (Guasch, 2004; Guasch and Kogan, 2003). • Mexico is not capitalizing on its enormous competitive advantage of proximity to the United States because logistic costs are so high: as an example, Mexico spends almost double what the United States does on transport as a percentage of GDP (IMCO, 2005a based on INEGI)).
Energy	• Inadequate investments in energy infrastructure have had a significant impact on TFP growth in Mexican manufacturing (Casteñeda Sabido, 2003). • The prices of fuels and electricity in Mexico are among the highest of the world. In contrast with other OECD and developed countries, the prices of electricity, natural gas, fuel oil and other fuels have increased over the last decade. (World Gas Intelligence, EIA, Edison Electric Institute, Eurelectric, among others). • A large portion (64 percent) of electricity subsidies are captured by the non-poor in Mexico (World Bank, 2004f). • The quality of the electricity service is poor compared to other countries. Service interruptions and voltage fluctuations affect the overall productivity levels of industries and prevent the installation of modern electronic equipment (World Bank, 2005d; IMCO, 2005a; and others).
ICT and Telecom	• Countries with higher levels of investment in ICTs experience higher economic and social development growth (OECD, 2004c). • Mexico's level of ICT expenditure (3.1%) as a share of GDP is substantially lower than Latin American countries such as Chile (6.7%), Brazil's (6.7%), Argentina (5.7%), and Peru (6.9%) (World Bank, World Development Indicators, 2003). • Business telephone charges (factoring in installation costs, monthly fees, and per minute rates) in Mexico are over 3 times greater than charges in Argentina and 4 times greater than charges in Brazil.
Agriculture	• Agricultural GDP grew only 1.3% between 1984 and 2004, while total GDP grew 3%. • Agriculture as a share of the total Mexican economy shrank from over 8% in pre-NAFTA era to 5% in 2004. • Public expenditure in agriculture declined from 13.4% to 6.9% between 1990 and 2003. • Out of the top 24 export agricultural commodities from Mexico to the United States, only 9 are increasing market share. The rest are losing market share to competitors. • Negative net trade balance (exports minus imports) for agriculture deepened from $211 million in 1991/93 to $1.3 billion in 2001/03.
Sub-national	• Aguascalientes ranks 33rd globally in the costs to start a business, while the Estado de Mexico ranks 127th (World Bank, 2006b). • The impact on investment per worker of a 10% improvement in competitiveness variables ranges from 841% to 12%, depending on the Mexican state (IMCO, 2006a).

II. MAXIMIZING MEXICO'S EFFICIENCY POTENTIAL

18. For Mexico to compete in what the World Economic Forum (2005) calls the "efficiency-driven stage" of development, Mexico needs to develop more efficient production processes and reduce costs throughout the economy. To reduce costs and improve productivity, Mexico should focus on a) encouraging competition between firms; b) facilitating trade and reducing logistic costs; c) improving business regulation and the investment climate; d) strengthening the energy sector; and e) improving the ICT and telecommunications sector.[41] These are all high impact areas, as shown in Table 6. Mexican authorities are supporting improvements in most of these areas,[42] but further progress is necessary. It is also important to address inefficiencies in the agriculture sector (f). Each of these areas is discussed in the following subsections.

IMPROVEMENTS IN MEXICO'S COMPETITION POLICY ARE NEEDED, PARTICULARLY TO FACILITATE ENFORCEMENT AND SERVE AS AN EFFECTIVE DETERRENT TO ANTICOMPETITIVE PRACTICES.

Description and Challenges

19. **Competition, and the benefits it brings with respect to lower prices, greater variety and the development of new products, has been recognized as crucial for markets to work well and for increasing the wellbeing of a society.** Policies that enhance competition are expected to bring not only static improvements in efficiency, especially in disciplining former monopolies, but also dynamic improvements in efficiency, through improvements in productivity and innovation. Recent empirical research indicates that regulation that lowers entry barriers and state control increases productivity and technological innovation, stimulates business investment, and increases long-run employment rates.[43] Therefore, reforms to enhance competition could have significant effects on growth. A study of the effect of pro-competitive regulatory reform in several industries in the United States found that annual welfare gains in the part of GDP affected by reform were more than 7 percent, with 90 percent of the benefits flowing to consumers.[44] Increasing competitive pressure can increase the probability that firms will innovate by more than 50 percent.[45]

20. **Competition enforcement is relatively recent in Mexico.** Although Article 28 of the Mexican Constitution of 1917 prohibits monopolies and monopolistic practices, competition policies and their implementation are relatively new in Mexico. It was only in 1993, during the important wave of reform of the mid 1980s, that the Federal Law of Economic Competition (*Ley Federal de Competencia Económica*) was enacted and the Federal Competition Commission (*Comisión Federal de Competencia*, CFC) was created. Regulations to the law, that defined the actual procedures that the CFC would use to implement the law, were later published in 1998.

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[41] The topic of taxes is not a subject analyzed in this report since it is the subject of the Mexico CEM: Challenges and Prospects for Tax Reform. Likewise, the topics of education, corruption and finance are addressed elsewhere through a parallel AAA on Education; an Institutional and Governance Review, and finance AAA, including an FSAP (Financial Sector Assessment Program).

[42] Some of these improvements are being supported by Bank operations such as the MX Competitiveness DPL and the MX Finance and Growth DPL series.

[43] Nicoletti and Scarpetta (2003) Nicoletti and Scarpetta (2004).

[44] OECD (2002).

[45] World Bank (2004a).

21. **The Competition Law defines a range of responsibilities for the CFC.** The Competition Law prohibits either absolute (price-fixing, output and distribution restrictions, market division, and concerted bidding in public tenders) or relative monopolistic practices if they demonstrably limit competition; the latter includes vertical market division, restrictions on resale, tied sales, exclusivity contracts, boycotts, predatory pricing, discounts, cross-subsidies, imposition of different prices or sales conditions of goods or services. The Competition Law provides administrative sanctions, including corrective conduct orders and fines, for monopolistic practice violations. The Competition Law investigates concentrations including mergers and acquisitions that combine corporations, associations, partnerships, shares, interests, assets or trusts between competitors, suppliers, customers or any other economic agents. Only large concentrations require economic agents to notify authorities prior to their completion. The CFC assesses the legality of concentrations and could sanction them by ordering partial or full divestiture and fines. The CFC also oversees State regulations and cancels them if they constitute interstate trade barriers.

22. The CFC is an independent agency of the Federal Government with technical and operational autonomy but is attached to the Secretariat of Economy for budgetary purposes. The CFC does not collect any fines but rather they are remitted to a general treasury fund. The CFC's President and four commissioners are appointed for staggered ten year terms by the President of Mexico. This provides independence since the commissioners are protected by the duration of their tenure and avoids the usual turnover during change in administration every six years. The CFC has a plenum, composed by five commissioners, of which one is the president. Resolutions of the plenum are adopted by the majority vote of commissioners, the president having the casting vote.

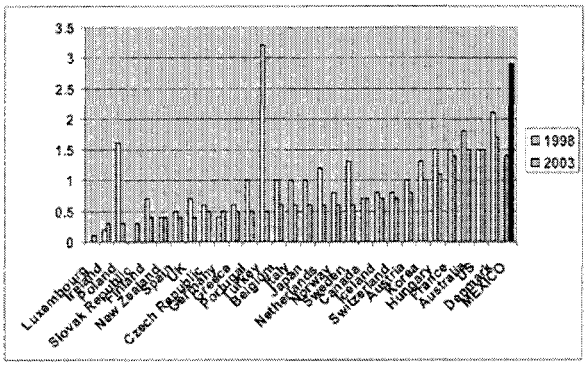
23. **A number of other agencies also play a role in ensuring competition.** In addition to the CFC, competition and consumer protection is also enforced through the Federal Consumer Protection Law by the Federal Prosecutor for Consumers (PROFECO). The objective of the Consumer Protection Law is to promote and protect consumer rights and procure equity and legal security in relationships between suppliers and consumers. Also, regulatory commissions have been established for specific economic sectors: the Federal Telecommunications Commission (COFETEL), which is a decentralized agency (órgano deconcentrado) of the Secretariat of Communications and Transportation, to regulate telecommunications; the Energy Regulatory Commission (CRE), a decentralized agency of the Secretariat of Energy, to regulate electricity and gas; the National Water Commission (a decentralized agency of the Secretariat of the Environment and Natural Resources, SEMARNAT) to administer and preserve national waters; the National Insurance and Bonding Commission to regulate insurance and bonds; the National Retirement Fund System Commission that regulates pension funds; and the Federal Regulatory Improvement Commission (COFEMER), a decentralized agency of the Secretariat of Economy, to guarantee transparency in the development and application of regulations, as well as ensure that the benefits of regulations outweigh their costs to society. The transportation sector is regulated directly by the Secretariat of Communications and Transportation. The Secretariat of Finance and Public Credit, the National Banking and Securities Commission, and the Mexican central bank regulate the financial and banking sector. Although these institutions can impose price controls to limit monopolistic power, the CFC has first to determine if there is an absence of effective competition in the market. Also, although these other "regulators" can award concessions, licenses, or permits in their regulated sector, they could only award them after the CFC has given a favorable opinion.

24. **OECD assessments show competition deficiencies in Mexico.** An OECD assessment of Mexico's competition law and policy completed in 1998[46] concluded that the law was well-conceived and that the

[46] OECD (1999), Background Report on the Role of Competition Policy in Regulatory Reform, in OECD, Regulatory Reform in Mexico.

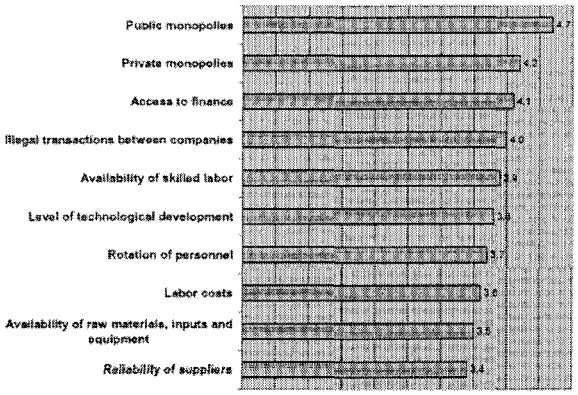
CFC had strong enforcement powers and important authority to affect direct market regulation by other agencies. There was, however, no clear base of support for competition policy, and the CFC's enforcement record could be questioned. Since then, a new review by the OECD[47] confirmed that the strengths identified in the first review still pertain, but there were now no doubts about the CFC's willingness to engage powerful economic interests. It also ascertained that the CFC had matured into a credible and well-respected agency that had compiled a remarkable record of achievement given the difficulties of its environment. It highlighted, however, the following challenges and opportunities for improvement: (i) the limited degree of general support for competition policy; (ii) certain deficiencies in statutory authority and judicial review processes that constrain the CFC's ability to address anticompetitive conditions effectively and efficiently; (iii) a decline in resources despite an increasing workload; and (iv) some of the CFC's procedures and methods of interface with other government entities that reduce its efficacy as a law enforcement agency and competition advocate. As shown in both OECD assessments discussed above, and despite Mexico having made progress in competition law and policy, there are several constraints that still limit competition. The OECD barriers-to-competition indicator—a measure of legal barriers to competition and antitrust exemptions for public enterprises—shows that this index has deteriorated in Mexico and that the country has the highest barriers to competition among OECD countries (Figure 14).[48]

Figure 14: Barriers to Competition



Note: Lower ranking numbers are better.
Source: OECD (2005c)

Figure 15: Market Obstacles to Business Development



Source: CEESP (2005).

25. **The challenges to effective competition in Mexico are reflected both in their effect on investment and on the perceptions of entrepreneurs.** According to IMCO's research on the effect of 10 dimensions of competitiveness on investment for 45 economies, Mexico ranks 33 in terms of level of competition and formality of the markets.[49] Furthermore, according to a recent governance survey, the two largest market obstacles to business development identified by firms in Mexico are government monopolies and private monopolies.[50] The Global Competition Review 2003 ranking of competition regimes in 25 countries places Mexico near the bottom with a score of 2.25, in a rating from 0-5, only

[47] OECD (2004b), "Competition Law and Policy in Mexico: An OECD Peer Review."
[48] In OECD (2005c), legal barriers to competition measure the explicit legal limitations on the number of competitors allowed in a wide range of business sectors, and antitrust exemptions measure the exemptions to competition law for public enterprises. The index is from 0 to 6 where 0 is no limitations and 6 denotes the highest limitations.
[49] IMCO (2005a), Hacia un pacto de competitividad – Situación de la competitividad de México 2004.
[50] CEESP (2005).

above Greece (2.0) and Argentina (1.5) since Mexico's competition regime is considered to be severely undercut by courts.[51]

26. **Limitations to the CFC's actions arise from two types of proceedings at the Federal Judiciary that are brought by dissatisfied parties seeking judicial relief.** These two proceedings, the *amparo* actions ("protection appeals") against the processes and resolutions of the CFC and the fiscal nullity actions at the Federal Administrative and Fiscal Justice Court,[52] can take many years to resolve and have proliferated over the years. On average it takes 401 days for these suits to be resolved, and between 1994 and 2004 the number of suits (amparos and fiscal nullity) increased from 41 to 170. (See Box 13 for a description of how amparos have prevented the enforcement of injunctions against *Telmex*.) Even if the CFC's orders survive the amparos and fiscal nullity actions, the imposed fines are not collected by the CFC but rather by the fiscal department of the municipality of residency of the fined party. From 1993 to September 2005, only 3.3 percent of the total amount fined by the CFC was collected, while 72 percent is under reconsideration and 20 percent is under amparo and fiscal nullity action.

Box 13: Shortcomings in Competition Enforcement: The Case of *Telmex*

The Federal Telecommunications Law empowers COFETEL (the telecommunications regulator) to impose specific obligations on a firm that has been declared by the CFC to have market power in a relevant market in terms of the Federal Competition Law. These obligations may include fixing rates (including price controls), quality of service, and information disclosure. However, the practical problem is that the CFC has no role in the design or content of the subsequent regulations. These regulations are the sole responsibility of COFETEL. These problems are aggravated by the abuse of the *amparo* system.

In December 1997, the CFC identified five relevant markets where *Telmex* was dominant: local telephony, local access (interconnection), national long distance, international long distance, and inter-urban transport (resale of long distance). Despite this declaration, which in theory would empower the regulator to take action against *Telmex*, COFETEL has not imposed the obligations that were issued by a previous administration. *Telmex* has avoided any sanctions by repeatedly appealing the decision.

The declaration was initially appealed before the CFC using the reconsideration procedure, but the CFC confirmed its resolution in 1998. However, *Telmex* still filed a number of *amparos* to delay the enforcement of this decision. COFETEL eventually issued a resolution establishing certain obligations for *Telmex* in 2000, but *Telmex* also appealed this resolution through another *amparo,* which delayed the entry into force of these obligations. In 2001, a judicial court annulled the original resolution of the CFC. In 2002, as a consequence of this ruling, *Telmex* was able to obtain the annulment of all acts and resolutions that derived from the original resolution. Because of this, the CFC had to restart and redo the original proceedings in order to correct the deficiencies that the judicial court had found. When the CFC finally issued a new resolution declaring *Telmex's* dominance, once again *Telmex* challenged this resolution and eventually won the *amparo* in May 2004. In August 2004, the CFC issued yet another resolution, which was likewise appealed by *Telmex*.

Source: Solano, del Villar, and García-Verdú (2006)

27. **Another important limitation of the CFC is that it lacks many powers common to competition commissions in other countries** (Figure 16). Among these is the ability to divest monopolies, undertake searches, implement leniency programs, and order preventive measures. Due to limitations in the Competition Law, the CFC is not able to prosecute and divest or impose price controls on a dominant

[51] Global Competition Review, Volume 6 • Issue 6 • June 2003.

[52] An *amparo* is a remedy against acts by any authority that violate any of the individual guarantees recognized by the Mexican Constitution. It is available in all legal matters and may be invoked in criminal, civil and administrative trials. If CFC's resolution imposes a fine, then the private party can request a review of the Federal Administrative and Fiscal Justice Court, which mostly considers tax cases, but also asserts jurisdiction to review any agency.

firm that restricts supply and raises prices. Also, without the use of search and seizure authority, it is difficult for the CFC to detect surreptitious collusion. The lack of a leniency program for the CFC restricts its ability to provide reductions in monetary penalties to conspirators who voluntarily reveal collusive agreements.

Figure 16: Powers of Selected Competition Commissions

	USA	European Union	Chile	Australia	México
Prevent agreements among competitors	✓	✓	✓	✓	✓
Prevent monopolistic practices	✓	✓	✓	✓	✓
Merger control	✓	✓	✓	✓	✓
Prevent predatory pricing	✓	✓	✓	✓	×
Monopolies divestiture	✓	✓	✓	✓	×
Undertake searches	×	✓	✓	✓	×
Implement leniency programs	✓	✓	×	✓	×

28. **The CFC has had limited coordination in the past with other regulators at the federal, state, and municipal levels.** Given the powers of the many sectoral regulators, of other agencies such as COFEMER and PROFECO, and of state and municipal entities, the CFC could improve its effectiveness by working more closely with them. The CFC could benefit from monitoring the sectoral regulator's regulatory postings and comment on them. Likewise, the CFC is not taking advantage of data available from other regulators, such as PROFECO, that could be useful in detecting collusive behavior. This collaboration and taking advantage of the possibility of exploiting synergies could also prove useful given the declining budget of the CFC. Although the number of cases has increased, the CFC's budget has fallen 9 percent in real terms between 2000 and 2004.

29. **Competition policy and the role of the Federal Competition Commission (CFC) are being strengthened.** Amendments to the Federal Law on Economic Competition—that reform 25 articles, repeal 1, and add 11 more—were approved in April 2006 and went into effect on June 29, 2006. The amendments are designed to increase the effectiveness of detecting and sanctioning monopoly practices. They classify new anticompetitive actions, increase fines and expand the capacity of the CFC to divest the assets of firms that engage in anti-competitive practices, in cases where they have not complied with previous orders; undertake verification visits; implement leniency programs; and order preventative measures.

30. **Other CFC actions include strengthening of internal procedures, cooperation agreements with other institutions, and actions to build general support for competition policy.** See Mexico

Competitiveness Development Policy Loan, Report No. 34570-MX for a full description of these activities.

Moving Forward

31. **Mexico needs to improve its competition policy through a variety of actions.** To improve the CFC's ability to address anticompetitive conditions and improve the effectiveness of competition policy, actions are needed that will do the following: increase the general support for competition policy, remove the constraints in statutory authority and judicial review processes, make more efficient use of the CFC's declining resources, and enhance the CFC's collaboration with other government entities. These areas are based on the various reviews of competition law and policy in Mexico, empirical evidence, and an assessment by the Bank. If appropriate actions are taken, substantial gains are possible: according to IMCO's research, a 10 percent improvement in the variables that compose the competition dimension could increase investment per worker in Mexico by 7.5 percent (Table 6).

32. **The amendments to the Federal Law on Economic Competition have been a great advance, but the associated regulation and its application are important.** To make the amendments concrete, the corresponding regulation needs to be issued, which is expected to occur by the end of December 2006. Training and diffusion efforts will then be necessary to support the implementation and application of the amended law. Training and diffusion efforts will then be necessary to support the implementation and application of the amended law.

33. **Although there have been advances, more collaboration between the CFC, different regulatory agencies, and states is needed.** The CFC has established cooperation agreements with 15 states and with COFEMER, CRE, and PROFECO but more advances are needed. For instance, a planned pilot program that focuses on cooperation between states should be pursued. Regulatory agencies should also increase their interactions to improve the diffusion of competition policy, and cooperation schemes between regulatory agencies and states regarding economic competition policy should be encouraged.

MEXICO'S TRADE ENVIRONMENT HAS BEEN TRANSFORMED BUT MORE SHOULD BE DONE TO FACILITATE TRADE AND REDUCE LOGISTICS COSTS

Description and Challenges

34. **The trade and investment environment in Mexico has been transformed over the past two decades.** This is in part due to the 1994 launch of the North American Free Trade Agreement (NAFTA) with the United States and Canada, and, more recently, trade agreements with the European Union and Japan.[53] Growing competitive pressures from countries such as China have also engendered policy reform measures to lower trade transactions costs to expand export opportunities for Mexican firms. The engine of export-led expansion in the second half of the 1990s, however, has turned to lower growth rates in recent years. Exports have diversified away from petroleum and related products, yet Mexico remains heavily dependent on a single market—the United States.

35. **NAFTA has increased Mexico's exports to the United States, but exports to other regions remain underdeveloped.** After implementation of the NAFTA, the growth of manufacturing exports from Mexico intensified as *maquiladora* operations along the U.S. border expanded. Since the early

[53] Currently, Mexico has signed 12 Free Trade Agreements with 43 countries in North America, Latin America, Europe, and Asia.

1990s, manufacturing has accounted for over 70 percent of the total exports (Table 8).[54] In addition, although the NAFTA has had clear and demonstrable positive impacts on growth and employment, the advantage of preferential access to the U.S. market is being eroded by international competition. Mexico has also had limited success in establishing strong relationships with European and Asian firms and expanding exports in these markets; this is in part due to the lack of incentives for *maquilas* to establish strategic alliances outside of NAFTA. Continued high trade transactions costs associated with reaching these markets for Mexican firms is one important contributing factor inhibiting progress in export expansion in this broader picture.

36. **In 2003, China surpassed Mexico as the United States' second largest trading partner after Canada.** Mexico is confronting competitive challenges from China and other countries not only in terms of labor costs but also in areas directly related to trade facilitation. These include, among other factors, wider use of information technology in trade transactions, streamlined regulatory requirements on imports, and assistance to small and medium-sized firms in trade logistics.

Table 8: Mexico's Trade Indicators

	2000	2001	2002	2003	2004
Real GDP growth (percent)	6.6	-0.2	0.8	1.4	4.4
Exports of goods fob (US$ bn)	166.1	158.8	161.0	164.8	188.0
Imports of goods fob (US$ bn)	174.5	168.4	168.7	170.5	196.8
Current-account balance (US$ bn)	-18.6	-17.6	-13.3	-8.5	-7.4

Principal exports 2004	US$ m	Principal imports 2004	US$ m
Manufactured goods	157,973	Intermediate goods	149,289
Maquila	86,952	Maquila	68,624
Oil	23,667	Consumer goods	25,359
Agricultural goods	5,421	Capital goods	22,599
Minerals	939		

Main destinations of exports 2003	% of total	Main origins of imports 2003	% of total
U.S.	88.8	U.S.	61.8
Canada	1.7	China	5.5
Spain	0.9	Japan	4.5
Japan	0.4	Germany	3.7

Source: Economist Intelligence Unit (2005)

37. **Trade indicators in *Doing Business* highlight room for improvement.** In the World Bank's most recent *Doing Business* report (2006), a "trading across borders" indicator compiles procedural requirements for trading a standardized shipment of goods across national borders. The detailed components of this indicator suggest that Mexico's performance remains at the Latin America and Caribbean region average. Considering Mexico's geographic proximity to the United States, the time for export and import at 18 and 26 days respectively indicates a great deal of work ahead to facilitate trade. The data for the OECD countries are 12 days on average for exports and 14 days for imports to clear borders (Table 9).

[54] Economist Intelligence Unit (2005). *Country Profile Mexico.*

38. **Mexico falls short of Canada's trade indicators and has mixed results vis-à-vis China.** Compared with its NAFTA alliance partner, Canada, Mexico still has significant room to improve in trade efficiency. For example, the number of signatures required in Mexico for exports is 4, compared with 2 in Canada and time for export is 18 days while it is 12 days in Canada. Signatures required in Mexico for imports total 11 while only 1 is required in Canada. The total time for import is 26 days compared with 12 days in Canada. Under the assumption that the US will remain a major import and export partner for Mexico, it is crucial for Mexico to continue to approach Canada's efficiency levels, considering its beneficial circumstances under the NAFTA alliance. Compared to China, Mexico is more competitive in terms of the number of signatures and days required for export, as well as documents for import, while China is in the better position in terms of the number of signatures and days required for imports.

Table 9: *Doing Business* Trade Indicators

Indicator	Mexico	LAC Region	China	Canada	OECD
Documents for export (number)	6	7	6	6	5
Signatures for export (number)	4	7	7	2	3
Time for export (days)	18	30	20	12	12
Documents for import (number)	8	10	11	7	6
Signatures for import (number)	11	11	8	1	3
Time for import (days)	26	37	24	12	14

Source: World Bank, *Doing Business* database (http://www.doingbusiness.org/)

39. **Tariffs impose welfare losses on citizens.** Kee, Nicita, and Olarreaga (2004) provide estimates of trade elasticies for 4,625 imported goods in 117 countries, as inputs into the Overall Trade Restrictiveness Index (OTRI), in order to study the effects of tariffs on gross domestic product (GDP).[55] The OTRI factors all trade restrictions and preferences and takes them into an overall consolidated equivalent tariff rate.[56] In contrast, the Anderson-Neary Trade Restrictiveness Index (TRI) is based on welfare equivalence.[57] The OTRI data suggests that homogeneous goods have higher elasticities, while point estimates increase as the level of disaggregation increases, at which elasticities are estimated. With welfare losses at around US$7 billion (0.06% of GDP in 2004) per year, the United States is the country in the sample whose tariff structure imposes the largest welfare costs on its citizens. Mexico has the third largest welfare loss at US$2 billion (0.3% of GDP in 2004) with their existing tariff structure in the overall sample.

40. **Evidence suggests that internal conditions are limiting Mexico's export growth.** Hanson and Robertson (2005, mimeo) suggest that in the 1990s import-demand conditions in the United States and other destination markets for Mexican exports were not the dominant factor constraining growth in Mexican exports.[58] They use a gravity model of trade to develop a framework for decomposing Mexico's export growth into components associated with export-supply capacity, import-demand conditions, and other factors. The result shows weak growth in export-supply capabilities, even during the 1990s expansion. The preliminary evidence suggests that internal conditions in Mexico associated with its ability to expand export-supply capabilities—areas directly related to trade costs and facilitation—are a

[55] Kee, Nicita, and Olarreaga (2004).
[56] World Bank (2005g).
[57] Anderson and Neary (2005).
[58] Hanson and Robertson (2005).

more important factor in limiting the country's export growth than China's expanded trade into the United States.

41. **Gains from trade facilitation reform can be substantial.**[59] Soloaga, Wilson, and Mejía (2006) find that trade facilitation reforms in Mexico could increase exports by $29.3 billion, equivalent to 21 percent of total Mexican manufacturing exports. On the imports side, these figures are $14.4 billion and 13.3 percent, respectively. Their analysis assumes that trade facilitation reforms would allow Mexico to halve the distance between its current score and the world average (75 countries) along 4 variables, as follows: 1) port efficiency; 2) customs environment; 3) regulatory environment as measured by the perception of corruption; and 4) service sector infrastructure as measured by speed and cost of internet access and effect of the internet on business (Table 10).

42. **Domestic reforms have much more impact than the trade facilitation reforms of trading partners**. The same study measured the simulated effect of domestic reforms in Mexico and reforms in Mexico's trading partners on Mexico's trade. It found that domestic reforms account for 86 percent of total export gains and 87 percent of total import gains. The food, textiles, transport equipment, and machinery sectors were analyzed and in most of the sectors, about 50 percent of Mexico's total gains (from both foreign and domestic reforms) come from improvements in domestic border measures (port efficiency and customs environment). About 30 percent of the total potential jump in exports comes from domestic improvements in the regulatory environment. For imports, improvements in Mexico's port efficiency appear to be the most important factor, accounting for 80 percent of the total impact (of foreign and domestic reforms) on imports. The textile sector would experience the largest jump in export values in percentage terms, with domestic reforms generating an expected 48 percent increase in textile exports. The background studies (www.worldbank.org.mx) for this report contain more details on the trade facilitation reforms study.

Table 10: Mexico's Potential Trade Gains from Domestic Trade Facilitation Improvement

	Port Efficiency	Customs Environment	Regulatory Environment	Service Sector Infrastructure	Total
Export gains ($billion)	6.8	8.0	10.5	2.1	29.3
Export gains (percent)	4.8	5.6	7.4	1.5	20.7
Import gains ($billion)	13.3	0.0	0.0	1.0	14.4
Import gains (percent)	12.2	0.0	0.0	1.0	13.3

Note: Corruption is used as a proxy to measure Regulatory Environment. Service Sector Infrastructure is measured by e-commerce use by businesses.
Source: Soloaga, Wilson, and Mejía (2006)

43. **Despite the benefits of increased trade, trade policy changes can entail risks for import-competing sectors.** Krebs, Krishna, and Maloney (2005) examined the relationship between trade policy and individual income risk faced by Mexican workers, in order to evaluate the welfare effect of trade

[59] In a narrow sense, trade facilitation simply addresses the logistics of moving goods through ports or the cost of transport services to domestic firms serving export markets. In recent years, the definition has broadened to include the overall environment in which trade transactions take place. This includes the transparency and professionalism of customs and regulatory environments, as well as harmonization of technical regulations to international norms, and expanded use of information technology in trade transactions, for example. The focus of trade facilitation efforts for countries such as Mexico, therefore, is now concentrated on "inside the border" domestic policies and institutional capacity needed to streamline trade rules and lower costs for exporters.

reform.[60] Their result shows that trade policy changes have a significant short run effect on income risk for industries with high levels of import penetration. Moreover, the welfare results in this analysis do not show that trade liberalization is necessarily costly to undertake.

44. **Domestic policy reforms increase the benefits of trade liberalization.** Nicita (2005) provides a quantitative estimate of the effect on Mexican households from the implementation of the Doha Development Agenda.[61] The findings suggest that multilateral trade liberalization is likely *not* to be beneficial for most Mexican households *unless* complemented by domestic reforms aimed at facilitating the response of households to these new market opportunities.[62] However, when the implementation of the Doha development agenda is complemented by domestic policy reforms targeted at increasing productivity and improving domestic price transmission, the overall effects become positive. The differences in effects across households are more closely associated with geographic areas of residence rather than income level, meaning that the poor would be likely to share in the benefits of such trade reforms as well. Measures aimed at enhancing domestic price transmission could ensure that any gains from trade reform, when accompanied by productivity-enhancing policies, would be more evenly spread throughout the country. It is these complementary reforms to raise productivity associated with lowering trade costs that Mexico must focus on in the decade ahead.

45. **Logistics improvements are complementary to trade facilitation reforms and can lead to improved competitiveness.**[63] Logistics costs include transportation infrastructure and services (roads, ports, railways, and trucks), warehousing and inventory financial costs, and the associated firm administrative costs resulting from supply chain organization. Besides increasing productivity and competitiveness in their own right, more efficient logistics can reduce the cost of exporting and importing and improve domestic price transmission. At the micro level, the reduction of logistics costs enables firms to improve their financial performance, resulting in positive economic outcomes for the country. With better logistics performance, a firm will be able to reduce its inventory level and costs as well as the total costs of goods delivered, allowing it to remain responsive to the client and consumers' preferences and ultimately increase its market share. In the context of global sourcing of goods, this results in increased trade and higher-value employment, leading to economic growth. Moreover, studies have shown that if a reduction in logistics costs takes place, products that were unviable to produce for export could become viable after this cost reduction. This is likely to be the case for primary products and commodities, such as fruits and vegetables, which are likely to be produced in poorer areas.

46. **Recent trends in international trade are increasing the importance of logistics.** After the decrease in tariffs following bilateral, regional, and multilateral trade agreements, countries are relying less on preferential tariffs to promote exports in the long run. Therefore, the improvement of logistic performance (cost and quality) is progressively becoming a key factor in countries' competitiveness. It is worth noting that increases in trade ultimately result in higher incomes and poverty reduction; Frankel

[60] Krebs, Krishna, and Maloney (2005).
[61] Nicita (2005).
[62] The analysis utilizes a two step approach for which changes in prices and factors are estimated through a CGE (computable general equilibrium) model and then mapped into the welfare function of the household using household survey data.
[63] Logistics refers to the physical flow of goods and data through the supply chain. Logistics involves the "process of planning, implementing and controlling the efficient, cost-effective flow and storage of raw materials, in-process inventory, finished goods and related information from point of origin to point of consumption for the purpose of conforming to customer requirements" (Council of Supply Chain Management Professionals, 2006). Logistics costs include transportation infrastructure and services (roads, ports, railways, and trucks), warehousing and inventory financial costs, and the associated firm administrative costs resulting from the supply chain organization.

and Romer (1999) found that countries closer to world markets enjoy higher levels of trade, and that a 1 percent rise in the ratio of trade to GDP increases income per person by at least 0.5 percent.

47. **Logistics costs are particularly high in Mexico.** They are estimated at 20 percent, while the OECD average is 9 percent.[64] A pilot survey of a new Logistics Perception Index, aimed at measuring operators' perceptions of countries' logistics environments, gives Mexico a score of 3.57 (7 being the best and 1 the worst), below other Latin American countries like Argentina (4.46) and Brazil (3.83).[65] Recent analyses by the government and the private sector, both of whom were concerned about Mexico's potential disadvantage vis-à-vis its competitors, also highlighted considerable logistics weaknesses. In 2003, the government issued a *Diagnóstico General sobre la Plataforma Logística de Transporte de Carga en México*, and the Mexican Competitiveness Institute (IMCO) performed a complete analysis of competitiveness in 2004, with a robust chapter on logistics.[66] Both confirm the need to further reduce logistic costs.

48. **The government has taken a number of actions over the past five years to lower trade costs.** Mexico's tariff have been harmonized and reduced on a number of products. Information technology is being leveraged to lower trade transactions cost for firms, for instance through electronic transmission of certificates of rules of origin. Customs operations problems are being streamlined through electronic information exchange between agencies. And participation in international organizations—such as the WTO and APEC—has helped facilitate trade. Mexico's transport infrastructure has also been improved, including roads, railways, ports, and border crossings. See the Mexico Competitiveness Development Policy Loan, Report No. 34570-MX, for a more detailed description of government actions.

Moving Forward

49. **Mexico would benefit from further lowering tariffs and non-tariff barriers and reducing the dispersion of tariff rates.** Besides offering gains for consumers and allowing firms to acquire lower cost inputs, lowering tariffs provides a foundation for addressing non-tariff obstacles. The GOM undertook a tariff reform in December 2004 which reduced tariffs between 3 and 10 points on more than 9,000 tariff lines, affecting 76 percent of all tariffs in the Mexican tariff schedule, but much more remains to be done.[67] The simplification or harmonization of tariffs would make more productive chains viable.[68] This is particularly important given the need to continue to diversify exports beyond oil and the major export destination, which continues to be the United States. Lower tariffs would reduce Mexico's dependence on imports from the United States as a supplier of inputs. It would also reduce the incentive for exporters to the United States and elsewhere to choose U.S. imports over either imports from other countries or from Mexico itself. A notable feature of China's most favored nation (MFN) trade reforms in recent years indicates a reduction in its dependence on exports. Exporters have increasingly sourced domestically, increasing the amount of domestic value-added in exports. Continued reduction in MFN tariff rates, building on steps taken in December 2004, are clearly important.

50. **Expanded use of information technology and reduced regulation can help lower trade costs.** Making trade procedures and documentation available electronically will reduce the time and costs for

[64] Guasch (2004)
[65] The Logistics Perceptions Index is a World Bank initiative implemented with the support of the Turku School of Economics and Business Administration, Finland. A pilot survey was carried out in 2003.
[66] IMCO (2005a).
[67] See also the background studies for this report (www.worldbank.org.mx).
[68] Currently, in some sectors it is more profitable to import final goods under preferential treatment, than importing the inputs and raw materials to produce those same goods domestically.

firms to conduct business abroad. Current GOM programs that increase the number of instruments and agencies involved in paperless transactions are addressing this issue. Streamlining regulatory requirements for firms can also help lower trade costs. One way to do this is through further strengthening the Temporary Import Program for Exporters (PITEX) and the *maquiladora* export promotion programs.

51. **Key internal corridors and logistics centers could be improved,** as manufacturers face high costs to deliver their products from/to the border, ports, or airports. Elevated transport costs and times have also led to high inventory levels for businesses: during the 1990s, Mexico had 90 percent higher raw materials inventory levels on average than the United States.[69] The lack of efficient multi-modal transportation platforms, such as logistics centers, increases the time to deliver/receive a product and the associated cost.

52. **Enhancing customs efficiency will bolster competitiveness.** Average customs transactions involve many parties, documents, and data. The time for export is currently 18 days in Mexico, compares with 12 days in Canada; Mexico requires 11 signatures for imports, while only one is required in Canada.[70] The lack of flexibility in working hours and locations for product clearance adds on delays and costs. The customs administration would also benefit from a modernization of its infrastructure, including better use of information technology, in ports, airports, and land border crossings.

53. **The organization of firms' supply-chains could be strengthened.** Manufacturing companies, especially SMEs, often incur higher costs due to a lack of skills in modern supply-chain management techniques. This involves rethinking the complete supply chain from material and services sourcing to the use of specialized distribution companies to deliver the end product to the client. Another factor slowing the adoption of modern supply-chain management techniques is the limited availability of efficient operators able to deliver integrated logistics services. The GOM has a relatively small *Logistics Practices Innovation Program* that attempts to improve supply-chain management within firms.

MEXICO HAS MADE FAR-REACHING REGULATORY IMPROVEMENTS BUT FIRMS STILL FACE PERVASIVE RED TAPE

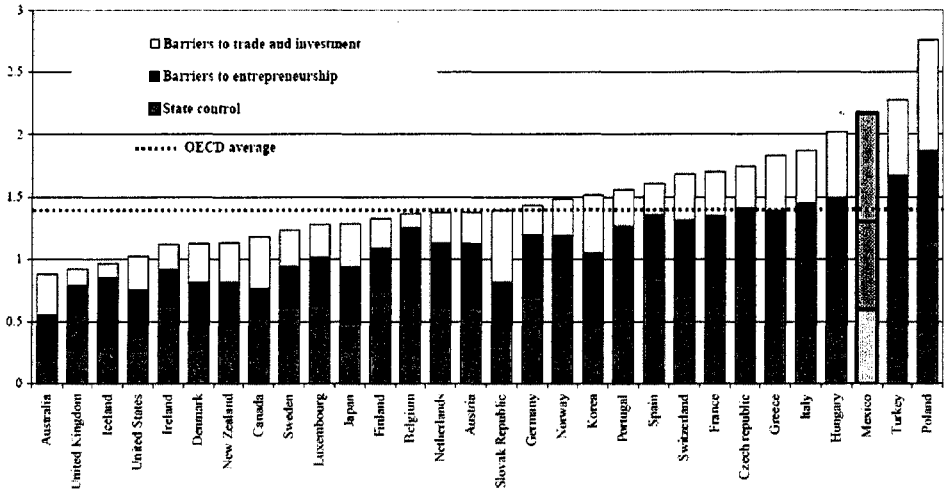
Description and Challenges

54. **Although recent reforms have been far-reaching, entrepreneurs still face microeconomic constraints.** Over the last two decades, Mexico has undergone a reform process that has redefined the economic role of the state. Market liberalization, especially through the establishment of NAFTA, privatization of state-owned enterprises (SOEs), and regulatory reforms affecting 90 percent of the legal framework, has moved the country closer to free and competitive markets. However, much remains to be done to address structural weakness that constrains productivity growth. Poverty remains high; approximately 52 percent of the population lives in poverty, a similar level to that of the early 90s, and 20 percent live in extreme poverty. The informal sector represents 33 percent of GDP. At a time when Mexico is facing increased competition from China and Central American countries, Mexican entrepreneur's competitiveness is hindered by a series of microeconomic constraints, including the increased cost of doing business that has been created by the regulatory burden.

[69] Guasch and Kogan (2003)
[70] World Bank, *Doing Business* database.

55. **Mexico needs to reduce its regulatory burden to improve productivity.** Several studies demonstrate how the regulatory burden in Mexico is still hindering business growth. In a review of the effect of product market regulations on investment and growth, the OECD found that when regulation is restrictive, productivity growth is generally below the OECD average (Figure 17).[71] As the OECD points out, this does not imply that governments should dismantle regulations. Regulation is necessary for well-functioning market economies. But regulation may also contribute to impede competition with detrimental consequences for resource allocation, innovation, and productivity. The challenge for Mexico is to design regulations that help to safeguard the public good without compromising economic performance. It is an area where learning from best performers is crucial. The OECD estimates that if those sectors that lag in terms of productivity were to modernize their regulatory framework and align it on best practice, then productivity could increase by as much as 10 per cent.

Figure 17: Restrictive Regulation of Product Markets is High in OECD Emerging Market Economies



Note: 2003 values. The scale of the indicators is 0–6 from least to most restrictive.
Source: OECD Indicators of Product Market Regulation (www.oecd.org/eco/pmr).

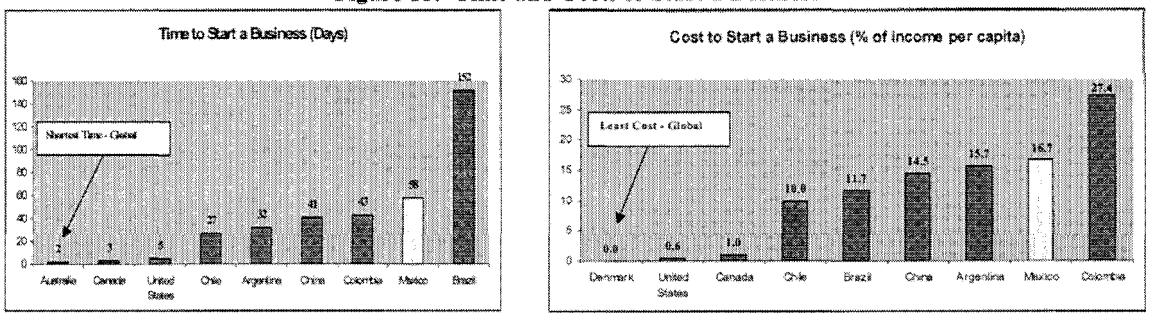
56. **Benchmarking the cost of doing business in Mexico is telling where improvements can be achieved through targeted regulatory improvement reforms.** The *Doing Business* reports and database of the World Bank have benchmarked indicators of the cost of doing business in Mexico against more that 150 countries around the world.[72] The report covers entry regulations, licensing regulation, employment regulations, registering property, court efficiency, corporate governance, creditor rights and credit information, bankruptcy, and tax issues.

57. **Compared to other countries in Latin America, Mexico clearly lags behind in the following: a) time and cost to open a business; b) time and cost to obtain a license; c) cost of hiring; and d) cost of tax compliance.** The *Doing Business* indicators contribute to a better understanding of progress in regulatory reform and demonstrate the efforts that remain to be made to improve the regulatory environment so as to allow the Mexican private sector to become more competitive. Despite its shortcomings, Mexico's overall performance in *Doing Business* indicators is better than the average, reaching the top 40 percent. However, competitors such as Chile, Malaysia and Thailand are in the top 20 percent.

[71] Cotis (2005).
[72] See www.doingbusiness.org.

58. **Time and costs to open a business in Mexico are high compared to China and Latin America.** *Doing Business* data shows that it is cheaper and faster to open a business in China (41 days, 14.5 percent of income per capita) than in Mexico (58 days and 16.7 percent respectively) (Figure 18). The picture darkens considerably when comparing Mexico to its Latin American neighbors. In, Chile, which competes with Mexico on trade with the European Union, it takes less than half (27 days) the time it takes in Mexico to create a business. Mexico also falls well short of countries like Argentina (32 days), Colombia (43 days), and even Bolivia (50 days).

Figure 18: Time and Costs to Start a Business



Source: World Bank, *Doing Business* database.

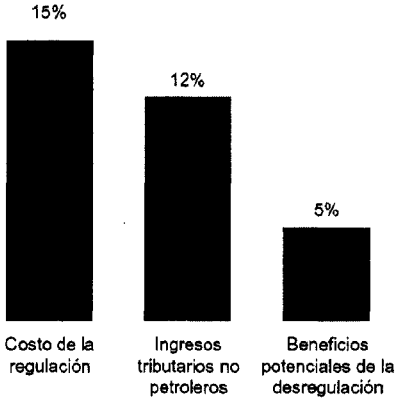
59. **The regulatory cost associated with operating a business is one of the main factors that drives companies into the informal sector, reducing the competitiveness of entire sectors of the economy.** The construction sector is particularly affected. *Doing Business* data shows that it takes 222 days to obtain a license to build a warehouse in Mexico, placing it in the bottom quarter of Latin American countries. In comparison, obtaining a license takes 150 days in Colombia, 187 days in Bolvia, and 191 days in Chile. Costs to obtain a license in Mexico (159 percent of income per capita) are not bad compared with many countries in Latin America, but there is still significant room for improvement. For instance, it only costs 48 percent of income per capita in Argentina and 125 percent in Chile. These times and costs are indicators of the weight that the regulatory burden can play on investment and/or compliance decisions that investors have to face while trying to grow their market share.

60. **Other *Doing Business* indicators also point to regulatory weaknesses.** Mexico is in the bottom third of the worldwide distribution of the ease of enforcing contracts. Regarding property registration, there are as many procedures in Mexico as in Australia and Ireland, but it takes at least twice as long. The registration at the registry of property is the main source of bottlenecks; this procedure may take between 1 and 3 months. Costs to register property are high in Mexico, encouraging informal transactions that leave the property registry out of date and reducing the availability of collateral for firms trying to access financing. Another example is the cost of hiring workers. *Doing Business* estimates that hiring an employee costs just under a quarter of that employee's annual salary in Mexico, well above all but three Latin American countries. Comparable numbers (percentage of salary) are 3 percent in Chile, 10 percent in Peru, and 14 percent in Bolivia. Finally, tax regulations are complicated enough that it takes the average Mexican entrepreneur 536 hours per year to pay taxes. Meanwhile, entrepreneurs in both Colombia and Chile only spend 432 hours paying taxes.

61. **The Mexican Institute for Competitiveness (IMCO) produced its own benchmarking report in 2005, which concludes that the cost of the regulatory burden currently represents 15 percent of Mexico's GDP,** while the benefits from regulatory improvement could yield a 5 percent increase in GDP (Figure 19). The IMCO (2005a) and *Doing Business* reports make clear that the costs related to the

complex regulatory framework, non-transparent business procedures and weak judicial structures remain factors inhibiting investment in Mexico. They create indirect costs that impede Mexican manufacturers in their competition with other countries, and translate into job loss and growth reduction.

Figure 19: Cost of Regulation and Potential Benefits of Better Regulation (percent of GDP)



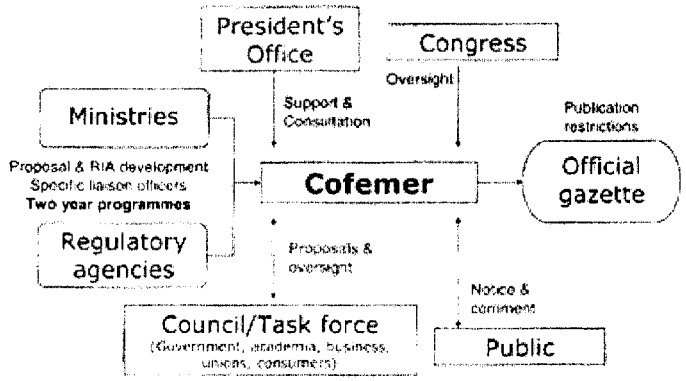
Source: IMCO (2005a)

62. **Lack of harmonization in the regulatory environment negatively affects businesses.** Since regulatory responsibilities are shared among the federal, state, and municipal levels, coordination is necessary to eliminate the overlaps, duplication and inconsistency with federal regulations. A 2003 study commissioned by the Business Coordination Council (CCE) showed marked differences in the quality of the regulatory framework among states.[73] On the positive side, improvements in some sub-national entities have attracted reforms in others, as has been the case with the Rapid Business Opening System (SARE). Benchmarking different states and municipalities can spur this positive competition to improve regulations. The result of two state by state studies was released in December 2005 by IMCO and the World Bank's Foreign Investment Advisory Service (FIAS)/*Doing Business*.

63. **COFEMER was created to improve regulation.** In 2000, amendments to the Federal Administrative Procedures Law (*Ley Federal de Procedimiento Administrativo*, LFPA) institutionalized the Federal Regulatory Improvement Commission (COFEMER). COFEMER is a technically and functionally autonomous agency of the Ministry of Economy created to coordinate and to supervise the Regulatory Improvement Program of the government. It aims to ensure the transparency of the regulatory process and promote regulations that produce benefits greater than the costs. Mexico is one of the few developing countries that has created a mechanism to challenge the quality of new regulation through the establishment of mandatory Regulatory Impact Assessment (RIA) for all new regulation that imposes costs on citizens. COFEMER plays the key role of systematically reviewing RIAs and regulatory improvement proposals (Figure 20).

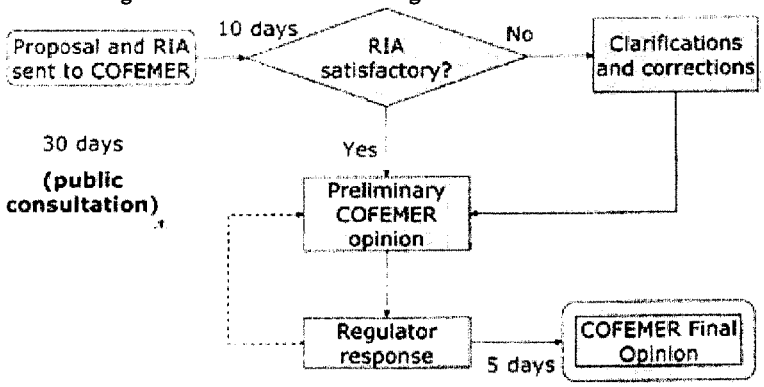
[73] CEESP (2003)

Figure 20: Institutional Design for Regulatory Review



64. **The systematic review of administrative proposals is now well-grounded in law, and COFEMER is fairly effective in improving new regulations** (Figure 21). Though COFEMER has the power to present reforms to existing regulation, it is sometime difficult to achieve results without a good partnership with the responsible ministry. In other words, COFEMER can push for the structural reform agenda, but it cannot carry it out on its own. Accountability and transparency of the regulatory review process is supported by the right to apply severe sanctions for non-compliance. Sanctions are applied by the Secretariat of Civil Service (SFP). A key enforcement power of COFEMER is that regulations cannot be published in the national gazette without its explicit opinion.

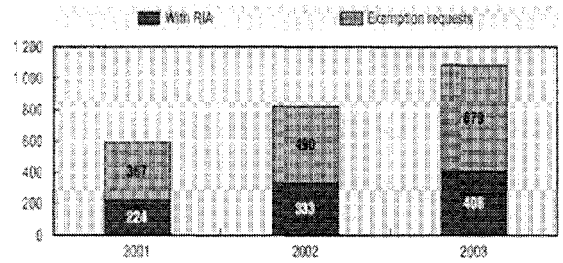
Figure 21: RIA and Draft Regulation Review Process



65. **Certain specified federal agencies must send each of their draft proposals, together with a RIA, to COFEMER, which makes them public on www.cofemer.gob.mx.** COFEMER has the authority to issue a public opinion concerning each draft proposal and RIA. It also has the authority to request changes in the RIA, and, in specific cases such as high impact regulations, it can seek expert opinions on the draft proposal. For other agencies, COFEMER has "optional or not optional" authority to review and analyze all proposals with general exemptions in fiscal policy, criminal justice, and national defense. Hence, COFEMER can develop reform proposals in collaboration with these agencies. In the Fox administration, COFEMER has made use of its optional authority to propose new measures in at least three areas, as follows: 1) with Interior, it co-sponsored the Transparency Act (2003), 2) with Treasury, Foreign Affairs, and Labor, it co- sponsored administrative reforms to reduce federal procedures for start-ups, and 3) with states and municipalities it sponsored the federal/sub-federal fast

track start-up program (see below). Figure 22 shows the number of draft regulations sent to COFEMER, with RIAs and exemption requests, between 2001 and 2003

Figure 22: Draft Regulation Sent to COFEMER



Source: COFEMER (2004)

66. **Regulatory planning activities are being undertaken via the Regulatory Betterment Program.** The amendments to the LFPA also included the creation of the Regulatory Betterment Programs (RBP) a mechanism to organize future regulations that give the public the opportunity to participate in regulatory planning. At least every two years ministries and regulators must prepare an RBP to inform the public of their plans for regulation proposal and the possible creation of new formalities. These RBPs are beginning to build a discipline of periodical review and planning of the regulatory framework and its amendments. The RBP also helps to achieve the central purpose of the federal regulatory improvement policy: to create and to modify regulations and formalities according to processes based on planning, transparency, analysis potential effects, and public consultation, in order to obtain the highest social benefit.

67. The first draft of the RBPs is submitted to COFEMER, and posted for public comments on COFEMER's Web site (www.cofemer.gob.mx) for at least twenty days. After the period of public consultation, COFEMER sends to each ministry and decentralized agency its comments to the programs as well as other public comments received. Each regulatory agency then makes any corresponding changes to its program or explains the reasons for rejection, publishing the final version in the Official Gazette within a month. Each agency must submit to COFEMER a periodic report on compliance with the program and possible modifications to the programs are assessed.

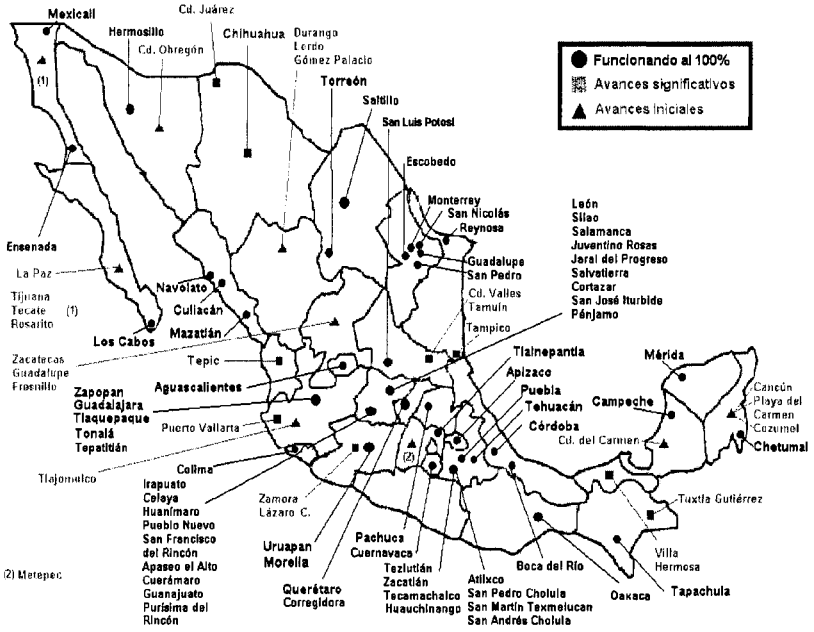
68. The last version of the RBP was presented in the summer of 2005 and it included a novelty: the RBP was prepared with a Private/ Public dialogue that took place before the first draft of the RBP was prepared. This approach made it possible to unify efforts in a new systemic approach to regulation, creating a coordination mechanism between the public, academic, and private sectors. The idea was to set regulatory priorities in conjunction with the private sector. The systemic approach also aimed to incorporate a holistic analysis of regulatory system in particular economic sectors. Together, the Mexican public and private sectors defined 36 specific actions related to regulatory improvement that could influence competitiveness in a positive way. Those actions have an impact in specific areas, such as the following: Transport and Telecommunications, Labor and Social Security, Health, Energy, Foreign trade, Finance, Technical Standards, Migration, and States and Municipalities.

69. **Progress has also been achieved at the sub-national level.** COFEMER does not have direct jurisdiction over the states and municipalities. However, one of the functions of COFEMER is to provide technical assistance in regulatory improvement to states and municipalities. Also, the Program for Regulatory Improvement 2001–2006 (*Programa de Mejora Regulatoria 2001–2006*) establishes the promotion of a culture of regulatory improvement in the three levels of government as one of COFEMER's strategic objectives. COFEMER has thus signed coordination agreements with all states

and the federal district in which states agree to implement regulatory programs similar to the ones at the federal level. COFEMER has also signed 50 Memoranda of Understanding with municipalities. COFEMER's support to states and municipalities has varied from providing technical assistance in establishing registries of formalities to conducting reviews of regulatory authorities to designing enforcement schemes. As an illustration, 67 municipalities' regulatory improvement systems are currently being inventoried by the COFEMER.

70. **COFEMER works with municipalities to simplify business opening procedures.** The Rapid Business Opening System (*Sistema de Apertura Rápida de Empresas*, SARE) was created by COFEMER and issued at the federal government level in 2002. It allowed businesses to complete two federal procedures—obtaining a fiscal identification number and name registration—in one business day. Building on this mechanism, some 85 municipalities (representing 35.7 percent of Mexican GDP) have also implemented the SARE, reducing the time to start up a business from over 30 days to 1–2 days (Figure 23). COFEMER aims to have implemented the SARE in a total of 100 municipalities by 2007. The SARE is also considered an important tool in developing compatible systems at the state and local levels. However, the SARE has been only partially implemented in some locations. Moreover, even with the SARE, the entrepreneur still has to register separately with labor and social security authorities as well as the statistical office.

Figure 23: SARE Municipalities to Date



Source: COFEMER (2005)

71. **The Federal Regulatory Improvement Council allows labor and business representatives to advise the government on regulation.** The Federal Regulatory Improvement Program, designed and co-coordinated by COFEMER, is supported by the Federal Regulatory Improvement Council (*Consejo para la Mejora Regulatoria Federal*), whose membership was also modified by the LFPA. The president of the Council is the Minister of Economy. Other members are the Minister of Finance, the Minister of Labor, the Minister of the Public Function, the General Director of COFEMER, the Governor of the

Bank of Mexico, five business sector representatives and at least one representative from the labor, agricultural and academic sector. The President's Legal Counsel, the President of the Federal Competition Commission, and the President of the Federal Consumer Protection Agency (PROFECO) were added as new members after 2000. This Council mirrors the experience of other OECD countries, involving labor and business representatives in official advisory bodies to the government for regulatory matters.

72. **A regulatory moratorium was issued in 2004.** In a meeting of the Council in April 2004, President Fox announced a moratorium for one year on regulations as part of an effort to further reduce burdens on businesses. Under this moratorium, any new federal regulations must be shown to have benefits that significantly surpass the costs, or be driven by an emergency situation. This moratorium has caused a significant reduction in issuing and renewing regulations. The moratorium process has been effective in reducing the number of regulations being issued, illustrated by the fact that 38 percent fewer regulations are now produced by the federal authorities, compared with the number before the moratorium. But it also has had a positive impact upstream, within agencies and institutions, which are now submitting 34 percent fewer proposals for new regulations, compared with the volume of proposals they used to forward for review before the moratorium.[74] In 2005, the Moratorium was extended for another year at the demand of the private sector.

73. **COFEMER has increased transparency in the implementation of regulations.** Through open communication with the public and the private sector in particular, transparency has been reinforced. COFEMER has emphasized its importance not only with RIA's and commentary on draft regulations, but also with public participation in comment procedures, and with clearer legal requirements for notifications. Within the government, COFEMER disseminates knowledge about RIAs among institutions through training courses and its electronic portal, which has proved to be a major success. COFEMER has also developed a Federal Registry of Procedures and Services (*Registro Federal de Trámites y Servicios*, RFTS) that contains all formalities and services of the federal administration with general exemptions in fiscal formalities.

74. **Transparency mechanisms have also been strengthened through the creation of the Federal Institute of Access to Public Information** *(Instituto Federal de Acceso a la Información Pública*, IFAI). IFAI enforces the Federal Law of Transparency and Access to Public Information (*Ley Federal de Transparencia y Acceso a la Información Gubernamental*), enacted in 2002. It also guarantees the effectiveness of both the right to access public information and the right to privacy through data protection and promotes transparency and public sector accountability.

Moving Forward

75. **Mexico needs to undertake important regulatory reforms to boost its competitiveness.** Specific sectors, especially in the manufacturing industry, are losing exports and even domestic market share to China and Latin American countries such as Honduras. While Mexico's labor wages cannot be reduced so as to compete with its competitors' low labor costs, the government needs to undertake actions to reduce the indirect costs of doing business. Specifically:

(iii) Procedures that impose large burdens on entrepreneurs need to be eliminated, replaced, or improved (those for starting a business, licensing, employment regulation, tax regulation);

(iv) Business interaction with government needs to be streamlined, so as to reduce uncertainty and implementation efficiency issues;

[74] COFEMER, see http://www.cofemer.gob.mx/.

Product market regulations: Industry sectors that are key to Mexican competitiveness and under specific competition threat from foreign markets could benefit from a thorough review of administrative barriers in order to identify where action can be taken to reduce cost. Such sectors and issues could include foreign trade, manufacturing, property, finance, norms and standards, transport and telecommunications, energy and labor among others. For each sector or issue, reduction of time, procedures, and costs of fulfillment would help improve competitiveness.

76. **COFEMER needs continuing support.** COFEMER can lead the tasks mentioned above, but it can exercise its full powers only if it enjoys broad support and acts decisively. One challenge is sustaining the support of the private sector and official institutions. Earlier, rallied by the domestic crisis and strong political support, the private sector took on an active role in pressuring agencies to improve regulation. Today many factors contribute to the more passive role of several public and private actors; of these two are the loss of founding members of the Council through turnover and a review process in which success has become routine. Additionally, political circumstances and a fragmented Congress have shifted the private sector's lobbying efforts from the executive branch and its agencies toward Congress. This trend can only be counterbalanced by a reinforcement of COFEMER's role vis-à-vis the institutions issuing regulations. In that sense, ensuring continuous training of public administration officials on the Regulatory Impact Assessment (RIA) framework is key to maintaining momentum while improving the upstream quality of proposed regulations. The cornerstone of this effort lies in demonstrating the benefits of the RIA process in terms of cost reduction to the entrepreneurs. In that regard, the establishment of an ex-post evaluation framework for RIAs[75] would help benchmark regulatory compliance of key administrations; it would also create strong political incentives for those administrations to streamline and simplify their regulatory environment.

77. **Public consultation needs to be strengthened.** Consultation in making, modifying, or repealing legislation and regulation in Mexico is still weak. There is still no legal obligation to undertake active public consultation for certain federal regulatory proposals. Nevertheless, COFEMER has included a section in the RIA questionnaire concerning public consultation. Institutional bodies are requested to specify if they established some type of public consultation and who was consulted about the proposals. The RIA also requests a list of all the submissions that were taken into account for the draft regulation that is being presented. But the input of the private sector when it comes to regulation affecting the cost of doing business should be reinforced.

78. **Better harmonization of regulation between the different levels of jurisdiction is necessary.** Today, any regulatory improvement process, including red-tape reduction at the sub-federal level, depends on the will and capacity of states and municipalities to coordinate with each other. COFEMER, through the SARE system, can play a key role in helping set up similar frameworks and systems between jurisdictions. It is crucial to deepen the voluntary relationship between COFEMER and the states and municipalities. As a first step, it is equally important to diagnose binding constraints at the state and municipal level in order to identify the different sources of competitiveness loss of specific industries or value chains. A benchmarking exercise between the states and municipalities could help identify best practices and drive the regulatory cost reduction agenda in that regard.

79. **Expanding the implementation of the SARE will reduce the time and cost of working through business opening regulations.** The target is for COFEMER to help implement the SARE in more than 100 municipalities, representing more than 40 percent of Mexican GDP by 2007. The output is to be measured in the start-up time for small and medium-sized businesses (from an average of 52 days to 3

[75] Ex-post evaluations would occur after regulatory changes have been implemented. In this way, actual impacts could be compared with the ex-ante impact assessments (RIAs).

days only) and a reduction in the associated cost. The outcome is to be measured in the number of new companies created, the value of investment in these entrepreneurial projects and the number of jobs created. Beyond the numerical targets, COFEMER shall also create a **system to measure the SARE's effectiveness and monitor its implementation** in order to keep improving the processes and to facilitate the introduction of the system to new municipalities.

80. **The Regulatory Impact Assessment process in federal institutions needs to be reinforced.** This component aims at generalizing the current RIA process among all agencies and institutions when applicable. This includes raising the number of RIAs being conducted (355 in 2005) as well as the quality of the RIAs being submitted for review. In that regard, training of public servants in impact assessment practices remains crucial. In order to ensure compliance and accountability in the RIA process, enactment of the by-laws of the Federal Administrative Procedures Law (*Ley Federal de Procedimiento Administrativo*) is also important.

81. **COFEMER needs to create a monitoring and evaluation framework for RIAs.** To date, COFEMER does not compare the cost it estimates for regulatory proposals to actual cost, which could be measured after regulatory changes have been implemented (ex-post). Similarly, COFEMER does not track how the regulatory alternatives it suggested during the RIA process were actually applied and implemented. Finally, COFEMER does not formally benchmark the quality of RIAs originating from different secretariats. A framework to achieve the above points should be put in place in the medium term. The impact of such actions would be, over time, to reduce the cost of doing business for Mexican entrepreneurs, especially compared with other Latin American countries, with an emphasis on entry, licensing, tax, and labor regulations.

82. **Increasing cooperation with sub-national jurisdictions and the private sector to keep improving regulations at all levels is important.** The aim is to improve local competitiveness by the following: (i) benchmarking the cost of doing business in at least 12 states in 2006; (ii) facilitating the creation of competitiveness action plans at the sub-national level; and (iii) building an inventory of existing state and municipal mechanisms for regulatory improvement. In turn, these activities shall increase the quality of the systems used by the municipalities (percentage reduction in proceedings and procedures, improvement of administrative processes, response times, etc.) and reduce the time and costs of business operations pertaining to entry regulation, property registry, contract enforcement, access to credit, and others.

MEXICO'S ENERGY SECTOR NEEDS TO STRENGTHEN ITS PERFORMANCE

Description and Challenges

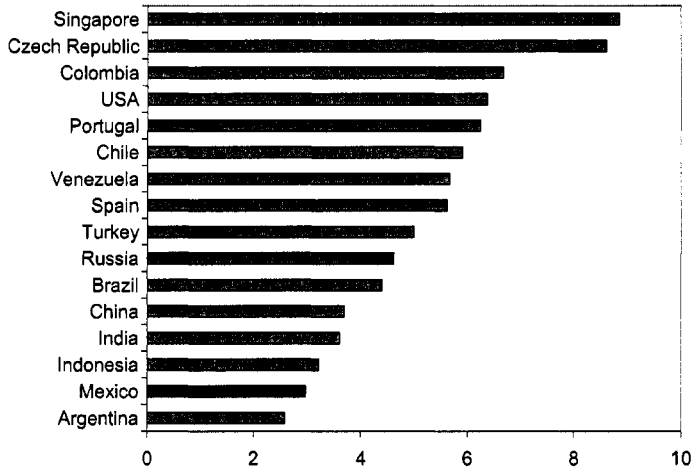
83. **Energy is a major driver of economic growth, productivity and competitiveness.** The energy sector is of high strategic importance to the economy.[76] Even slight changes in the availability and price of hydrocarbon fuels or electricity can have serious effects on economic growth. An increase in the relative price of energy inputs increases the cost of production of goods and services, thereby putting pressure on profit margins. A modeling exercise by the IMF (2000) shows that a sustained US$5 per barrel increase in the price of oil results in a 0.1 percent decrease in GDP—even in oil exporting countries such as Mexico. Since January 2002, oil prices have increased from about US$20 to US$55 per barrel.[77] Another study showed that a ten percent increase in electricity infrastructure stock (generation

[76] See **Annex 5** for a more detailed description of energy sector challenges and relevant programs and strategies.
[77] West Texas Intermediate Crude Oil Price

capacity) could lead to a general increase of 2 percent in manufacturing growth with a higher impact on 31 percent of all manufacturing output.[78]

84. **Price volatility and uncertainty associated with fuel availability and the quality of service significantly affects consumers and producers in the economy.** Both energy and non-energy businesses' investment decisions are based on expectations about energy prices and service quality levels. And unfortunately, expectations of Mexican businesspeople are quite low. In fact, Mexico scored second to last of 51 countries on IMD's World Competitiveness Yearbook business survey in terms of energy infrastructure adequacy and efficiency (Figure 24). The countries that have achieved a secure supply of fuels and electricity at competitive prices have exhibited high levels of economic development and consequently an increase in their level of competitiveness.[79]

Figure 24: Energy Infrastructure Adequacy and Efficiency (2005)



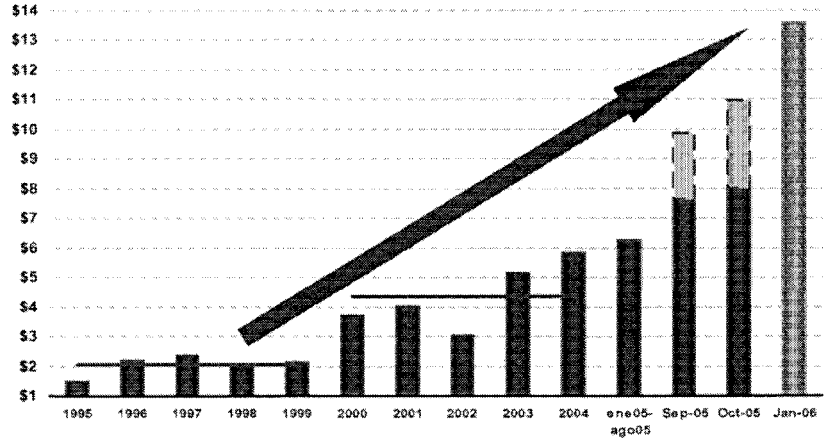
Note: Scores (between 0 and 10) are based on business survey responses to the question: "Is the energy infrastructure adequate and efficient?" The highest value indicates the most positive perception.
Source: IMD World Competitiveness Online.

85. **The Mexican hydrocarbons industry faces important challenges.** About 60 percent of oil revenues are diverted to finance at least 35 percent of national budgetary needs. This has a significant impact on the capacity of the Mexican oil company (PEMEX) to finance new infrastructure for sustainable and competitive growth. Furthermore, meeting the growing demand for energy will require a significant increase in investment that the government will not be able to finance unless it severely curtails spending on other important social goals (such as health, education, and rural infrastructure). Breaking out of this vicious circle is one of the most important challenges facing Mexico today. To a large extent, the technical and operational efficiency of state-owned enterprises depend on the levels of spending approved by Treasury and the Congress every year. But beyond the spending constraints, various national and international experts agree that PEMEX needs to make additional efforts to increase operational efficiency, lower costs, and improve the quality of service.

[78] Castañeda Sabido (2003).
[79] Aspe (2004).

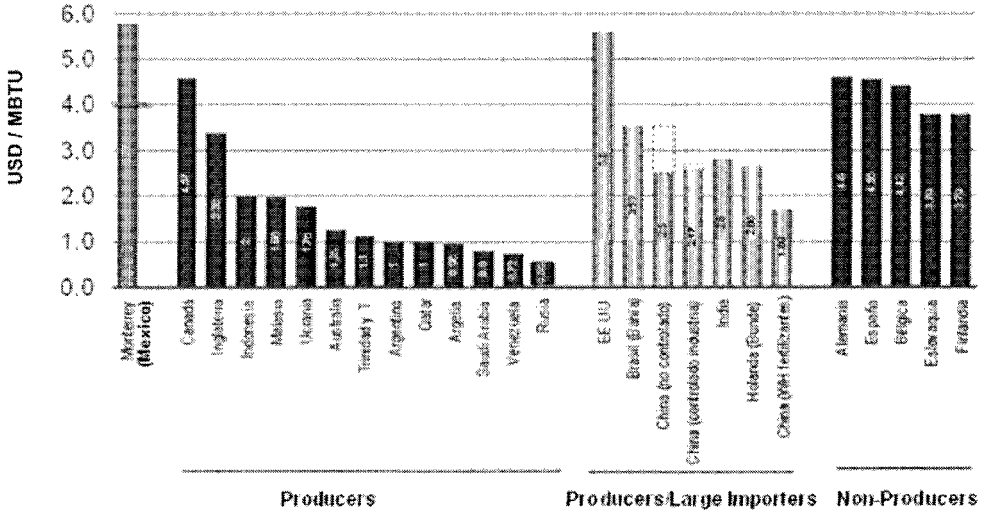
86. **Natural gas prices have seen dramatic increase.** Despite the fact that Mexico has the sixth-largest gas reserves in the Western Hemisphere, the country imports 15–20 percent of its domestic demand.[80] These imports are mainly supplied by the U.S. natural gas market, one of the most volatile of the world. Natural gas prices in Mexico have increased by 236 percent over the last six years and are among the highest in the world (Figure 25 and Figure 26). The lack of economic and technical efficiency in the hydrocarbons sector has also translated into high fuel oil prices, which have increased by 183 percent since 1999.

Figure 25: Reference Price Natural Gas Mexico (USD/MBTU)



Source: Consejo de Coordinadores Empresarial (2005) based on PEMEX, NYMEX.

Figure 26: Natural Gas Prices, 2003

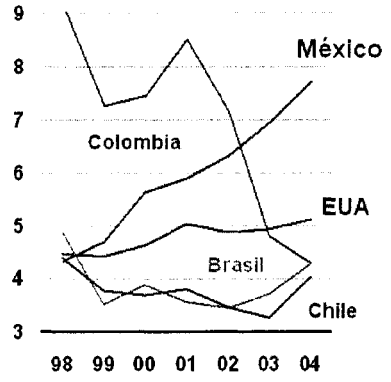


Source: Consejo de Coordinadores Empresarial (2004) based on PEMEX, World Gas Intelligence, ANP, EIA, Inside FERC's, consumers greater than 5mmpcd.

[80] SENER data, 2004–2005

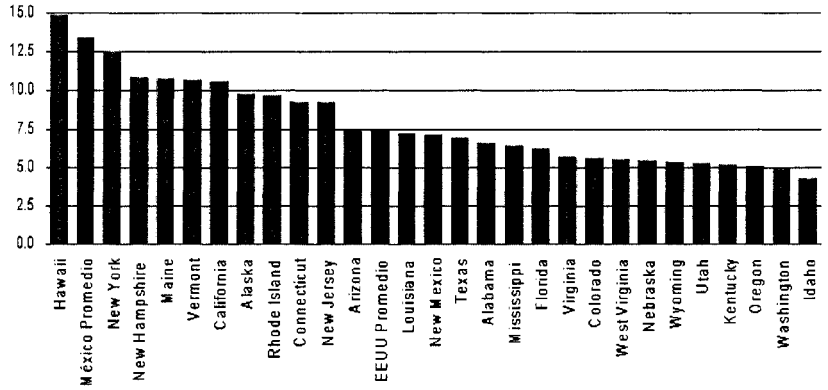
87. **Electricity tariffs in Mexico have increased 77 percent since 1998, compared with a rise of only 14 percent in the United States** (see Figure 27). And commercial tariffs are among the highest in the world. Indeed, average commercial tariffs in Mexico are 80 percent higher than the U.S. average (Figure 28). Transmission tariffs in Mexico are also among the highest in the world, below only Japan and Italy.

Figure 27: Electricity Prices (USD¢ / kWh)



Source: Consejo de Coordinadores Empresarial (2005) based on national sources.[81]

Figure 28: Commercial tariffs, 2000 (USD cts./kWh)



Sources: Consejo de Coordinadores Empresarial (2004) based on U.S. Department of Energy and Mexico Federal Electricity Commission (CFE).

When equivalent consumption levels (in terms of capacity factor, tension, and type of service) are compared across regions, Mexicans pay higher rates across the board (See Table 11).

[81] National sources include:
México: www.cfe.gob.mx / información pública de la CFE / estadísticas de ventas / datos históricos. Suma total de ingresos por ventas del Sector Eléctrico Nacional a Mediana Industria y Gran Industria entre suma total de MW vendidos a Mediana Industria y Gran Industria.
United Status: www.eia.doe.gov. Data taken from the EIA Monthly Energy Review November 2004, Average Retail Price of Electricity, Industrial.
Brasil: www.aneel.gov.br. Agencia Nacional de Energía Eléctrica de Brasil. Tarifa industrial promedio nacional annual.
Chile: www.cne.cl. Comisión Nacional de Energía (de Chile). Precio medio de nudo Maitencillo (zona Santiago) para abril de cada año.
Colombia: www.creg.gov.co. Comisión Reguladora de Energía y gas (de Colombia). Tarifa industrial promedio nacional anual.

Table 11: Electricity Pricing in Mexico Relative to Different Regions of the World

Type of fixed tariff (industry)	vs. North America	vs. South America	vs. EU	vs. Asia	vs. Oceania	vs. Far East	vs. Africa
HT-L (large)	20–60%	90–130%	10–60%	10–140%	n.d.	2%	236%
HS-L (medium)	25–50%	27–70%	21–50%	n.d.	106%	19%	n.d.
H-M (small)	30–60%	n.d.	5–45%	n.d.	86%	21%	n.d.
O-M (small)	5–40%	n.d.	5–30%	n.d.	63%	22%	n.d.

Note: HT-L and HS-L are rates for general high-voltage service. These correspond to large and medium size industrial customers. H-M and O-M are rates for general medium-voltage service and correspond to smaller industrial customers. The percentages refer to the premium paid by customers in Mexico vis-à-vis other regions.
Source: Consejo de Coordinadores Empresarial (2004).

88. **The quality of the electricity service delivery has important effects on the competitiveness of companies**. For instance, service interruptions and voltage fluctuations affect the overall productivity levels of industries and prevent the installation of modern electronic equipment, which requires robust service delivery.[82] According to official data, the quality of electricity services has improved (Table 12). Customer interruptions caused by operating events and customer complaints declined, while connection time decreased for both the national electric company (*Comisión Federal de Electricidad*, CFE) and Luz y Fuerza del Centro (LFC). However, when annual interruptions are compared with Latin American privatized distribution companies, the performance of CFE is poor (Figure 29).

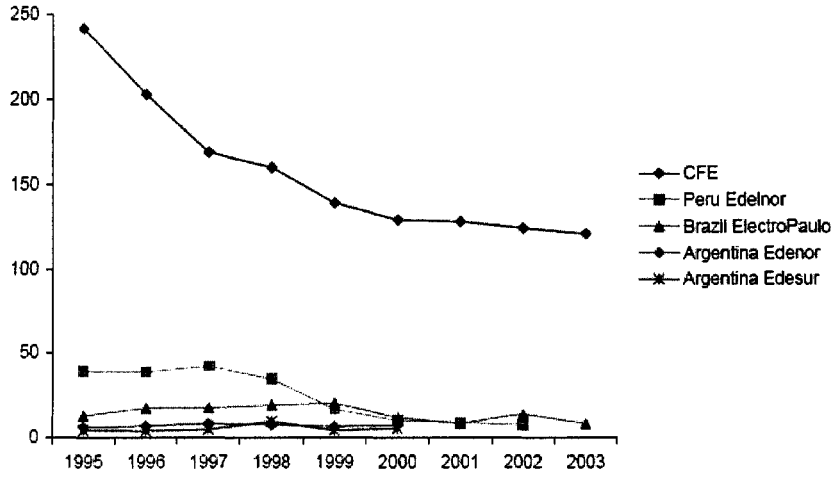
Table 12: Quality of Electrical Service, 1995–2003 (IPER)

		1995	1998	2002	2003
Interruption of Service (min/customer)	CFE	242	225	124	121
	LFC	—	374	144	135
Complaints (no./1,000 customers month)	CFE	14	10.7	4.2	4.1
	LFC	—	6.7	4.4	4.3
Connection time, new customers (days)	CFE	2.3	1.4	1.2	1.1
	LFC	—	10	5.5	6

— Not available.
Source: World Bank (2005d) based on data provided by CFE's Subdirección de Control Financiero, and LFC's Subdirección de Finanzas.

[82] Arizmendi (2005).

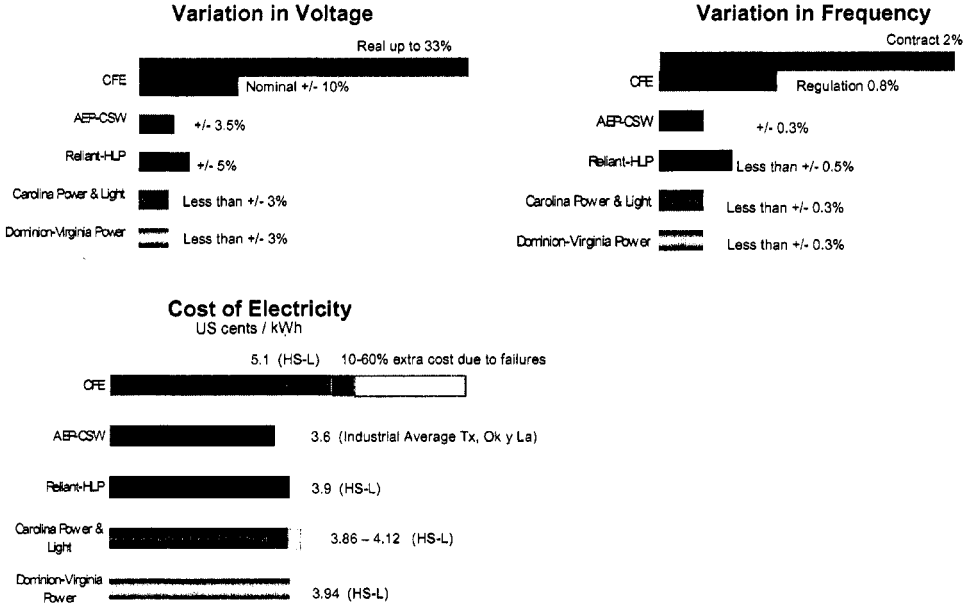
Figure 29: Annual Interruptions (minutes) per Connection (IPER)



Sources: World Bank (2005d) based on CFE financial data; and Andres, Foster, and Guasch (2005).

89. **In Mexico, high costs are compounded by fluctuations in frequency and voltage**. The result is effective costs that are 10 to 60 percent higher than those of U.S. counterparts (Figure 30). Companies also face other barriers associated with the electricity service in Mexico: difficulty in obtaining permits for self-generation and co-generation, high connection costs for self-generating units or new connections to the grid, and others.

Figure 30: Cost and Quality Comparisons, Mexican vs. U.S. Companies



Source: Consejo de Coordinadores Empresarial (2004) based on information from U.S. electric companies and information from users in the U.S. and Mexico.

90. **Subsidies for infrastructure services absorb significant public resources in Mexico and encourage inefficient resource use**. For example, subsidies (for operations and consumption) in the electricity sector amount to about 1.1 percent of GDP (Table 13). Tariffs for commercial and industrial users are set near levels allowing full recovery of the cost of supplying these consumers. However, average residential and agricultural tariffs covered only 42 percent and 28 percent of cost, respectively, during 1997–2003.

Table 13: Estimate of Subsidies for Electricity, 2003

	Sectoral (Federal and State)	FAIS (2002 estimate)	Total	As a Share of GDP (%)
	(MxP billion)			
Consumption Subsidies financed by CFE (off-budget)	49	0	49	0.73%
Other Subsidies (LFC operation and FAIS)	21	2.9	23.9	0.35%
Total	70	2.9	72.9	1.08%

Note: FAIS is a fund to support social infrastructure.
Source: World Bank (2005d) based on Samaniego-Breach (2005).

91. **Residential electricity subsidies are highly regressive**: Upper middle income households (income deciles 6, 7, and 8), receive the greater part of the consumption subsidy. The electricity subsidies also go mostly to the regions that are already more economically developed. The bulk of the subsidy—over 90 percent—is not a lifeline for the poor and encourages inefficiency, especially in the hot areas in the summer, which benefit from highly subsidized rates. Poverty criteria are absent in the determination of regional electricity tariffs, unlike in water, where some municipalities set lower tariffs in poorer neighborhoods.[83]

92. **In the manufacturing sector, the cost of energy as a percentage of total production costs increased by 2.25 percentage points to an average of 10.5 percent between 1995 and 2002. This is comparable to labor costs, which are in the range of 4 to 20 percent.** The energy-intensive industrial sub-sectors are particularly vulnerable to volatility in prices and uncertain availability. The cost of energy as a percentage of the total production costs for these types of industries is particularly high (see Table 14 below). The quality and price of the products from energy-intensive industries are of fundamental importance, as they are used as raw materials in the manufacturing of other diverse products. For instance, the price of cement in Mexico is about twice the price in the US, the European Union and other countries around the world (115 USD/ton, CEMEX Data 2004). Steady increases in energy prices have had serious effects on the costs of production across different industries.

[83] World Bank (2005d), IPER

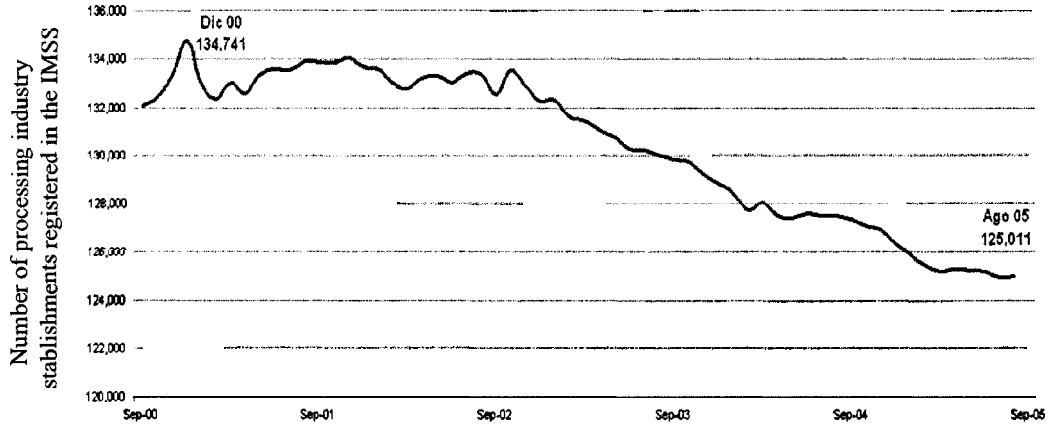
Industry	Percentage
DATA FOR MEXICO	
Cement	30–40
Average manufacturing sector	10.52*
DATA FOR UNITED STATES	
Chemical industry	Up to 85
Primary aluminum	33
Glass industry	8–12
Steel	12–15
Petroleum industry	Up to 85

* When labor costs are included, the share of energy costs as a percentage of the total is 5.86 percent on average (2002).

Source: Commission for Environmental Cooperation (2003) for cement in Mexico; INEGI (2002) for manufacturing in Mexico; Energy Information Administration (2005) for United States

93. **Over the last five years, there has been a steady fall in the number of energy-intensive processing facilities in Mexico.** This has been largely attributed to the increasing costs of energy and to uncertainty regarding the availability of natural gas and other fuels (Arizmendi, 2005) (Figure 31). The studies and surveys conducted by the Center for Studies on Competitiveness (CEC) at the Instituto Tecnológico Autónomo de México (ITAM) to analyze the competitive status and prospects of different industries—including mining, electronics, and vehicle parts—have concluded that high energy costs and the low quality of infrastructure services are factors contributing to lower economic efficiency and prospects for growth and competitiveness (CEC 2004a, 2004b, 2004c).

Figure 31: Reduction in Processing Facilities in Mexico[84]



Note: IMSS is the Mexican Social Security Institute (*Instituto Mexicano del Seguro Social*)

Source: Consejo de Coordinadores Empresarial (2005) based on data from INEGI.

94. **Reforms to the energy sector maybe extremely difficult to achieve.** Over the last decade, different groups have called for the implementation of far reaching reforms in sector policies as a necessary condition to attract sufficient private financing, improve efficiency, lower costs, and expand the sector's contribution to the federal budget and the economy. Although a national consensus has not

[84] Reducción establecimientos de industria de transformación: Patrones registrados en el IMSS industria de transformación (INEGI, 2005).

been reached with regard to the nature and extent of energy sector reforms, the GOM has gradually taken conservative steps to allow limited private sector participation and improve transparency and regulatory accounting.

95. **Mexico has adopted a strategy to strengthen and modernize the energy sector.** Specifically, the Energy Sector Program 2000–2006 (PROSENER) includes measures to strengthen the technical, economic, financial, and legal aspects of the different energy sub-sectors. In electricity, it places special emphasis on: (i) fuel share diversification and security of supply –measures (e.g., increasing the share of renewables and other sources); (ii) energy efficiency and conservation; (iii) finding ways to increase private sector participation and, (iv) increasing commercial integration with regional energy markets. In the hydrocarbons sector, PROSENER is mostly concerned with the modernization of the oil industry including the transformation of large industrial complexes, and the introduction of incentives to increase the efficiency and competitiveness of the sector. In particular, the program emphasizes the need to adopt international standards for project planning, management, and development, and for service and product quality.

96. **Regulation is being improved through an agreement between COFEMER and the Secretariat of Energy (SENER).** The 2001 agreement includes measures to modify regulatory frameworks and ensure transparent regulatory accounting and public disclosure.

Moving Forward

97. **Mexico needs to implement a number of strategic measures to ensure the long term sustainability of the energy sector and the competitiveness of economic activities.** The constraints affecting the energy sector have been repeatedly exposed over the last decade by both expert analysts and public enterprises PEMEX and CFE. In the hydrocarbons sector, it has been estimated that about US$130 billion would be needed between 2004–2012 for priority investments; with these sums available, the focus would be on restitution of reserves and minimization of imports allowing for activities in exploration and production, refining, petrochemicals, and others.[85] Likewise, the electricity sector needs important sums to finance additional capacity and modernize interconnected infrastructure. The growing dependence on fuel imports and the gradual deterioration of energy infrastructure calls for the implementation of a number of far-reaching strategic measures, which may include the following:

- **Finding ways to lower the country's fiscal and budgetary dependence on oil revenues and allow autonomous enterprise management in hydrocarbons and electricity**. This will perhaps require a programmatic approach that considers the gradual strengthening of other sectors of the economy to substitute PEMEX and CFE for other sources and which could sustain budgetary needs and the financing of social programs. One important move toward this end would be the continued strengthening and modernization of the fiscal regime to guarantee sufficient, reliable and stable contributions (i.e. lower risk exposure to oil revenues and eliminate possible bottlenecks to social and economic development). Also, it would be necessary to ensure high efficiency in spending on social programs with an emphasis on long term social and economic development. An increase in private sector participation is also considered essential to minimize the fiscal burden and financing needs of the hydrocarbons and electricity industries.

- **Launching a structured national dialogue that includes relevant stakeholders and expert analysts to review the options for ensuring the long term sustainability of the energy sector**

[85] Acevedo (2004).

(e.g. national expert committee). In parallel, strengthen the capacity of political parties, senate and congress members and the civil society to analyze energy sector bottlenecks. This exercise should try to integrate the political dimension and seek Congress and Senate approval only after a set of sound strategies has been clearly identified, along with their associated economic and social costs and benefits.

- **Establishing a strategy to modernize the energy sector and reduce dependence on fuel imports**. This strategy should include the following: a) implementation of a sound program of investments and capital expenditures; b) fuel diversification measures; c) encouraging private sector investment interests and promotion of strategic partnerships to bring in additional sources of capital; d) implementation of a program to improve service quality and performance to international levels; e) design and implementation of innovative legal and financial instruments to lower risks associated with fuel price and fuel availability. Such measures could include innovative covenants in power purchase agreements, phasing out of PIDIREGAS, fuel price hedging, and fixed price coverage with reference price or cap.

- **Strengthening policy and regulatory frameworks**. New investments will require the consolidation of policies and regulatory frameworks that increase long-term certainty levels for all participants in different segments of the hydrocarbons and electricity supply chains.

MEXICO LAGS ON ICT AND TELECOM AND MORE COMPETITION IS NEEDED

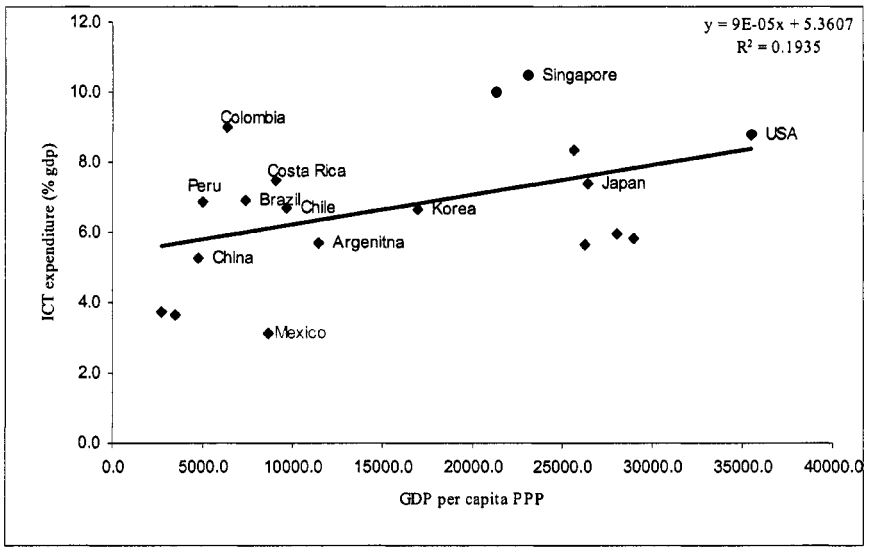
Description and Challenges

98. **Investment in Mexico's information and communications technology (ICT) sector, especially the telecommunications sector, has grown dramatically since the 1990s. This growth is** in large measure due to the gradual opening up of the market to competition and foreign investment. According to Mexico's telecommunications regulatory agency (Comisión Federal de Telecomunicaciones, COFETEL), from 1999 to 2003, more than US$20 billion have been invested in the telecommunications sector alone. In 2003, a time of significant contraction in the global telecommunications industry, investment in the Mexican telecommunications sector amounted to US$ 2.3 billion and grew at a rate four times faster than the economy as a whole. In 2004 the GDP indicator for the telecommunications sector grew by 22.6 percent, compared to a national GDP growth rate of 4.4 percent.

99. **Despite this impressive growth in absolute levels, Mexico lags behind other Latin American and OECD countries in terms of investments in the ICT sector as the share of the overall economy.** As Figure 32 illustrates, Mexico's level of ICT expenditure (3.1 percent) is significantly below OECD countries such as Japan (7.4 per cent), United States (8.8 percent) and New Zealand (10 per cent). It is also nearly half that of Chile and Brazil's rates of 6.7 percent and 6.7 percent respectively and lower than Argentina's, Peru's, and China's rates of 5.7 percent, 6.9 percent and 8.4 percent respectively. As a growing number of studies have found,[86] countries with higher levels of investment in ICTs experience higher economic and social development growth.

[86] See OECD (2004c), "ICTs and Economic Growth in Developing Countries."

Figure 32: ICT investments as a Share of GDP, 2003



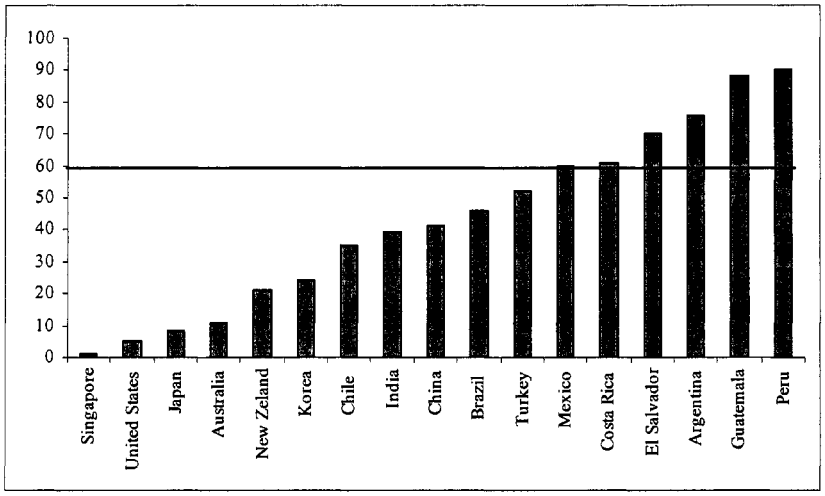
Source: World Bank, World Development Indicators,

100. **Mexico falls short in terms of network readiness.** Reasons for underinvestment in Mexico's ICT sector can found in a wide range of studies and global indices on the ICT sector that highlight problems with Mexico's legal and regulatory framework. For example, according to the World Economic Forum (WEF) Mexico was ranked 44th out of 102 countries in the 2003–2004 Networked Readiness Index (NRI).[87] The NRI is one of the world's most widely recognized measurements of countries performance with regard to ICT readiness and usage. As can be seen in Figure 33, compared to other Latin American countries, Mexico's 44th rank places it behind Brazil (30th), Chile (32th), India, China, Turkey and all OECD countries. The NRI is a composite index that is comprised of several sub-indices, including a political and regulatory sub-index[88] and on this sub-index, Mexico received the lowest ranking of any OECD country (73) as well as a ranking lower than nine other Latin American countries, including Chile (35), Brazil (50), Jamaica (51), Uruguay (57), Costa Rica (58), Trinidad and Tobago (60), Colombia (69), and Dominican Republic (72).

[87] The Networked Readiness Index (NRI) is defined as "the degree of preparation of a nation or community to participate in and benefit from ICT developments." The NRI provides not only a model for evaluating a country's relative development and use of ICT, but also allows for a better understanding of a nation's strengths and weaknesses with respect to ICT.

[88] Political and Regulatory Sub-index: "The priorities of a nation are reflected in its policies and laws that in turn influence its rate of growth and direction of development. This component of the NRI measures the impact of a nation's polity, laws, and regulations and their implementation on the development and use of ICT."

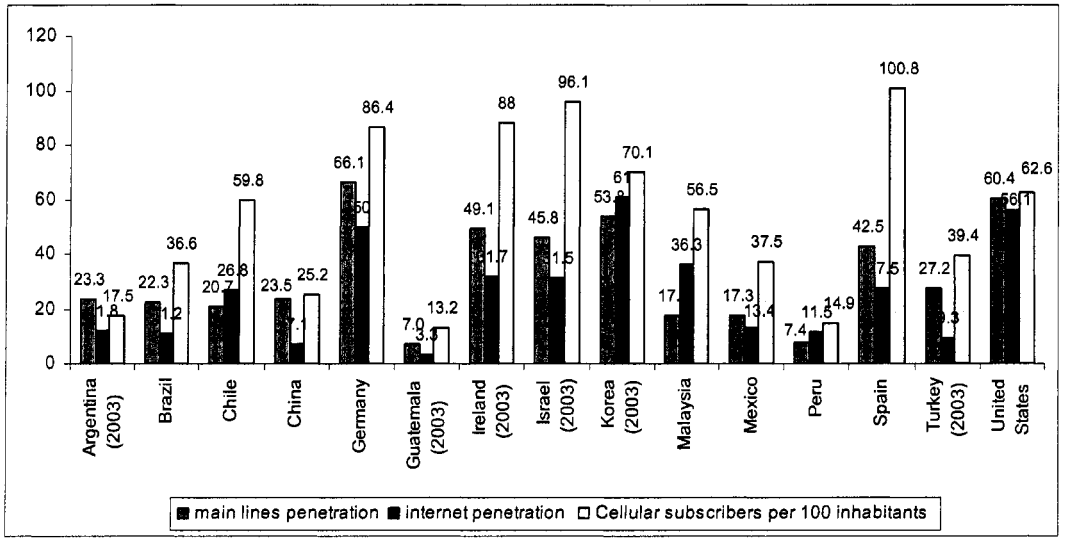
Figure 33: World Economic Forum (WEF) Network Readiness Index 2004–2005



Note: The y-axis is the country's ranking out of 104 countries. A lower rank is better.
Source: World Economic Forum (2005b).

101. **Mexican fixed line growth has not kept pace with comparable countries.** Between 1998 and 2004, the number of fixed lines in Mexico almost doubled from 9.9 million lines to more than 18.1 million, with an average annual growth rate of around 10 percent and a total fixed line penetration rate of 17.1 telephones per 100 people in 2004. Although this growth has been significant, it is substantially below the rates found in other similar countries, In 1991 Mexico, Brazil, and Chile had comparable fixed telephone penetration levels, however during the following decade, Mexico's growth levels were significantly lower than those of Brazil, Chile and other OECD countries and as a result, Mexico now has significantly lower fixed line penetration levels than other Latin American countries (except Peru), as well as comparable developing countries in other regions as can be seen in Figure 34.

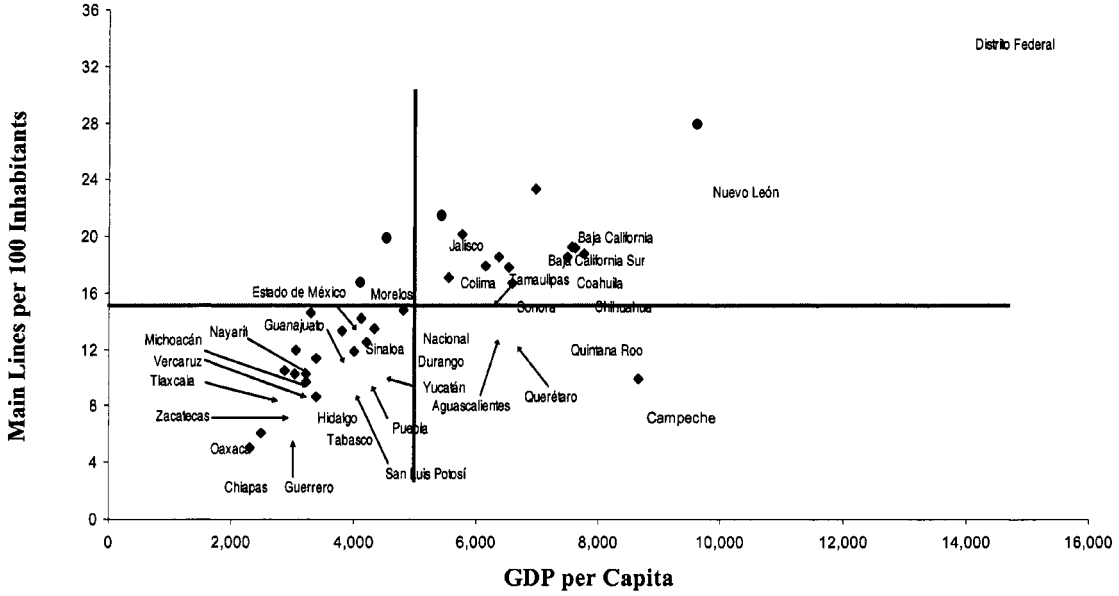
Figure 34: Fixed, Mobile and Internet Penetration—Various Countries (2004)



Source: ITU database; World Markets Analysis.

102. **The digital divide within Mexico is also an issue.** Not only has the digital divide between Mexico and other countries, as measured by fixed telephone penetration, increased but Mexico also lags in terms of reducing the digital divide within Mexico, especially between urban and rural areas. Two indicators highlight this trend.[89] First, as is the case in nearly all developing countries, telephone penetration levels in urban areas tends to be much higher than in rural areas. As can be seen in Figure 35, the Federal District has nearly 35.4 fixed lines per 100 people, while the Southern states of Chiapas, Oaxaca, and Guerrero have, respectively, only 3.9, 4.7 and 7.6 fixed lines per 100 people.

Figure 35: Regional Distribution in Mexico of Main Lines per 100 inhabitants and GDP per Capita, (2004)

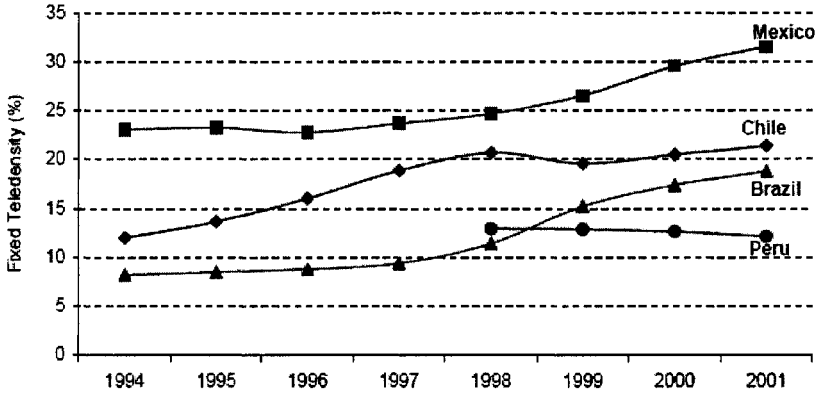


Source: COFETEL

103. A second way to compare digital divide trends is to compare changes in the distribution of telephone penetration between the region with the highest penetration level and the region with the lowest penetration level in different countries. As Figure 36 highlights, Mexico has a more unequal distribution of fixed teledensity than Chile, Brazil, and Peru. The disparity in mobile coverage between Mexico City (highest teledensity) and Chiapas (lowest teledensity) has increased tremendously in recent years, going from less than 5 percentage points in 1997 to 33 percentage points in 2002. This compares to a disparity in Brazil of only 13 percentage points in 2001.

[89] These indicators are taken from Mariscal (2005).

Figure 36: Disparity Levels of Regional Fixed Teledensity

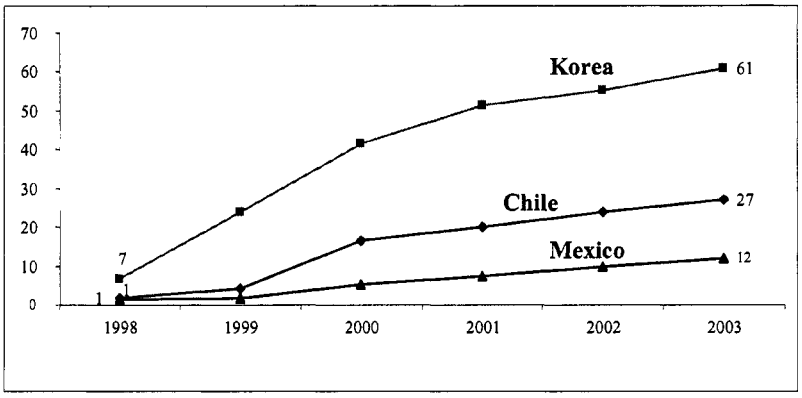


Note: The Fixed Teledensity percentages measure the disparity in coverage between the region in each country with the highest coverage and the region with the lowest coverage.

104. **With respect to the internet, Mexico is a study in contrasts.**[90] On the one hand it has some the most advanced profiles of large business Internet use in Latin America. The internet is widely used for business-to-business, business-to-government and government-to-government transactions. As a result of the web sites and content generated by the e-Mexico, a comprehensive government initiative launched by the Fox administration, Mexico has received many awards for e-government initiatives. On the other hand, Mexico has one of the least advanced profiles for consumer use of the internet. Within Latin America, Mexico has one of the lower household internet penetration levels as can be seen in Figure 34. Within Mexico, the disparity between Internet use in different states is as great, if not greater than the telephony disparity previously described. Mexico's growth rate has also been substantially lower than Chile and Korea. As illustrated in Figure 37, Mexico increased the number of internet users per 100 inhabitants from 1998 to 2003 around 10 times (from 1.3 users per 100 inhabitants to 12 internet users out of 100 inhabitants), while Chile's grew more than 15 times, from 1.7 to 27.2 internet users per 100 inhabitants. In Korea, the number of internet users per 100 inhabitants increased from around 7 users per 100 people in 1998 to more than 60 percent of the population during the same period. Finally, Mexico also lags behind other Latin American countries in ownership and use of personal computers (PCs)—Mexico has only 8.2 PCs per 100 persons, which is lower than Chile's rate of 11.9 and Costa Rica's rate of 19.7.

[90] See Mariscal (2005). Also, Carlson, DeSpain, Elorrieta, Flamm, Kornegay, and Mahaffey, Chapter 7. "The Mexican Case." A chapter in a book being edited for publication.

Figure 37: Internet Users in Mexico, Chile and Korea

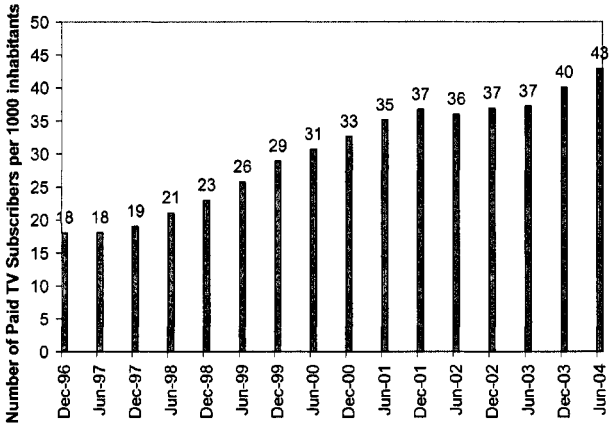


Source: ITU database

105. **The mobile sector has grown tremendously but faces several challenges.** From the mid-1990s, Mexico's mobile sector grew at an explosive annual rate of nearly 100 percent, though compared to other Latin American and OECD countries, Mexico's cellular penetration level is still low. Growth has been driven mainly by the following: the speed and efficiency with which the government allocated spectrum in 1996–1998; competition; the introduction of calling-party-pays policy by the regulator in 1997–1998; and by the widespread adoption of pre-paid calling cards. Penetration of wireless services was greatest in areas where fixed services had not expanded, including lower income areas. The major challenges facing the sector are as follows: the declining average revenue per user due mainly to the popularity of pre-paid calling plans; quality of service and consumer complaints; industry consolidation; creation of incentives to provide internet services using wireless technologies; and extending service to rural and low income areas.

106. **Fiber optic networks and cable and paid television have also seen robust growth.** Mexico's high-speed fiber optic networks that carry the traffic for telecommunications and ICT service also grew dramatically since the sector opened to competition in 1996–1997. From 1993, Mexico went from having around 15 thousand kilometers of fiber optic networks operated by Telmex to around 112 thousand kilometers of fiber optic networks operated by at least six different companies in 2003. In addition, broadband access in many countries including Mexico has been based on cable and paid television infrastructure. The number of paid television subscribers in Mexico grew from 1.81 subscribers per 100 persons in 1996 to around 4.38 subscribers per 100 persons by the end of 2004, as shown in Figure 38

Figure 38: Paid TV Subscribers per 1000 Inhabitants in Mexico (2004)



Source: COFETEL, 2005

107. In 2003, several dozen cable television companies, out of 713 paid television concession holders, applied to obtain a concession to provide data and telephone service over their cable networks. Approximately twenty companies have been granted authority to carry data. However, to date, no cable television company has been granted a concession to provide voice services. COFETEL and the Secretariat of Communications and Transport (SCT) have not granted any such licenses because, they contend, it would require that they allow Telmex to enter the cable TV sector.

108. As can be seen in Table 15, more than 60 percent of Mexican consumers who have high-speed access to the internet do so through cable networks, and cable television companies have more than 70 percent share of the total paid television market. Telmex, which dominated fixed line and mobile networks, does not compete in the paid television market though it has successfully gained a significant and growing broadband market share though its ADSL services.

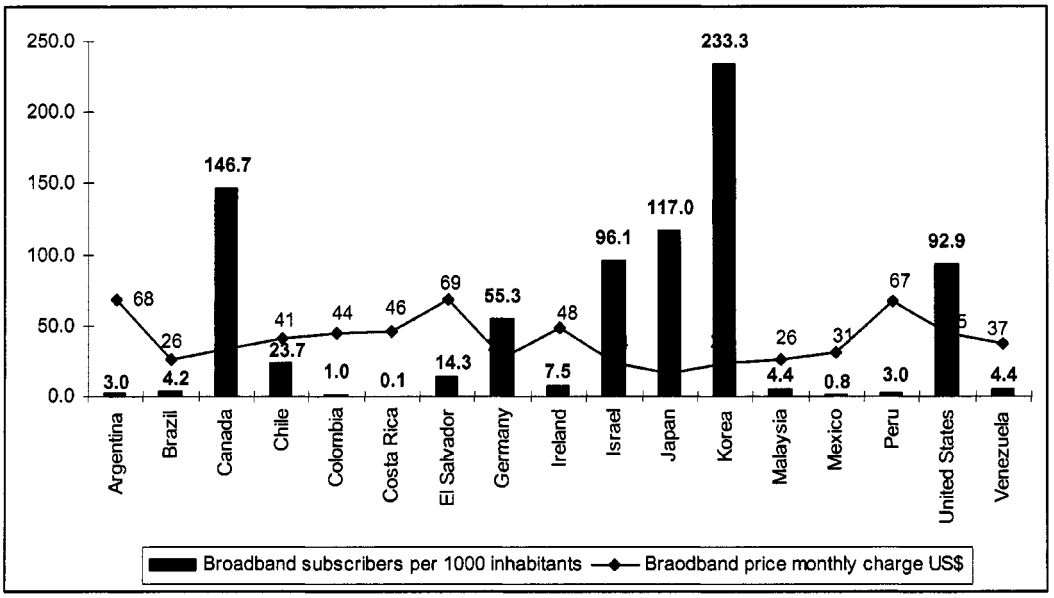
Table 15: Technology and Growth for Broadband Internet Access Services (Consumers)

Access Technology	2001	2002	2003	2004	2005	2006	CAGR 2001–2006
ADSL accounts	7,698	44,791	91,201	146,245	206,199	269,061	104%
Market share	12.45%	22.54%	31.0%	37.2%	41.4%	44.4%	-17%
ISDN accounts	27,221	24,140	20,278	16,628	13,468	10,775	
Market share	44.0%	12.2%	6.9%	4.2%	2.7%	1.8%	54%
Cable accounts	25,316	122,000	158,600	46.9%	206,053	222,537	
Market share	40.9%	61.4%	53.8%	45,850	41.4%	36.7%	
Wireless accounts	1,616	7,823	24,510	11.7%	72,182	103,455	130%
Market share	2.61%	3.9%	8.3%		14.5%	17.1%	
TOTAL	61,851	198,754	294,589	392,699	497,902	605,828	58%

Source: Select, June 2002

109. **Mexico has low broadband penetration.** Access to broadband internet is increasingly used as an indicator of the development of the ICT sector. As can be seen in Figure 39, Mexico has very low broadband penetration rates not only when compared to other OECD countries, but also when compared to other Latin American countries such as Argentina, Brazil, Chile, El Salvador, Peru, and Venezuela.

Figure 39: Broadband Penetration and Prices



Source: ITU database

110. **The incumbent, Telmex, remains dominant.** Telmex, as can be seen in Table 16, clearly dominates the long distance, local, and cellular telecommunications markets. It provides service to over half of all dial-up internet accounts and over a third of high-speed internet access accounts. Its share of high-speed internet accounts increased significantly during 2002.

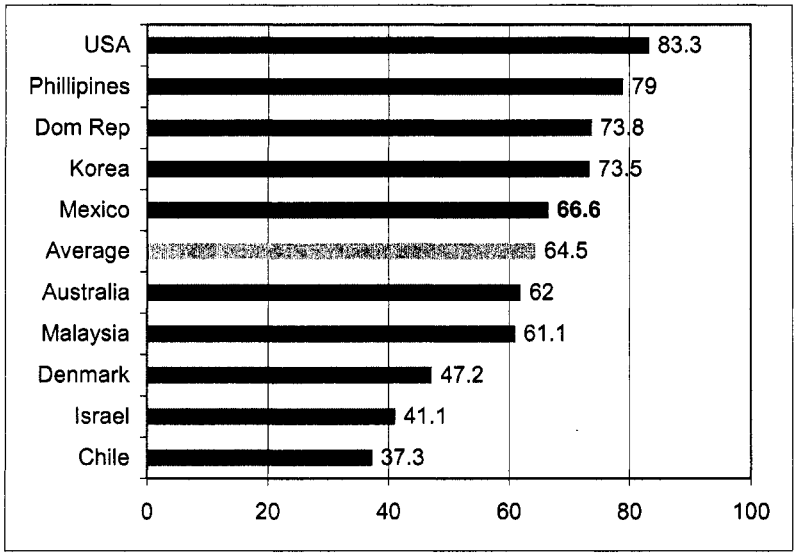
Table 16: Telmex Market Shares

Market Sector	Market Share	Sector	Market Share
Int. long distance (2003)	61.3%	Internet access: 56 kbps dial-up (2002)	51%
Cellular (2005)	75%	Internet access: 128 kbps and above (ADSL, cable TV, etc) (2002)	37%

Note: Internet access estimates based on number of accounts.
Source: Telegeography 2004. EMC 2005.

111. Telmex's market share in the international sector in 2003 represented around 66.6 percent which is often cited as an argument that Telmex is too dominant. As Mexican authorities have pointed out, Telmex's market share after five years of competition is comparable to the five-year benchmark of other countries (see Figure 40). Indeed, a recent survey of eighteen countries found that the average five-year incumbent market share benchmark is 64.5 percent. What is remarkable about Telmex is not that it is dominant in one market segment, but that it has retained, and in some cases increased, its market power in a number of sectors, which has ripple effects on access, innovation, and prices.

Figure 40: Incumbent Market Share after 5 years of Competition



Note: The average is based on data from 18 countries that report market share information for markets opened for at least 5 years.
Source: Telegeography, 2003.

112. **Telmex's net profit margin and earning per share from continuing operations is more than twice that of its closest rival** (Table 17). Telmex is also far ahead in operating income as a share of revenues compared to other U.S. and British companies. During the last five years, Telmex has also transformed itself into a fairly efficient company in terms of lines per employee.

Table 17: Financial Performance of Telecommunications Companies (December 2004)

Telecom Company	Annual Net Income (US$ millions)	Employees	Annual Sales (US$ millions)	Revenue per Employee (US$)	Net Profit Margin	Earning per Share from continuing operations (US$)
Telmex	**$2,467.8**	**62,103***	**$12,457.5**	**$201**	**19.8%**	**$3.97**
Bellsouth	$4,758.0	63,000	$20,300,0	$322	23.4%	$1.85
Verizon	$7,831.0	210,000	$71.283.0	$339	11%	$2.59
DT	$6,277.0	244,645	$78,404.0	$320	8.0%	$1.49
France Telecom	$3,771.0	218,523	$63,879.0	$292	5.9%	$1.52
Telefónica Argentina	($3.0)	9,642	$1,033.0	$107	14.8%*	$(0.02)
Tele Norte, Brazil (2003)	$73.4	37,690	$4,833.8	$128	1.5%	$0.19

* 2003
Source: Hoovers Detailed Annual Reports. All based on December 2004 reports.

113. **Telephone charges are high in Mexico compared to Latin America.** Table 18 shows the evolution of telephone tariffs between 1995 and 2003. Although monthly subscription and usage fees have not changed much, connection charges have dropped drastically. In 2003, the basic monthly tariff

was about $14.5 for residences and $18.3 for businesses, and the local calling charge was about 14 cents for each call. As seen in Table 19 and Table 20 prices in Mexico are much higher than other similar countries. All calls originating in the public network in Mexico are subject to the basic 14 cents calling fee, unlike most Latin American countries where telephone charges are based on usage or the United States where local calls are covered by the monthly recurring charge. Businesses pay this rate for all calls, but residents pay only for calls exceeding 100 per month. Telmex reports that approximately half of the residential customers make fewer than 100 calls per month.

Table 18: Telephone Tariffs in Mexico, 1995–2003

Tariff ($)	1995	1996	1997	1998	1999	2000	2001	2002	2003
Connection charge									
Business line	480	409	442	383	366	370	375	362	162
Residential line	277	236	123	107	111	119	121	117	105
Monthly subscription fee									
Business line	14	13	19	19.3	19.9	20.9	21.2	20.5	18.3
Residential line	7	9	14	14	14.5	15.5	16.8	16.2	14.5
Local call (3 minutes, USD)	0.07	0.10	0.14	0.13	0.14	0.15	0.16	0.15	0.14

Source: ITU database, 2005.

Table 19: Local Telephone Prices Compared to Similar Countries (2003)

Country	Business telephone monthly subscription (US$)	Residential monthly telephone subscription (US$)	Residential telephone connection charge (US$)	Cost of three minute local call (US$)
Mexico	**18.35**	**14.51**	**104.73**	**0.14**
Argentina	12.94	4.56	51.72	0.02
Chile	9.20	9.20	43.95	0.10
Brazil	13.71	7.72	1 3.81	0.05
Korea	4.36	4.36	50.35	0.03
United States	42.40	24.75	40.76	0.00
El Salvador	1.62	0.95	6.86	0.01

Source: ITU

Table 20: Local Prices Basket (2003)

Country	Business (1000 min)	Residential (600 min.)
Argentina	111.20	23.60
Brazil	78.80	26.70
Costa Rica	8.22	12.50
Guatemala	16.71	28.03
Korea (Rep.of)	55.40	32.90
Malaysia	26.00	7.60
Mexico	**348.20**	**106.40**
Turkey	26.30	15.70
United States	25.70	8.40
(a) Total Basket = (installation cost/120) * (monthly rate) * (charge p/min call)		

Source: ITU database with author's calculations

114. **Local loop prices for businesses are quite high.** Businesses that generate large amounts of long distance and international data traffic, typically lease two types of data or circuit services — one to carry the traffic from their offices to the switch of the long distance carrier (known as a local loop), and a second for the long distance portion. The long distance price compares favorably with other countries, but not the local loop price. Table 21 shows that the price of a local loop in Mexico is much higher than that found in most other comparable Latin American countries. The installation or non-monthly recurring charge for a local loop with E-1 capacity is $19,669, more than twice the price charged by Telmex's competitors and more than six times the price charged in Buenos Aires. Similarly, the monthly recurring charge for a Telmex E-1 local loop is more than twice what a new entrant charges in Mexico City; moreover, it is more than 40 percent more expensive than the monthly recurring charges in Argentina and Brazil and more than four times as expensive as in Chile.

Table 21: Local Loop Prices for Carriers 2002: E-1 CAPACITY

Location (Local Provider)	Install/Non-monthly recurring charge (non-MRC)	Monthly recurring charge (MRC)
Mexico City (Telmex)	$19,669	$1,150
Mexico City (new entrant)	$8,709	$509
Argentina – Buenos Aires	$3,000	$800
Brazil – Sao Paolo	$645	$851
Chile – Santiago	$1,400	$260
Peru – Lima	$4,000	$1,960
Venezuela – Caracas	$1,500	$4,000

Note: Assumes a one-year lease for an E-1 local access line. Prices are based on those publicly registered.
Source: Company survey by World Bank.

115. **People in rural areas pay relatively more for similar services.** Consumers in remote rural areas not directly served by Telmex can make calls through Telecomm, a quasi-private company overseen by the (SCT). However, Telecomm is not a carrier and has to pay Telmex to transport signals from its hub near Mexico City to the final destination. Telecomm is not considered a public operator and does not have an interconnection contract with Telmex. Telmex considers Telecomm a "large user". It also does not receive the access charges from incoming international calls. As a result, Telecomm's tariffs to users are high for the remote rural consumer (Table 22). Telmex rates, in contrast, are lower, and they do not charge for incoming calls. Telecomm has tried to establish an agreement with long distance carriers that would allow it to create a "calling-party-pays" system, but without success. Thus ultimately, people in smaller (and poorer) communities pay more for the same service than people in larger (and richer) communities.

Table 22: Telephone Prices for Rural Telephony

Type of Call	Telmex rate per minute without VAT (Towns of more than 500 population)	Telecomm rate per minute without VAT (Towns of 100 to 500 population)
National calls	20 cents	40 cents
Calls to USA	$1.04	$1.04
Incoming calls	--	20 cents

116. **Mexico's ICT regulatory framework is weak.** The shortcomings and challenges of Mexico's ICT sector—lack of investment in rural areas, low broadband penetration, market dominance and high tariffs—are largely a reflection of shortcomings in Mexico's legal and regulatory frameworks and institutions. Industry reports consistently rank Mexico's regulatory frameworks as one of the weakest in Latin America.[91] More importantly, recent reports and decisions by international organizations such as

[91] See Pyramid Reports (www.pyyramidresearch.com).

the OECD and the World Trade Organization have also highlighted the shortcomings of Mexico's ICT policy, legal and regulatory framework, and institutions.

117. **Regulatory issues were at the root of a World Trade Organization dispute with the United States.** As is highlighted in Box 14, a recent decision by the WTO involving a dispute between the United States and Mexico over telecommunications, found that Telmex is a "major supplier" and that Mexico's regulatory regime and regulator had not only failed to stop Telmex's anticompetitive practices, but that it had adopted regulations that required anticompetitive behavior. The WTO dispute resolution panel ruling was drafted to be narrowly limited to Mexico's WTO commitments on international telecommunications. However, it is significant insofar as it carries out a detailed and balanced analysis of Mexico's WTO commitments as well as Mexican regulations.

Box 14: Telecommunications and the WTO: the Case of Mexico

The first (and so far only) case of WTO dispute resolution on telecommunications services (and, indeed, on services generally) was initiated in 2000 by the United States with reference to Mexico. In August 2000 the United States requested consultations on Mexico's obligations and commitments on basic and value-added services under the GATS Annex on Telecommunications and the Reference Paper. Successive rounds of consultations did not resolve the issues raised, and in April 2002 the WTO established a dispute resolution panel to examine the complaint. The Panel met several times with the parties (the United States and Mexican government representatives) and with ten third-parties having an interest in the case. The Panel issued its final report to the parties in March 2004. The Panel decision was not appealed to the WTO Appellate Body, the WTO's Dispute Settlement Body unanimously approved the Panel report in June 2004, and the parties agreed on a plan to redress the underlying problems by July 2005.

Mexico had undertaken specific commitments under the GATS Articles XVI (market access), XVII (national treatment), and XVIII (additional commitments, comprising the Reference Paper). The United States claimed that, with respect to the services at issue, Mexico had:

- Failed to ensure that TELMEX, the largest operator, interconnects U.S. suppliers on a cross-border basis on cost-oriented, reasonable rates, terms, and conditions.
- Failed to prevent anticompetitive behavior, as regulations empower TELMEX to lead a cartel that fixes rates for international interconnection and restricts supply.
- Failed to ensure access by U.S. suppliers to public telecommunications networks in Mexico, thus preventing them from providing non-facility-based services within Mexico (through commercial agencies or 'comercializadoras') and international simple resale (through cross-border leased circuits).

The WTO panel's 238-page final report basically ruled in favor of the United States on the first two counts and ruled partly in favor of Mexico and partly in favor of the United States on the third count. On the first two counts, the panel determined that Telmex was a "major supplier" and that it had engaged in anticompetitive behavior. Furthermore, the panel found that the Mexican government had not only failed to stop Telmex's anticompetitive behavior, but that its international long distance regulations required Mexican operators to engage in anticompetitive behavior that was tantamount to a cartel. On the third count, the panel ruled in favor of the United States in so far as Mexico needed to issue regulations to allow non-facility-based operators (i.e., comercializadoras) to provide services, but it sided with Mexico in agreeing that Mexico had not made any WTO commitments to legalize international simple resale (ISR). In most OECD countries, ISR is allowed and widely used by operators.

As a result of the panel ruling, the parties agreed in April 2004 called for the following actions which COFETEL is in the process of implementing:

- Within two months of adoption of the Panel's report, Mexico will revise its international long distance rules to allow competitive negotiation of settlement rates by eliminating uniform settlement rates, proportional returns, and the requirement that the operator with most outbound traffic negotiate the settlement rate on behalf of all Mexican operators

- Within 13 months, Mexico will have in force regulations to license 'comercializadoras' allowed to resell international switched telecommunications services provided by Mexican concessionaires
- Mexico will continue to have the right to restrict international simple resale (use of leased lines to carry cross-border calls)

118. The government, through the SCT, is responsible for monitoring Telmex compliance with its concession obligations; including the process of gradually rebalancing Telmex's highly cross-subsidized telephone tariffs to prepare the company and Mexico's telecommunications markets for competition that was set to begin in mid-1996. Telmex's tariffs were not fully rebalanced by the end of its monopoly, in part due to the 1994 financial crisis. The failure to rebalance Telmex's tariffs planted the seeds for subsequent challenges.

119. **Regulators have been reluctant to take action on controversial issues.** Ever since Congress began debating the new telecommunications law in late 2001, the SCT and the regulator COFETEL have been reluctant to take action on a number of controversial issues such as unbundling, collocation, issuing resale regulation. COFETEL, however, has taken action on a number of low-key, though important issues such as numbering, dominance rules (though these have been frozen due to legal challenges), tariffs, and local loop competition. Due to political factors, the new telecommunications law was never issued, leaving COFETEL without a strengthened regulatory framework fostering independence and institutional credibility.

120. The 1995 Federal Telecommunication Law called for the creation of a regulatory body as part of the SCT but did not specify the powers and authority of the regulator. As a result, SCT drafted a presidential decree that created COFETEL on August 9, 1996 as a regulatory body to be led by a chairman and three commissioners without set terms, who are nominated by and can be removed at the will of the SCT Secretary. Between 1996 and 2004, COFETEL has been led by four chairmen, and has not had the stability needed to create a strong new institution charged with regulating a complex and powerful industry.

121. **COFETEL lacks adequate enforcement powers and independence**. One of the main reasons for the lack of independence is the need for a legal figure that can give COFETEL independent decision-making power without political pressures. Also, the head of the COFETEL is nominated without a fixed term of office. A recent OECD institutional analysis study,[92] which evaluates the regulatory framework of the Water, Energy, Financial Services, and Telecommunications agencies, concluded that there is an urgent need for a national debate to discuss the creation of a regulatory figure to legitimize these regulatory entities.

122. Mexico has several fairly effective quasi-independent regulatory bodies that can be used as models for the establishment of a more independent and effective COFETEL. One example is the Federal Competition Commission (CFC), which was created by the Federal Competition Law. The Commission has legal underpinnings that give it independence and autonomy, and it is headed by a board with members that enjoy ten year staggered terms.

123. **"E-Mexico" is a major initiative to expand ICT access throughout the country and develop on-line applications across several sectors.** The objective of this initiative, as stated in President Fox's address to the Nation, on December 1, 2001, is "to use the revolution of information and communications to project a national character and reduce the digital gap between governments, companies, homes, and individuals, with a reach to the last corner of our country." The e-Mexico Project has three major

[92] See OECD (2004a) "Progress in Implementing Regulatory Reforms: Mexico."

initiatives: (i) the connectivity initiative that proposes to extend broadband access to internet to 10,000 locations throughout the country; (ii) the applications initiative, that aims at developing applications in education, health, SMEs, and e-Government; and (iii) the implementation initiative; the last includes building telecenters, access points, and local area networks in schools, health centers, community centers, and municipalities and creating associations of producers to use the applications and to train their staff. The e-Mexico program aims to build on the existing capacity of telecommunications infrastructure (100 percent digital), to use this infrastructure to deliver applications, and to extend ICT to provide government services directly to the citizens.

124. The e-Mexico coordinator who reports directly to the SCT Secretary officially coordinates the program. A high level official in the Office of the Presidency is also partly responsible for monitoring implementation. e-Mexico has a small staff that is responsible for coordinating the activities of other secretaries and ministries responsible for the e-education program, e-commerce, and e-Government.

125. Aside from the e-connection program, the e-Mexico coordinator's role is mainly to act as a catalyst for the line-ministries to develop specific projects that have ranged from developing web pages, to implementing comprehensive and innovative programs to deliver and procure education and government services through the Internet. Mexico's information technology industry has, for example, been very supportive of the e-Mexico initiatives developed by the Secretary of Economy to support the development of the Mexican software industry. The Secretary of Economy has developed similar programs aimed at using ICT to increase the competitiveness of Mexican companies in more than six key industries.

126. **After nearly two years of preparatory work, mostly within government, e-Mexico initiatives started operating in 2002**. That year the government allocated nearly $75 million for the first of three stages of the e-Mexico connectivity program, which would provide a partial subsidy to a private sector company to provide broadband connectivity to 3,200 Centros Comunitarios Digitales (CCDs) or digital community centers connected via a VSAT satellite network. After extensive studies, the e-Mexico program issued on September 3, 2002 a request for proposals to establish 2,443 CCDs nationwide, especially in Mexico's poorer and more rural areas. Each CCD would have at least three computers with high speed connectivity and the service provider needed to commit to managing and running these systems as well as providing a range of services. The government subsidizes these CCDs in two ways: first, by providing free high speed connectivity via satellite transponder capacity; this the SCT had reserved for five years for social purposes from Satmex when it was privatized and from the concessions of the satellite service providers. The winning bid would have to pay for the cost of installing the VSAT antennas and the equipment to run the CCDs, Second, the government subsidy would provide a one-time payment to the CCD service provider to help offset the capital costs of building the VSAT antennas and CCD equipment. The service provider was also guaranteed that each CCD would be paid $30 a month by the school or municipality where the CCD was based.

127. On December 3, 2002 Interdirec was selected as the winner of the first CCD program, outbidding proposals from Telmex and Avantel. Interdirec is a relatively small company that has been using innovative wireless technology to provide distance education and internet access in several Mexican communities. By 2003, the first 3,200 CCDs were installed in all the municipalities of the country, and in 2004, two more biddings for 2000 CCDs each were launched by the SCT. The winner of both biddings was Telmex. By the beginning of 2005, 7,200 CCDs had been installed around the country. For 2006, the SCT expects to have more than 10,000 CCDs installed in the country along the municipalities.

128. **The Telecommunications Social Access Fund (*Fondo de Cobertura Social de las Telecomunicaciones,* FCST) promotes telephone access in rural and low income areas.** Congress

authorized a US$70 million budget to develop the Fund in 2002 and a committee with representatives of public and private sectors was created. COFETEL developed both a study to determine which localities would benefit from the fund and a feasibility study. The uniqueness of this fund is that its objective is not only to install public telephone lines, but mainly to increase telephone penetration through residential lines in rural localities with more than 500 inhabitants. Specifically, the objective is to reduce the access gap of localities with the least telecommunication coverage around the country. The FCST was designed to use at least 70 per cent in residential fixed lines (with any technology) and up to 30 per cent in public telephone lines.

129. **The FCST has some budgetary shortcomings.** The FCST depends entirely on arbitrary budgetary allocations instead of on an annual assessment on the revenues of telephone companies of 1 percent to 2 percent as is the case with similar funds in Brazil, Colombia, and Peru. In the United States, telephone companies are collectively assessed by several universal access funds an average of 2 percent to 5 percent of revenues. In 2002, the FCST was allocated $70 million and in 2003 it was allocated less than half the 2002 amount. The International Telecommunications Union (ITU) estimates that in 2003 Mexico's telecommunications sector had revenues of around $17 billion, which means that a 1 percent tax on Mexican telecommunications companies would raise about $170 million for universal access programs on a sustainable basis. Such an assessment would provide sufficient funds to put in place a more effective, comprehensive, and sustainable universal access program.

130. In 2004 a first bidding of approximately US$30 million and use of the radio frequency spectrum (1.5 Ghz) was launched. This bidding included around 3,930 localities that will benefit around 3.2 million inhabitants. This first bidding is expected to provide around 125 thousand lines in which 30 per cent of the cost of each line will be covered by the Fund (capital investment) and the rest by the winning operator (operating costs). The operators will charge only the outgoing calls through a prepaid calling card scheme; the installation fee and the telephone device will be covered by the Fund. The Fund will cover the first 30 per cent of the lines demanded in each localities, the rest will be covered by the operator entirely or by incoming competitors. The incumbent, Telmex, won the bid in March 2005 and is expected to start expanding the service in these localities. A new bidding is expected to start in June or July 2005.

131. **The FCST fills an important gap given that the SCT has not imposed universal access requirements on Telmex.** Prior to 2002 when the FCST program was created, Mexico's only universal access programs were those contained in Telmex's concession requirements, the Telecomm payphone program, and concession build-out requirements in other carrier concessions. As a result, Mexico did not have an explicit universal access program aimed at increasing access to telecommunication services. When Telmex was privatized in 1990, it was given a six-year exclusivity period. As part of its concession requirements, Telmex was required to comply with certain network expansion needs by 1995, including expanding the number of telephone lines nationwide by 12 percent each year; providing telephone service in population centers greater than 5,000; and offering rural telephony via payphones in population centers greater than 500. The Telmex concession required that after 1995 it must comply with four expansion programs negotiated with the SCT. Telmex complied with its concession requirements. Since 1999 the SCT has not imposed new build-out requirements on Telmex, though it is required to continue to provide services to all areas where it currently provides services as a result of its concession requirements. The SCT has not imposed new universal access requirements on Telmex as part of an effort to undercut Telmex's opposition to SCT and COFETEL initiatives and regulations aimed at increasing competition.

132. **Several e-Government initiatives will reduce transactions costs within government and for businesses and citizens.** The government has implemented some key projects and initiatives that will

provide different types of on-line services to the citizens such as the Citizen's Portal (www.gob.mx), Compranet, Declaranet, and Tramitanet. The Federal Government has also enacted legislation to develop e-Government and modernize its processes (for example digital signature, E-commerce legislature package in 2000, Electronic Declarations Legislation in 1998). Some key projects are discussed below:

- **System for Government Procurement** (www.compranet.gob.mx): This system allows all government purchasing departments to publish their procurement needs, including products, services, leasing, and public works. Potential suppliers may access this information and bid for specific contracts using the same portal. There were almost 28,000 public bids conducted using Compranet in 2003. Today, 100 percent of public bids are registered in Compranet and 40 per cent of them were totally conducted via Internet (64% of value). During the first half of 2004, another 80 government agencies joined the Compranet system.

- **Single Registry of Authorized Persons** (*Registro Unico de Personas Autorizadas*, RUPA): This registry will enroll citizens who work frequently with many government agencies and will issue them a universal identification number that will be used as the only identification required to work with government agencies. The decree mandating the creation of this registry was published in May 2004 with the expectation of having the basic registry fully operational by the end of November 2005. The Ministry of Finance worked together with the Ministry of Public Function (SFP) to define the rules and standards, procedures and technology for the advanced electronic signature to be used across all government agencies that would use it. RUPA will be consistent with these regulations.

- **Citizen's Portal of the Federal Government** (www.gob.mx): The portal is part of the e-Mexico system and the Presidential Agenda to Promote Better Government. It represents one of the most noticeable results of the digital government strategy. As of today, www.gob.mx receives 12,000 visitors daily. Its structure represents a "world-class" e-Government portal at a national level. The portal has been acknowledged internationally and was awarded first place in the *2004 Stockholm Challenge Award* for the e-government category. www.gob.mx represents a single access point to all levels of government services and provides answers to the informational needs of the community and a link by which to perform government-to-consumer, government-to-business, and even government-to-government transactions.

- **Tramitanet** (www.tramitanet.gob.mx): This sub-portal consists of an online catalog of federal and some state "*tramites*" (government procedures/paperwork) made available on the Internet. For each *tramite*, information is provided about procedural steps to be followed, the supporting documentation required, location and working hours of the government office, and cost of fulfilling and/or complying with the proceedings. The new regulatory framework mandates that electronically generated and submitted federal *tramites* be recognized and have the same legal effect and value as *tramites* conducted by traditional methods. Federal *tramites* can be "signed" with a high security certification procedure administered by a government entity or notary public. To obtain a certificate, an individual or corporation must first appear physically before the certifying authority to verify the user's identity. Unfortunately, this legal certainty is not available for all state level *tramites* because some of them do not have the legal frameworks in place to support electronic forms and proceedings (digital signature, data messages, etc.).

- **E-Government at the State and Municipal level:** The states of Puebla, Sinaloa, Aguascalientes, Baja California, and Colima are the leading states in the performance of e-Government. By deploying interactive kiosks developed locally, Colima has become very innovative in leveraging scarce resources to offer digital services, Puebla has partnered with a private company to issue drivers'

licenses. It is relevant to say that in most of these states, the person in charge of IT reports directly to the governor. The great majority of the states have not leveraged the Federal Government's infrastructure to offer better services to their constituents through the use of technology. To assist them, the Federal Government has provided a portal (www.e-local.gob.mx) to help municipalities and states strengthen their institutions and share good practices.

Moving Forward

133. **The private sector provision of ICT infrastructure needs to be expanded.** Although e-Mexico, FCST, and related connectivity programs provide important contributions towards the development of a knowledge economy, they do not adequately address the most important challenge: that of dramatically increasing private sector provision of ICT infrastructure in Mexico. To do so would require a level playing field, elimination of entry barriers, healthy competition, and increased access to ICT services. The following are some recommendations to bring these goals about.

Create a Level Playing Field: Institutional Changes

134. **Rebuilding the credibility, effectiveness, independence, and transparency of COFETEL is necessary.** Despite a promising beginning, COFETEL is a weak regulator that does not inspire the confidence new entrants need to make investments in this sector. This has become the single most important barrier to ICT growth in Mexico. Congress should focus on adopting amendments to the Federal Telecommunication Law that would make COFETEL as independent and transparent as the CFC, and set aside amendments over more technical issues, such as interconnection, tariff, and unbundling which could be better addressed by a more effective and independent COFETEL. The amendments should also remove the ability of the SCT to review or oversee COFETEL and, equally important, mandate that COFETEL immediately adopts and follows transparent and accountable procedures in decision-making. COFETEL should have the power to develop and implement its own regulations and not simply be responsible for implementing those developed and approved by the SCT. The COFETEL Chairmen and commissioners, nominated by Congress, should be appointed for fixed terms, and should only be removed for gross ethical violations. To send a dramatic and clear signal that there is an institutional break with the past, Congress could direct COFETEL to report to the Secretariat of Economy, which could have an added benefit of increasing coordination between COFETEL and the CFC—the telecommunications and competition regulators. Congress should also enable COFETEL to have adequate financial resources: the organization should be able to finance itself through fines and license fees. It should also be accountable to the Congress for its annual budget. Making COFETEL a more effective regulatory agency with increased autonomy and transparency will not only strengthen COFETEL, but it will also reduce the ability of disaffected parties to misuse the judicial system to reverse or delay regulatory decisions through the use of amparos.

Eliminate Entry Barriers and Foster Competition

135. **The licensing regime for new entrants should be simplified and streamlined.** The current concessions, permits, and licensing regime in Mexico is complex, and imposes burdensome requirements for information that cause unnecessary delays not only for new entrants, but also for current concession holders who simply wish to amend their existing concessions. Mexico would be better served by adopting a simplified licensing regime, on similar lines to those adopted by the European Union, Argentina, Chile, or Peru. A company wishing to provide domestic voice service, or a concession holder seeking to add services to its concession, needs to provide extensive financial, business, network, and technical information to SCT and COFETEL. The entire process takes at least nine to 24 months and requires the outlay of considerable legal fees. This is in sharp contrast to Europe where class licenses are in most cases granted automatically or within a period of weeks. Simplified licensing regimes for value-

added services are critical to fostering the development of ICT service providers and applications. In Europe the process would be at most a simple one of self-certification. In Peru, the value-added service application is a simple two-page document, and registration is typically granted within a couple of weeks.

136. While some of these barriers may have arguably served a purpose before Mexico's transition to a more competitive telecommunications market, it is time Mexico adopted international best practice with a more streamlined, less burdensome, and simplified licensing regime that is transparent and accountable and operates within a stipulated period of time. Such an approach would enable COFETEL to devote more staff and resources to revising and updating regulations and taking action against monopolistic behavior.

137. **Requirements to register contracts with COFETEL for all but the incumbent should be eliminated.** Currently, all concession holders must submit all of their draft contracts to COFETEL for their approval before they present them to new clients. The approval process for the generic contracts can take months and COFETEL sometimes uses this process to impose additional regulatory requirements on certain services. These requirements also hinder companies from rapidly introducing and tailoring new services and contracts for clients, since the company runs a legal risk if the contract that is signed deviates significantly from the generic contract approved by COFETEL. In addition, all interconnection agreements between concession holders must also be approved by COFETEL before they can go into effect. Imposing such requirements on an incumbent carrier may prevent monopoly activities. However, their imposition on new entrants contributes to delays and uncertainty regarding the introduction of new ICT services since these, because they involve new services and technologies, often do not neatly fit into the regulatory classifications of COFETEL. International best practice allows non-dominant companies to enter into contracts freely and modify them with their clients.

138. **Legacy voice-centric regulations should be eliminated.** A significant number of COFETEL's regulations, such as the international long distance and interconnection rules, are focused on the provision of voice services and leave much ambiguity in the rights of companies that provide data and corporate services. COFETEL should issue resale regulations, as is allowed under the 1995 Federal Telecommunication Law, to enable any service provider, not just companies with voice concessions, to lease and resell capacity from other companies. The refusal to issue resale regulations may have encouraged companies to invest in infrastructure earlier. Today such regulations mainly act as an entry barrier to new operators who can package services to serve small businesses and other niche markets. While voice-centric regulations need to be eliminated or revised, new regulations are needed to foster and ease the interconnection of data networks.

139. Other voice-centric regulations are requirements imposed on the concessions granted to backbone operators. These concessions require them to certify that their customers are carrying voice traffic that terminates or originates only on the network of a Mexican operator with a long-distance license. Such a requirement is an attempt to reduce voice-over-the-internet (VoIP) traffic by forcing backbone companies to police their customers. In most OECD countries, VoIP traffic is classified as a data service and is unregulated. As a result, VoIP in OECD countries has grown dramatically. More recently, COFETEL has proactively enforced its regulations by shutting down companies with only value-added licenses but that carry VoIP.

140. **Automatic review of regulations should be required.** Every two to three years COFETEL should review its regulations with the requirement that it amends or eliminates regulations that hinder competition, market entry, price reduction, and network expansion in order to respond to changes in technology and market conditions.

Promote Equity and Increase Access

141. **Broadband deployment should be fostered and local loop costs reduced through competition.** In markets where there is more than one provider of local loops, the price and quality of service improves dramatically. The government should foster increased local loop competition by promoting and easing the provision of service to business and residential consumers by cable television service providers, by wireless local loop providers, and by data service providers.

142. **The universal access program should be strengthened.** The e-Mexico connectivity and the FCST programs are important first steps to addressing disparities in access to ICT infrastructure in Mexico, but they do not constitute nor provide sufficient financing for a comprehensive and sustainable universal access program. In order to reduce the digital divide within Mexico, the Congress should establish a neutral universal access tax (capped at 1.5 percent of revenues), finish rebalancing tariffs, and transform the FCST into a sustainable universal access agency within COFETEL. As previously noted, a one percent tax on the revenue of Mexican telecommunications operators could raise approximately $170 million for universal access, more than twice the 2002 congressional appropriation for the FCST and nearly six times the congressional appropriation for FCST in 2003.

143. FCST should be given the mandate to develop an effective and comprehensive universal access program using the FCST funds, and review and modify as appropriate all government programs that seek to foster increased access to ICT infrastructure, including the current e-Mexico connectivity initiative, Telecomm's rural telephony program, and Sepomex's ICT program. Ideally, all three programs should be part of the FCST, allowing better coordination between them and avoiding duplication of effort. FCST could be made a part of the new COFETEL, or it could be a part of the new ICT Secretariat. If the latter is the case, the FCST Agency and COFETEL need to be given explicit mandates. FCST could be responsible for developing and implementing policies dealing with the allocation and administration of FCST funds, while COFETEL could be responsible for developing regulations and enforcing them.

144. **The government should undertake a consensus-building campaign on the priorities for universal access.** It should consult with state and municipal authorities, identify and remove existing legal, licensing, regulatory, and other barriers to private sector participation, and ensure provision of service to underserved communities, and small businesses. The e-Mexico initiative to prioritize widespread access to broadband services over telephone access is a unique approach that can lead to some innovative programs using ICT to foster greater economic development and improved education.

145. **Cross-subsidy issues should be addressed.** COFETEL should undertake a transparent and public initiative to determine whether and how Mexico's current interconnection and tariff regime contains cross-subsidies between services and companies. Where cross-subsidies exist, COFETEL should determine whether these should be phased out, as well as how to replace them with more transparent programs that will foster competition. This initiative should examine the Telmex public payphones program in towns with populations between 500 and 2,500, and Telecomm rural telephony, to determine whether the programs are financially self-sustaining, whether there are tariff or regulatory issues that would be obstacles to the independent functioning of the programs, and whether they require a review of their cost structure to distribute the costs equitably. The goal would be to reach the underserved with a low-priced efficient service.

AGRICULTURE FACES GREAT CHALLENGES IN BOTH DOMESTIC AND INTERNATIONAL MARKETS

146. **Agricultural performance has been lagging since the 1980s,** compared to the Mexican economy as a whole and to major regional competitors. This is despite consistently high subsidies, drastic domestic reforms, and the advent of NAFTA. Thus, whereas annual GDP growth in 1984–2004 averaged 3 percent for the economy as a whole it was only 1.3 percent in agriculture. In per capita terms, agricultural GDP fell at an annual rate of 0.4 percent during this period. Also, while Mexico exceeded the Latin America and Caribbean (LAC) average in total factor productivity growth in 1961–1980 (1.6 percent against 1.4 percent), the opposite was true in 1981–2001 (1.5 percent against 2.3 percent).

147. **Decline took place despite continuous large public spending in rural areas and in agriculture.** In 2005, all federal spending on rural areas (including all rural sectors) was US$13.7 billion equal to 43 percent of the administrative budget of the federal *secretarías* involved in rural areas. For the average of 1996–2000, Mexico had the second highest public agricultural spending per workers in LAC, the first per hectare, and also the highest ratio between the share of agriculture in public expenditure and its share in GDP.

148. **NAFTA provided Mexico with new opportunities for agricultural exports but the agricultural trade balance with the United States deteriorated.** Exports surged after NAFTA (71 percent increase in 1994–1999), especially in fresh fruits and vegetables, and processed foods and beverages. Opportunities, however, were unequally distributed. Middle and large commercial farmers with irrigation facilities, mostly in the northern states, were the main beneficiaries, while small rain-fed farms remained behind. Imports also surged, more than exports, turning the agricultural trade balance with the United States more negative. The much feared collapse of Mexican grain output did not materialize, however. The expansion in grain demand, particularly for feed grains, was taken up by imports, while domestic grain production increased slightly.

149. **Market share is being lost in the United States.** Despite strong export growth, there are worrisome trends in the dominant export market, the United States, which absorbs some US$9 billion or 85 percent of Mexican food and agricultural exports. Mexico is still the largest provider of fresh fruits and vegetables to the United States, with 56 percent market share, but is facing share erosion in most of its 24 top export crops, losing market share to South and Central American competitors. Diversification to non-U.S. markets is minimal despite the signing by Mexico of 12 free trade agreements (FTAs) other than NAFTA with various countries and trade areas. With 4 percent of Mexican agricultural exports, the European Union is the second market, but market share is also being lost there.

150. **Mexican agriculture faces great competitive challenges.** As NAFTA tariff exemptions expire in 2008, Mexican producers will face renewed competition in products like maize, sugar, powder milk, and beans, while transitory support programs, like Procampo[93], will be discontinued, at least in principle. Also, as the United States signs FTAs with other regions and countries, giving them preferential treatment, Mexico will face increasingly tougher competition in its most important export market.

[93] Procampo is a program in Mexico that was introduced to compensate farmers for the anticipated negative effect of NAFTA on the prices of basic crops.

Declining Trends in Agricultural Growth and Productivity

151. **Declining Agricultural Growth.** Mexican agriculture grew at a fast pace of around 6 percent annually until the end of the 1960s, fueled by the incorporation of new land, irrigation investments, agricultural protection, and favorable commodity prices. By the 1970s, however, growth slowed down to about 2 percent despite a wide array of government interventions. Growth continued to be weak after 1984 (1.3 percent in 1984–2004), compared to the rest of the economy (3.0 percent), but performed somewhat better after 1994, that is, upon the signing of NAFTA (Table 23).

Table 23: Average Annual Growth Rates of Total and Agricultural GDP

Periods	Total GDP		Agriculture GDP	
	Total	Per Capita	Total	Per Capita
1984 – 1994	2.7	0.8	0.8	-1.1
1994 – 2004	3.3	1.8	1.9	0.4
1984 – 2004	3.0	1.3	1.3	-0.4

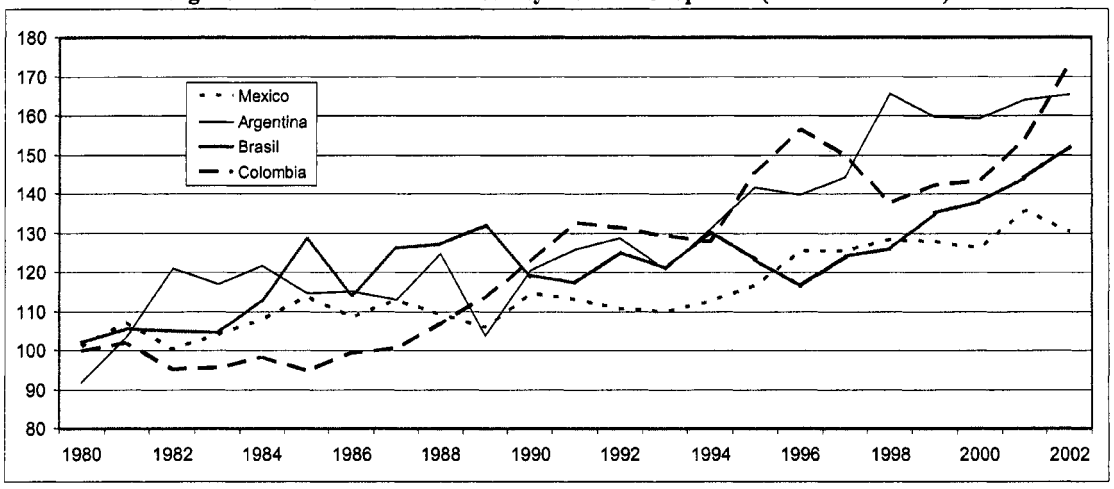
Source: World Bank statistics

152. **Weak long-term performance can also be gauged from other indicators** such as the share in GDP, employment, and exports, all of which point to a diminishing industry. The share of agriculture (including fisheries and forestry) in GDP fell from 16 percent in 1960 to 8 percent in 1980, and less than 5 percent today. The share of agriculture in the labor force fell from 50 percent in 1960 to 36 percent in 1980 and some 20 percent in 2004, while the contribution to exports fell from 13 percent in 1980 to around 4 percent today.

153. **Land Productivity.** Land productivity, that is, average yield per hectare, grew some 30 percent in 1980–2002 (i.e., 1.2 percent annually), with growth being more significant since 1994. This is the result of yield increases in individual crops plus improved cropping intensity and crop mix. While yield increases were more important in the pre-NAFTA years, improved cropping intensity and mix were more important in the years after NAFTA (see FAO, 2004).

154. **Other major LAC competitors have gained in land productivity more than Mexico.** Thus, while Mexico's land productivity index grew only 30 percent in 1980–2002, those of Argentina, Brazil, and Colombia show increases of 50 to 70 percent (Figure 41).

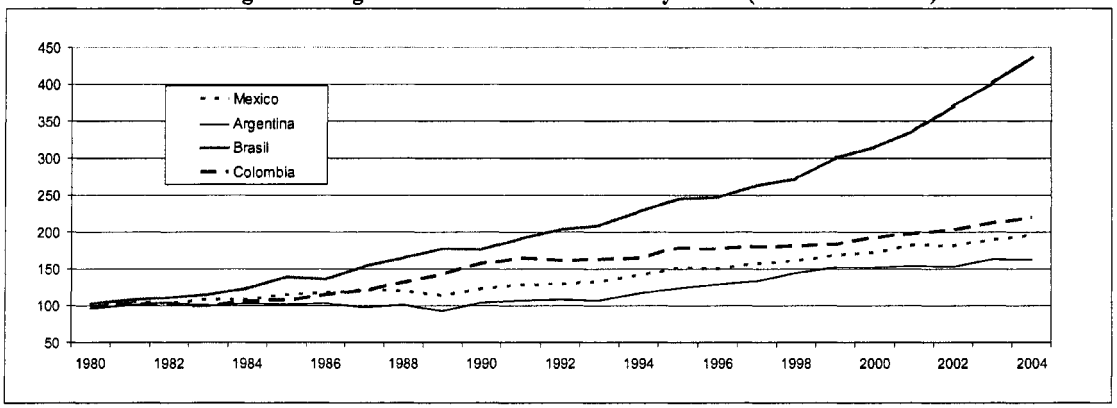
Figure 41: Evolution of Productivity Index in Croplands (1979–1981 = 100)



Source: FAOSTAT

155. **Labor Productivity**. Labor productivity in Mexican agriculture almost doubled between 1980 and 2002 (Figure 42). Performance lagged with respect to Brazil, where labor productivity more than quadrupled, and Colombia, but was above Argentina. In absolute terms, agricultural output per worker is US$2,533 (1995 prices) in Mexico, US$9,988 in Argentina, US$5,737 in Brazil, US$3,769 in Colombia, and US$3,766 in all LAC. Mexico, thus, is below major competitors and the LAC average.

Figure 42: Agricultural Labor Productivity Index (1979–1981 = 100)



Source: FAOSTAT

156. **Yields.** Yield growth has been slow for most crops in Mexico (Figure 44 and Figure 46), which has yields below other major LAC countries and the United States for almost all crops (Figure 43 and Figure 45). The main exception is wheat, which Mexico produces almost entirely on irrigated lands with yields larger than those of Chile and the United States (Figure 43). In general, most yield increases have occurred in irrigated areas.

Figure 43: Yields for Major Basic Grains (2001–2004, ton/ha)

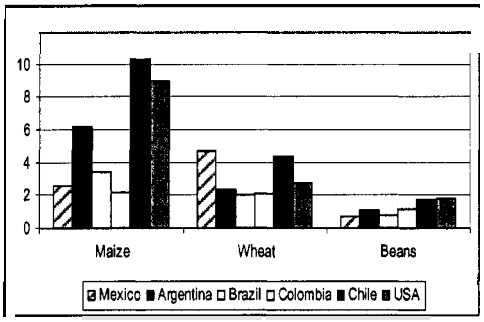


Figure 44: Trend in Yield for Mexico for Major Basic Grains (1983–2004. ton/ha)

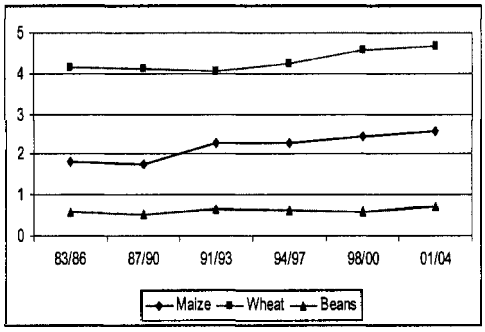


Figure 45: Yields for Major Export Crops (2001–2004, ton/ha)

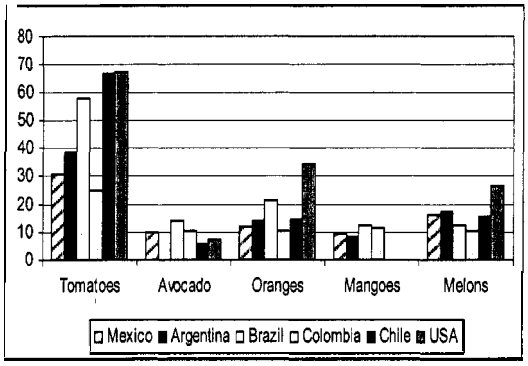
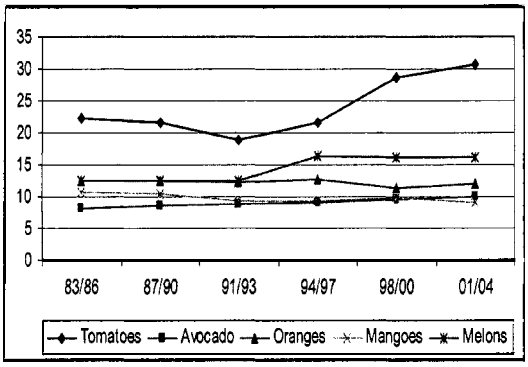


Figure 46: Trend in Yield for Mexico (1983–2004, ton/ha)



157. **Total Factor Productivity (TFP).** TFP measures productivity growth not captured by the contributions of individual production factors. It explains the impact of technology improvements measured as the residual output growth after the effect of growth in all factors has been considered. Annual TFP growth in Mexico in 1980–2001 was 1.5 percent, smaller than the 2.3 percent of the period 1961–80, and smaller than that of other major LAC competitors and the LAC average (Table 24).

Table 24: Annual Growth Rates of TFP in Mexico and Other Countries

Countries	Crops		Livestock		Agriculture		
	1961/80	1980/01	1961/80	1980/01	1961/80	1980/01	Average
Argentina	3.08	3.93	0.90	0.43	1.83	2.35	2.09
Brazil	0.38	3.00	0.71	3.61	0.49	3.22	1.86
Chile	1.08	2.22	0.24	1.87	0.69	2.05	1.37
Colombia	2.01	1.27	0.49	2.24	1.37	1.73	1.55
México	1.53	1.43	3.02	1.63	2.26	1.51	1.89
LAC average	**1.46**	**2.40**	**1.42**	**2.21**	**1.39**	**2.31**	**1.85**

Source: Ávila and Evenson (2004) [94]

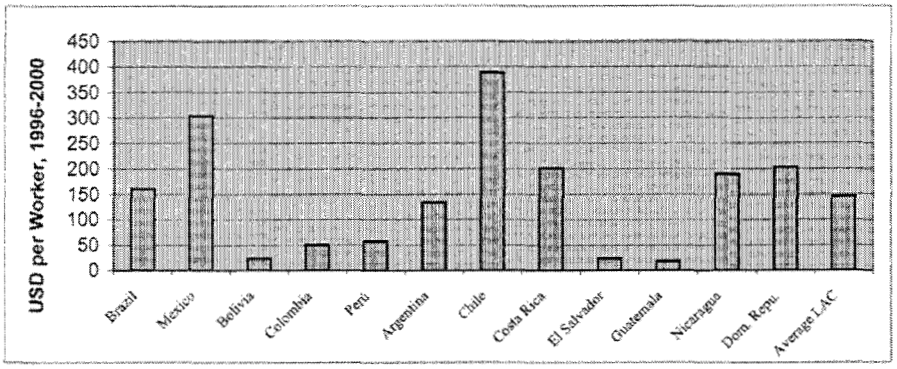
158. **Mexican agriculture has lost its long term dynamism.** During the last thirty years sectoral growth was sluggish, with agriculture falling behind the rest of the economy as well as the agricultural

[94] The factors considered were land, labor, fertilizer, animal traction, machinery (tractors and harvesters) for crops and land, labor, animal capital cost, and feed for livestock.

sectors of major regional competitors. Growth in value-added, land productivity and TFP was smaller than in comparator countries, and with few exceptions yields and labor productivity are low compared to those countries.

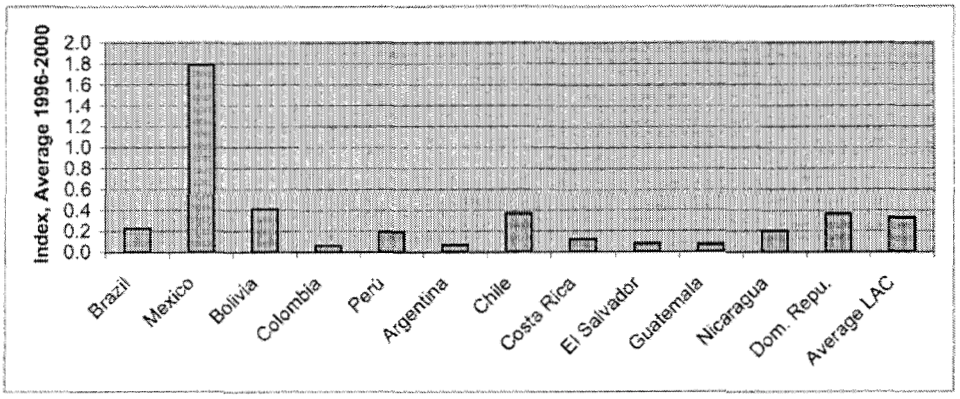
159. **Agricultural dynamism was scarce in spite of high government spending in the sector.**[95] Thus, for the average of 1996–2000, public expenditure in agriculture per agricultural worker in Mexico was second only to Chile, almost double the levels of Brazil and Argentina, and six times the level of Colombia (Figure 47). Average federal expenditure in agriculture in these years was 8 percent of total public spending. The proportion between the share of agriculture in public expenditure and its share in GDP or the "agriculture orientation index" is 1.8 in Mexico, by far the greatest in the region. In Chile it is less than 0.4, in Brazil 0.22, and in Argentina and Colombia less than 0.1 (Figure 48).

Figure 47: Public Expenditures in Agriculture per Agricultural Worker in LAC (average 1996–2000)



Source: World Bank (2005f), on the basis of FAO data.

Figure 48: Agriculture Orientation Index in LAC Countries (Average 1996–2000



Source: World Bank (2005f), on the basis of FAO data

160. **Federal public spending in rural areas in general is also high in Mexico.** Thus, in 2005, the federal budget for rural areas (including agriculture and other sectors) estimated under the so-called

[95] World Bank (2005f), Kjollerstrom (2004), Rello (2004)

Programa Especial Concurrente was US$13.7 billion equal to 43 percent of the administrative budget of the federal *secretarías* involved in rural areas.

A Weak but Transforming Agriculture Innovation System

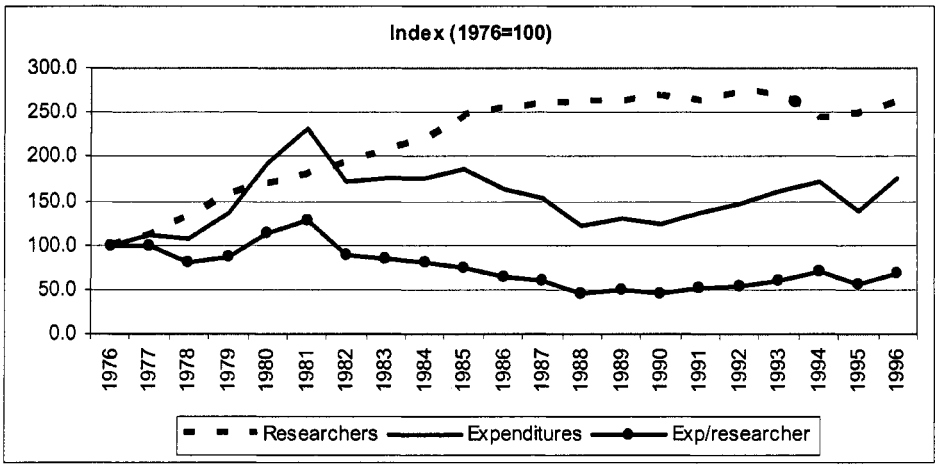
161. **The Mexican agricultural innovation system was in crisis in the 1990s** for three reasons: (1) declining performance of the national research institute, INIFAP, (*Instituto Nacional de Investigaciones Forestales, Agrícolas y Pecuarias*); (2) dismantling of the national extension service; and (3) greater pressure to modernize technology under stiffer competition brought about by liberalization.[96] Recent reforms have improved the overall health of the system, focusing on increased competition among research suppliers, greater stakeholder participation in priority settings, and decentralization.

162. **A model in need of overhauling.** The Mexican agriculture research and extension system shares similarity with that of other countries in the region; a state-owned, autonomous, highly centralized, nationally financed institute of research, with a wide geographic and thematic mandate, including both research and extension, dependent on the Ministry of Agriculture. This model produced some positive results in the past but was exhausted by the beginning of 1990s, unable to respond adequately to producers' needs. Also, public expenditure in agricultural research decreased since the early 1980s both in absolute terms and, especially, measured per researcher (Figure 49).

163. **The massive public extension system of the 1970s was dismantled without adequate replacement.** Public agricultural extension started in the 1940s and grew rapidly in the 1960s and 1970s to reach 21,500 staff in 1977–1979. It originally focused mainly on the irrigation districts. In 1981, the Extension Department at the Ministry of Agriculture was disbanded and its functions transferred to INIA and the irrigation districts.[97] In the second half of the 1980s, the extension service was severely reduced and reformed to introduce decentralization, private implementation, and producers' co-payment. It concentrated mainly on commercial producers, with marginal areas being serviced by PRONASOL (*Programa Nacional de Solidaridad*). This parallel approach failed and public extension was almost abandoned in practice in 1993–1994. It was partially revived later on through private service providers in the framework of *Alianza para el Campo* (the leading Mexico's farm modernization program operating since 1996), particularly through PRODESCA (*Programas de Desarrollo de Capacidades en el Medio Rural*), a program operating in the framework of *Alianza* to provide training and technical assistance to small farmers. The scope, however, is very limited.

[96] Roseboom (2004)
[97] Eckboir et al. (2003)

Figure 49: Development of research staff, expenditures, and expenditures per researcher in the public component of the agricultural research system



Source: Roseboom (2004)

164. **The agriculture research and extension system has three shortcomings.** They are the following: 1) lack of response to actual demands by producers due *inter alia* to lack of communication among researchers, extension, workers, and producers; 2) dependence on scarce federal funding, with very few funds coming from state governments and the private sector; and 3) dismantling of the public extension services without adequate replacement.

165. **Reforms are being introduced to address the shortcomings in the research system.** The main reforms are as follows: 1) a competitive nationwide agricultural technology fund for up- stream research, jointly financed by the National Council for Science and Technology (CONACYT) and the Ministry of Agriculture; 2) state level research foundations, called *Fundaciones Produce*, which provide competitive funding for adaptive technology research, validation and transfer; 3) the Mexican Foundation for Agricultural and Forestry Research (FUMIAF), created to help INIFAP handle agro-industry funding; and 4) competitive "mixed" science and technology funds, financed by CONACYT and state governments, that target local agricultural research issues. The first three mechanisms were introduced in the mid 1990s, and the fourth in 2001[98].

166. **The *Fundaciones Produce* are a valuable mechanism but need strengthening.** The *fundaciones,* created in 1996 as part of *Alianza*, are administered by representatives of producers. Their objective is to bring agricultural research closer to farmers' demands and to reflect regional priorities in the innovation system. Activities are nationally coordinated by COFUPRO (*Coordinadora Nacional de la Fundaciones Produce*). Funding comes from the Federal Government mostly. Thus, 82 percent of the Pesos 570 million 2005 budget came from the federal budget, and 18 percent from state governments. Producers may provide some limited co-financing, usually in land and labor. Research is carried out by individual researchers or institutions through a competitive funding process. Of the 1,005 projects financed in 2005, 80 percent were for primary activities and only 5.6 percent for processing. INIFAP is the main research institution engaged in *Produce* projects, but its participation has declined from around 80 percent in 1996 to 57 percent in 2001 and 37 percent in 2005. Universities have gained importance, with a 22 percent

[98] Roseboom (2004).

share of funding in 2005, while the private sector, service providers, and the *Fundaciones* themselves, increased their participation to 12 percent. Agro-industries participate with 1 percent only.

167. **The *fundaciones* have six main challenges.** The challenges are as follows: 1) bringing about closer regular interaction between all participants of the innovation system; 2) developing financing instruments to facilitate cross-institutional collaboration in agricultural research and to enable multi-year projects; 3) increasing the participation of the private sector; 4) strengthening technology dissemination; 5) strengthening supervision and the evaluation of project outcomes; and 6) increasing the limited level of funding.

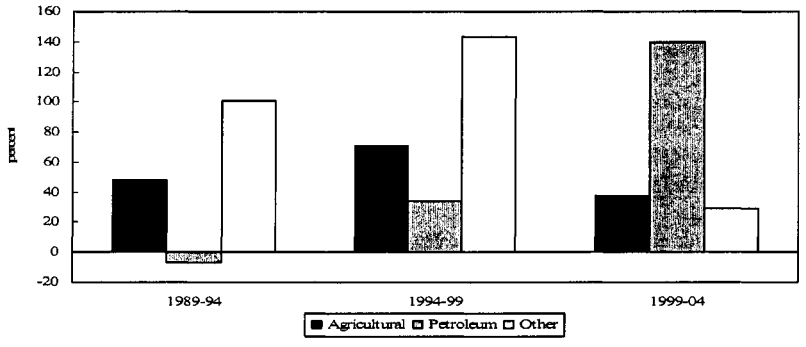
168. **Importance of public involvement in technology development and transfer.** Without a significant increase of public sector involvement in these areas, agricultural competitiveness may be impaired not only in the domestic but also in the export market. Thus, a study by Málaga, Williams, and Fuller (2001) concludes that Mexican investments in yield-enhancing technologies could have a greater impact on the future level of Mexican exports of tomatoes and other fresh vegetables to the United States than the elimination of U.S. vegetable import tariffs under NAFTA.

The Impact of NAFTA

169. **From a closed economy to NAFTA.** Before the mid-1980s, Mexico had highly protectionist and interventionist agricultural policies. Mounting external debt, a sharp devaluation of the Mexican Peso, the economic crisis of the early 1980s, and international pressure, forced Mexico to abandon the import-substitution model and institute an historic process of sweeping economic reforms. As part of the adjustment, Mexico entered GATT in 1986, reducing its average tariff level from around 80 to 50 percent. In the agricultural sector, Mexico went further, unilaterally reducing average tariff levels to between 10 and 20 percent long before signing NAFTA in 1994.

170. **Rapid export growth upon liberalization, before NAFTA.** In the five years prior to NAFTA, Mexican exports increased 72 percent—from US$35.2 billion in 1989 to US$60.6 billion in 1994. Agricultural exports increased 50 percent in the same period—from US$ 3.0 billion to US$ 4.5 billion. In contrast, Mexican exports of petroleum fell 6.5 percent, and exports of other non-petroleum products grew by 100 percent (Figure 50).

Figure 50: Percent Change in Agricultural and Non-Agricultural Export Value (1989–2004)



Source: COMTRADE

171. **With NAFTA, the growth in Mexican exports accelerated.** Thus, in 1994–1999, total Mexican exports grew by an annual average of US$15.1 billion, three times as much as in the previous five years, while agricultural exports increased 71 percent (Figure 50). Exports of petroleum and other non-petroleum goods also increased. In the most recent period of 1999 to 2004, agricultural and other non-petroleum exports continued to increase but substantially less (38 percent and 30 percent, respectively), while petroleum exports increased a great deal.

172. **NAFTA was important but its impact is difficult to assess.** NAFTA provided a sliding system for the elimination of tariffs and non tariff barriers.[99] It also established norms for the application of measures to counter threats to domestic producers and customers such as sanitary and phytosanitary requirements, anti-dumping and countervailing duties, and safeguards. A formal mechanism for resolving disputes was also introduced. Tariffs of many agricultural products were rapidly cut to zero. Only a few sensitive products were allowed tariff rate quotas (TRQs). Mexico currently has TRQ rights for the importation of dry beans, maize, and powder milk, while the United States established seasonal tariffs and TRQs for certain fresh fruits and vegetables. TRQs on these commodities are scheduled for elimination by 2008. Mexico has not needed to resort to over-quota tariffs since import demand for TRQ products has not exceeded the quota (or the quota was unilaterally increased, as in the case of maize). NAFTA has been an important milestone but its impact is difficult to isolate from the effects of other major events such as the Peso devaluation of 1994–1995. Also, NAFTA follows over a decade of drastic agricultural reform policies. The effect of NAFTA on specific exports will be discussed further in the next section.

173. **Multiplication of FTAs.** Following the signing of NAFTA, Mexico embarked on a global strategy to diversify its export customers through aggressive negotiation of FTAs. Since 1994, Mexico has signed 12 FTAs: with Bolivia (1995), Costa Rica (1995), Colombia and Venezuela (G-3, 1995), Nicaragua (1998), Chile (1999), Israel (2000), the European Union (2000), Iceland, Norway, Liechtenstein, and Switzerland (EFTA, 2001), Guatemala, Honduras, and El Salvador (North Triangle, 2001), Uruguay (2003), and Japan (2005). Little research has been done on the effects of these FTAs on Mexican agricultural trade, but there is little evidence that headway was made in developing new agricultural export markets. Nevertheless, the potential remains, eventually, for these agreements to provide some cushion against declining shares for many of Mexico's agricultural exports to the U.S. market.

174. **Exports surged after NAFTA but the agricultural trade balance with the United States deteriorated.** NAFTA resulted in fragmented agricultural growth, which favored mostly irrigated and commercial farms growing fruit and horticulture crops mainly for exports; it also favored the export of processed foods and beverages. Overall, sectoral performance in agriculture after NAFTA has been moderate only, below the levels of regional competitors such as Chile, Brazil, and Argentina. Agricultural imports increased substantially, more than exports, resulting in a deterioration of the agricultural trade balance with the United States, which passed from US$-211 million in 1991/93 to US$-1.3 billion in 2001/03.

175. **Surprisingly, the production of basic grains did not fall but increased slightly after NAFTA.** This may be due to several factors: 1) indirect price protection through Aserca's marketing subsidies, 2) the need for farmers to continue cultivating the land in order to receive the Procampo subsidy, 3) an increase in cereal yields in irrigated areas, (4) the resilience of maize production in rain-fed areas due to tradition, risk factors, shortage of alternatives, and subsistence consumption, and 5) the segmentation of

[99] One major non-trade barrier that NAFTA eliminated was Mexico's import licensing requirements. Before NAFTA about 25 percent of the value of U.S. agricultural exports to Mexico (e.g. poultry, wheat, maize, dry beans) was subject to licensing or prior import permits. Under NAFTA, licenses were converted to tariff rate quotas (TRQs).

Mexican cereal markets due to differences in varieties associated with tastes, location, and marketing channels. In this respect, local food grains have an advantage not enjoyed by feed grains where imports increased most.

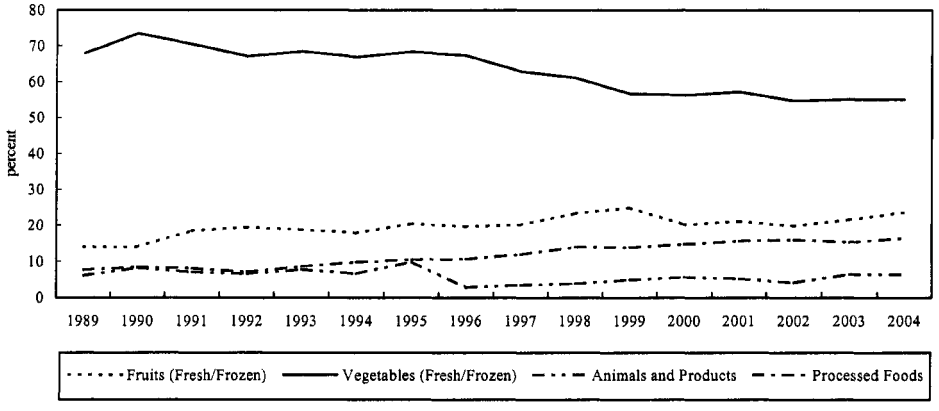
Agricultural Exports to the US Market

176. **Competitiveness of Mexican Agricultural Export in the US Market.** The United States is the major market for Mexican food and agricultural products, currently accounting for about 86 percent of all Mexican agricultural exports.[100] In 2004, processed food products represented 38 percent of all Mexican food and agricultural exports to the United States, above vegetables (35 percent), traditionally the largest export category to the United States. The fruits and animal products categories accounted for 15 and 10 percent, respectively. Mexican exporters to the United States enjoy several advantages: 1) proximity to consumption centers, 2) growing U.S. population of Mexican origin and rapid expansion of Mexican foods and cuisine in the United States, 3) established marketing channels, and 4) preferential treatment under NAFTA.

177. **Losing U.S. market share in vegetables.** Despite continued increase in the value of exports of vegetables to the United States since pre-NAFTA years, Mexico's share in U.S. imported vegetables has declined almost continually from a peak of 75 percent in 1990 to 55 percent in 2004 (Figure 51). This may be traced to two recent market phenomena. First, competition from Canadian and European exports of vegetables grown in greenhouses (particularly tomatoes and bell peppers) has increased dramatically in the last years[101]. Also, the opening of the U.S. market to imports from Central and South America through bilateral agreements (Caribbean Basin and Andean initiatives) has also increased competition for Mexican vegetables, particularly asparagus, melons, and broccoli/cauliflower.

178. **Winning U.S. market share in processed foods, led by beer.** The Mexican share of processed foods imported by the United States doubled between 1990 and 2004, from 9 percent to 18 percent (Figure 51). This is closely related to the strong export performance of Mexican beer in U.S. markets, and also to that of other beverages such as tequila, processed vegetables, and bakery and confectionary products.

Figure 51: Mexican Market Share of U.S. Agricultural Imports by Four Major Product Groups (1989-2004)



Source: UN Statistics Division.

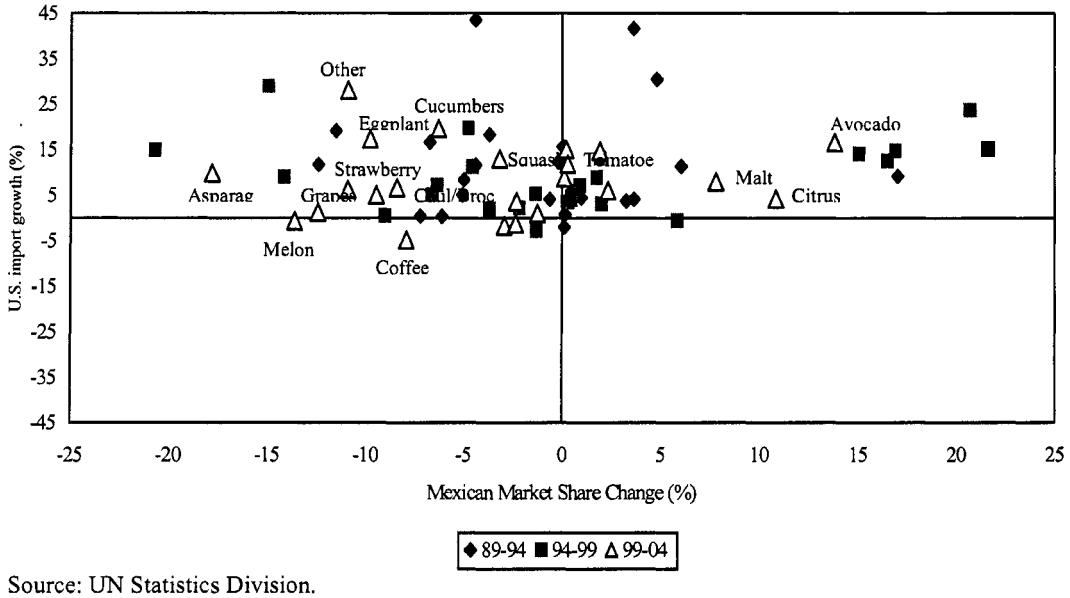
[100] Most of the analysis in this section is based on the top 24 individual commodities exported from Mexico to the United States, accounting for some 85 percent of the value of all Mexican agricultural exports to the United States.
[101] Cook and Calvin (2005)

179. **Increase also in the share of imported fruits.** Mexican export share in U.S. fruit imports has also grown rapidly, jumping from 14 percent in 1990 to 25 percent in 1999 before sliding back to 20 percent in 2000 followed by gradual growth back to 23.7 percent in 2004 (Figure 51). This growth is the result of a surge in Mexican grape and avocado exports associated with the lifting of US phytosanitary barriers.

180. **Declining share in animal products.** After a steady increase in 1989–1995 the Mexican share of U.S. imports of animal and animal products dropped sharply during the height of the Mexican economic recession in 1996 and recovered slowly in the post-recession years (Figure 51). A recent increase in the share to about 6.5 percent in 2004 was mainly due to the U.S. ban on imports of Canadian cattle. Nevertheless, there is a generally downward trend in the share; it is related to stagnant trends in U.S. per capita beef consumption, and to increasing U.S. imports of fed cattle from Canada and of meat products from several other countries, including New Zealand, Brazil, and Argentina.

181. **Performance analysis of Mexico's top 24 agricultural exports to the United States.** In Figure 52 changes in market shares since 1989 for the 24 top Mexican agricultural exports to the United States are compared with the growth of U.S. imports of those products in three periods: 1) pre-NAFTA (1989–1994), 2) early stage of NAFTA (1994–1999), when most U.S. tariffs were eliminated and Mexico began signing free trade agreements with other countries, and 3) 1999–2004 when increased access to U.S. markets was given to third countries through bilateral agreements. The upper right quadrant shows products with positive changes to Mexican share and U.S. import growth during each of the three periods—that is, products for which Mexico gained a larger share of a growing market. The upper left quadrant includes products with negative Mexican share changes but positive U.S. import growth—that is, products for which Mexico was losing share in growing U.S. imports. Investments in these products to increase productivity and eliminate remaining barriers could have the highest payoff. The bottom left quadrant shows products with negative Mexican share changes and negative U.S. import growth. Investments in these products would probably have the lowest payoff.

Figure 52: Market Share Changes versus US Import growth for Major Mexican Agricultural and Food Exports to the US (1989-94, 1994-99, 1999-04)



Source: UN Statistics Division.

182. **Mexico is exporting most of its top food and agricultural exports to the United States, into growth markets.** Table 25 shows the details for the 24 products. United States imports from all sources decreased for only 5 products in 1999–2004; coffee, bananas, melons, sugar, and cattle. However, Mexico lost market share in 15 of its 24 top products in 1999–2004. Note that while Mexican exports of cucumbers, mangoes, asparagus, and cauliflower/broccoli to the United States have all been growing in recent years, Mexico has been losing market share of these products. In the case of tomatoes, peppers, and onions, exports of which have also been growing consistently, Mexico was able to prevent erosion of its market share. Mexican tomato exports, for example, were losing market share to Canadian greenhouse tomatoes until 2000 when the Mexican tomato industry began adopting similar technologies and recapturing some of its lost market[102]. In the case of grapes and "other beverages," which experienced impressive growth in the pre-NAFTA and immediate post-NAFTA years, the Mexican shares of growing U.S. imports were substantially eroded in recent years. Squash, melons, strawberries, eggplant, and cut flowers show also signs of losing their competitive advantage. The success stories in agricultural exports to the United States are avocados and malt beverages (beer), the latter at the expense of Canadian and European beers. Loss of market share in asparagus, mangoes, bananas, and grapes is due to competition from Chile, Peru, Ecuador, and Brazil; that of melons, cauliflower/broccoli, strawberries, and coffee is due to competition from Central American and Caribbean exporters.

Table 25: Change in Mexican Share of US Imports and US Import Growth Rates for Top 24 Agricultural and Food Commodities Exported by Mexico to the US (1989-94, 1994-99, 1999-04)

	Change in Mexican Share of U.S. Imports			U.S. Import Growth		
	1989-94	1994-99	1999-04	1989-94	1994-99	1999-04
	percent					
TOTAL AGRICULTURE	0.3	2.2	0.5	4.3	6.9	7.5
Tomatoes	-5.0	-20.7	0.1	8.4	14.9	8.9
Cattle and calves	-12.4	-1.3	70.7	11.7	-2.8	-11.5
Peppers	-4.4	-4.5	0.2	11.7	11.3	15.1
Cucumbers	-0.6	-6.6	-6.3	4.1	5.1	19.7
Grapes, fresh	3.3	21.6	-10.9	3.8	15.3	6.2
Squash	-0.2	1.8	-3.1	12.3	8.9	13.0
Cauliflower/Broccoli	-5.1	-6.3	-8.4	5.0	7.3	6.6
Coffee	-7.2	2.0	-7.9	0.4	3.1	-4.8
Onions	-6.7	-9.0	2.3	16.7	0.5	6.1
Pecans	-4.4	-1.3	1.9	43.5	5.3	14.8
Citrus, fresh	4.8	-15.0	10.8	30.4	28.9	4.2
Melons	-26.9	15.1	-13.6	3.1	14.1	-0.6
Strawberries	17.0	1.9	-9.5	9.2	13.1	5.1
Mangoes	-3.7	-14.2	-12.4	18.3	9.0	1.3
Asparagus, fresh	-11.5	-4.8	-17.8	19.2	19.8	9.8
Fruit Juices	0.1	0.3	-1.2	-1.9	3.5	1.0
Avocados	3.6	20.7	13.8	41.7	23.7	16.7
Red meat and products	0.2	0.5	0.3	0.8	4.0	11.9
Eggplant	0.0	-3.7	-9.8	15.6	2.0	17.4
Sugar	-6.1	5.9	-2.9	0.4	-0.6	-1.7
Cut flowers	0.5	0.9	-2.3	5.9	7.1	3.6
Bananas/plantains	3.7	-2.2	-2.4	4.2	2.3	-1.3
Malt beverages	1.0	16.5	7.8	4.4	12.5	7.9
Other beverages	6.1	16.9	-10.9	11.4	14.8	28.1

Source: USDA.

[102] Cook and Calvin (2005)

183. **Slow market diversification.** Mexico has attempted to diversify export markets since the signing of NAFTA as a means of reducing dependency on the United States. The European Union is the second major export market for Mexican agricultural products, but only about 4 percent of Mexican food and agricultural exports go to the European Union in spite of the EU-Mexico FTA signed in 2000. Substantial penetration of E.U. markets is difficult because of distance and fierce competition from Eastern European, African, Middle Eastern, and South American countries. The main opportunity for export growth to the European Union will likely continue to be beer. Mexico has been losing market shares in the European Union primarily to Middle Eastern and African countries with which the European Union has preferential trade arrangements. Food and agricultural exports to Canada are growing but from an extremely small base.

Moving Forward

184. **Key to further export growth is not so much market access as removing internal constraints.** Policy recommendations to boost exports often focus on issues limiting access to foreign markets. Mexico, however, has already quite successfully tackled market access through its aggressive bilateral negotiation strategy. For Mexico, then, further export growth requires enhancing competitiveness through increased productivity in the production and marketing chains. Some specific export promotion efforts need to be included in the policy mix. However, the key general component of any successful strategy to enhance agricultural exports must be substantial efforts in critical areas such as irrigation, transport infrastructure, and technology generation and dissemination. These areas are examined below.

- **Targeted promotion to diversify and expand Mexican export markets.** In general, because of the small amounts involved, the marginal return to increased investments to promote Mexican exports in the European Union, Canada, and Japan is likely to be low. Nevertheless, some specific Mexican items have found niches in those markets that might be exploited by targeted export promotion efforts; these should be aimed at developing strong relationships with specific foreign buyers and branding Mexican products. Such products include beer, avocadoes, mangoes, guava, peppers, dried legumes, and possibly grapes. Targeted export promotion could also be used to reverse the downward trend of the Mexican export share of cucumbers, asparagus, broccoli, squash, strawberries, eggplant, and cut flowers. Targeted assistance instruments could include export credit guarantee programs, export incentive programs for specific high priority products and markets, market research assistance, product and market specific export counseling, and assistance with documentation and other export requirements.

- **Improvement in irrigation**. Because of their nature, most Mexican agricultural exports require irrigation. Hence, improving this is critical to sustaining export growth. This improvement is not limited solely to hydraulic infrastructure; to improve irrigation efficiency, institutional strengthening must also be included to improve the technical, administrative, and financial management capacities of the water sector. The need is particularly critical in the eastern and central regions of Mexico characterized by a large number of small farms with limited access to resources to expand production. Since water scarcity is a great problem in major agricultural areas and agriculture is the dominant user of water, water saving techniques need to be encouraged to raise water productivity.

- **Increased public investments in trade-related transport infrastructure.** Particular targets would include: additional bridges, access roads, and rail lines to cross the border; additional commercial inspection facilities; the modernization and expansion of Mexican port facilities; updating and expansion of intermodal transportation facilities; and improved highways to handle the rapidly

growing truck traffic. In addition, significant attention must be given to reducing the time and cost of currently lengthy and cumbersome customs clearance procedures at U.S. border crossing points.

- **Increased public investments in agricultural research and extension.** Investments in research and extension are critically needed to adapt and disseminate technologies developed in other countries, particularly for small and medium-sized agricultural and agribusiness firms. Also needed is the generation of new technologies adapted to the conditions of Mexican resource endowments. Research is also needed on a broad range of topics related to economic, animal, and plant systems; agro-processing; business, risk, and resource management; and a host of other topics to enhance and support decision-making all along the supply chains.

- **An enhanced market intelligence system.** Because globalization is forcing markets to operate in fundamentally different ways, agricultural producers and agribusinesses need to function in different ways too. Globalization is forcing marketing and distribution systems to be more tightly aligned with producers. Unfortunately, in Mexico the generation and flow of information needed by agricultural producers and agribusinesses is not keeping pace with the growth of globalization. Although much has been done to enhance market information, numerous Mexican agricultural producers and agribusinesses still lack access to information they critically need to manage risks and make sound production and marketing decisions.

- **A better functioning land market.** Important reforms have taken place in Mexico's land legislation and land administration since the constitutional reform of 1992. Legislation now allows *ejidos*[103] and other communities to privatize land ownership if so they decide. Also, *Procede*, the land titling program that has now covered more than 80 percent of *ejidos* (but not many communities), has clarified land rights in the *ejidos*, thus facilitating land transfers. In *ejidos* with high land values due to irrigation or peri-urban location, land rental and purchase markets have developed involving *ejido* members and outsiders. On the whole, however, legal restrictions on *ejido* and community lands do still interfere with land allocation and transfers, and in low value areas transactions involving outsiders are still scarce. Recent surveys also show that agribusinesses and large farmers prefer to rent rather than purchase land in order to avoid high transaction costs and possible administrative and political problems.[104] This may lead to unsustainable soil and water use.

- **A more efficient and effective SENASICA.** Additional and stable resources to support the operations of the National Service of Health, Innocuousness, and Food Quality (SENASICA) would greatly improve Mexico's effectiveness in responding to food safety and sanitary and phytosanitary (SPS) problems, and prevent hazards more effectively. A 2004 external evaluation of SENASICA by the Inter-American Institute for Cooperation on Agriculture (IICA) recommended changes such as the following: making available funds for emergencies or producer compensation in case of outbreaks, a closer working relation with the private sector, reducing the level of politicization, increasing the number of staff with high technical skills, and better coordination with the Ministry of Health.

[103] An *ejido* is a legal entity of the "social interests sector", as defined in Mexican legislation. It is a land owning peasant community or the land owned collectively by the members of such a community.
[104] See World Bank (2005i); Höllinger (2004); and Deininger and Lavadenz (2001).

III. MOVING TOWARD THE INNOVATION-DRIVEN STAGE OF DEVELOPMENT

185. If Mexico wants to advance beyond competing solely based on efficiency and move to the "innovation-driven" stage of development, it needs to invest more and more effectively in a) innovation; b) quality; and c) education and training. Improvements in these areas are being supported by Bank operations,[105] but further progress is necessary. Such progress will allow Mexico to engage in higher value-added activities based on innovative products and processes; it will thus place the country on a more equal footing with its OECD brethren and allow the achievement of faster growth to secure strong job creation and significant poverty reduction.

INCREASED INNOVATION AND TECHNOLOGY DEVELOPMENT AND BETTER LINKS TO THE PRIVATE SECTOR ARE ESSENTIAL FOR PRODUCTIVITY INCREASES AND FASTER GROWTH

Description and Challenges

186. **Innovation is a major driver of economic growth and productivity**. Roughly half of cross-country differences in per capita income and growth are driven by differences in total factor productivity (TFP), generally attributed to technological development and innovative capacity.[106] These differences should be understood in a broad sense, referring not only to the ability to engage in research and development (R&D) activities, which eventually may or may not be transformed into new outputs; the differences should also extend to the efficient use of modern operating technologies and to the adoption and adaptation of new ones. According to Prescott (1998), to understand large international income differences, it is necessary to explain differences in TFP. He argues that one of the main candidates to explain those gaps is resistance to the adoption of new technologies and to the efficient use of current operating technologies, which in turn are conditioned by the institutional and policy arrangements a society employs (investment climate variables). Escribano and Guasch (2005a, 2005b), using firm level data from investment climate surveys, investigate the determinants of productivity using a large array of variables in four large categories: red tape, corruption, and crime; infrastructure; quality, innovation, and labor skills; and corporate governance. They find that in most countries of Latin America and Asia covered by their study variables related to innovation, quality, and training are important determinants of productivity.

187. Lederman and Saenz (2003) present econometric evidence that suggests that innovation outcomes, namely patents per capita, are an important explanation of the levels of development observed around the world. On the other hand, spending on R&D, which often includes not only basic research but most expenditure on adaptation of technologies, has typically been used as an indicator of innovation inputs.[107] Lederman and Maloney (2003a) examine the relationship between the R&D effort and the development process and find that the share of GDP dedicated to R&D increases with income per capita in the average country; not only that, but they find also that several high growth comparator countries (such as Finland, Korea, and Israel) had dramatic take-offs relative to the benchmark, a path that China and India have

[105] The MX Competitiveness DPL I, the MX Innovation for Competitiveness APL I, MX Basic Education APL III, MX Education Quality APL and MX Tertiary Education APL I, .

[106] Hall and Jones (1999), Dollar and Wolf (1997).

[107] Although it would be possible that firms may have innovative sales without spending anything on R&D, it has been hypothesized that in general firms and countries need to spend on R&D to develop absorptive or learning capacity (see Cohen and Levinthal (1990), Forbes and Wield (2000), Griffith, Redding, and Van Reenen (2003), Pavitt (2001)).

recently followed. Several studies have estimated economic gains to the firms investing in R&D; estimates range from 25 to 30 percent, a return far above the average return on capital estimated to be around 7 percent.[108] Furthermore, R&D spending on the economy can increase the return to R&D several fold through knowledge spillovers that, by technology adoption and learning, improve other companies' products and production techniques. Lederman and Maloney (2003a) in a panel of countries estimate that the social returns to R&D exceed the return to investments in physical capital by a factor of 6 to 10 depending upon the initial level of income per capita. For Mexico, the calculations suggest a social return to R&D above 60 percent.

188. But R&D expenses only (or derived input measures from them) do not reveal all the intricacies at work. The newly available data from innovation surveys has opened new routes for the assessment of the contribution of innovation to productivity by enabling an explicit estimation of the innovation production function.[109] Recent examples of this line of research that follow a structural modeling approach[110]—which owes much to Griliches (see e.g., Griliches, 1998)—are presented in Crépon, Duguet, and Mairesse (1998), Griffith, Redding, and Van Reenen (2001), Lööf and Heshmati (2001), Klomp and Van Leeuwen (2001) and Correa, Sánchez García and Singh (2005). These studies investigate the channels linking investment in knowledge and innovation to productivity performance at the firm level and, in general, they find a significant impact of innovation output on the level of productivity.

189. **The Mexican innovation system performs below par compared with economies of its income level, and it has a low ability to translate investments into innovation**. Lederman and Maloney (2003b) analyze two key indicators of innovation performance: the number of patents produced and the number of scientific publications; they conclude that Mexico is currently under-performing in both dimensions when compared with other Latin American, East Asian, and OECD countries. Dahlman and Kuznetsov (2005) construct knowledge economy indexes for Mexico and find that its relatively low ranking is due to weaknesses in all four knowledge economy pillars, namely economic incentive regime, education, innovation, and information and communication technologies. The low performance with regard to innovation stems from a combination of factors:

- **Insufficient private sector involvement in innovation activities.** According to the innovation survey done in 2001 for the period 1999–2000, only 28 percent of the Mexican firms reported have been involved in an innovation project and 13 percent reported performing R&D activities. There is no information available with respect to the total amount that Mexican firms spend on innovative activities. However private investment in R&D, both as a proportion of GDP and as a percentage of total national R&D expenditures, is very low. Mexican firms invest a little above 0.1 percent of GDP in R&D, which compares to 1.5 percent in the OECD area, 0.4 percent in Brazil, 0.3 percent in Chile, and 0.8 percent in China. Large companies (above 500 employees) account for the majority (69 percent) of private R&D. Some recent studies suggest that the 100 largest Mexican firms have only 12 research groups, which altogether hire less than 1,000 specialized researchers with PhDs. Those firms use a strategy of *learning by using* rather than one of *learning by* doing.[111] Multinational corporations seem to see no advantage in shifting some of their R&D operations across the border and hence are not providing Mexican local firms with role models and spillovers.

[108] See Jones and Williams (1998) for a review.

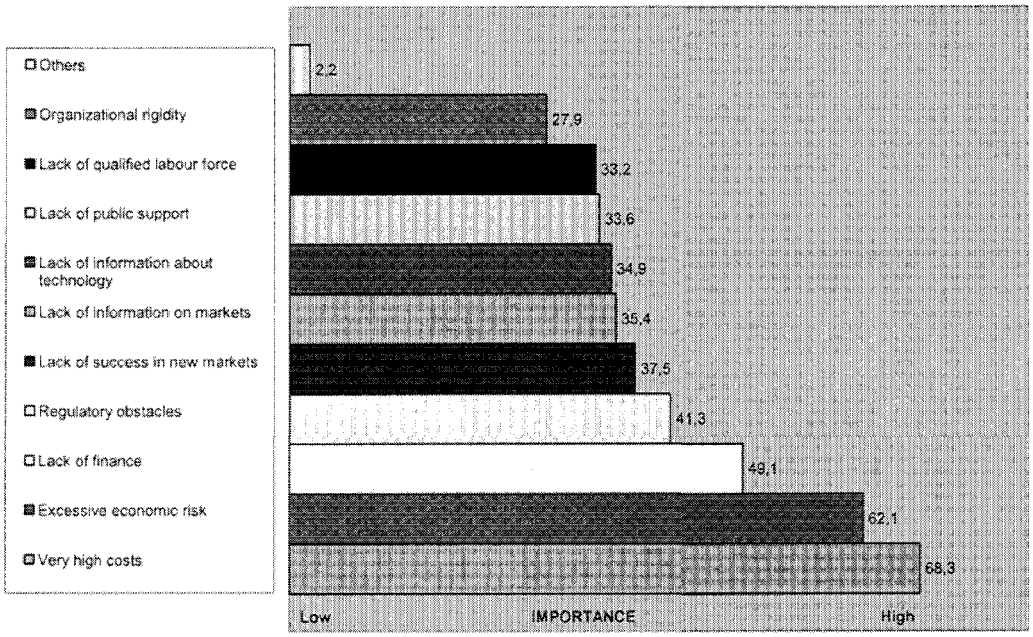
[109] According to Griliches (1979), this production function should describe the transformation process that runs from innovation inputs to innovation output.

[110] The bottom line of this approach is that it is not innovation investment but innovation output, measured for example by the share of innovative sales in total sales, that should be used to estimate the contribution of innovation to firm performance (e.g., multifactor productivity (growth).

[111] Results presented in the *Congreso Nacional de Vinculación para la Competitividad* organized by the *Foro Consultivo Científico y Tecnológico.*

- **Total R&D investment, public and private, is also far below the OECD levels.** Expenditures on R&D as a percentage of GDP in Mexico (0.44 percent in 2003) is the lowest of OECD countries and inferior to other emerging economies such as Chile (0.6 percent), Brazil (1.1 percent), or China (1.2 percent).
- **High cost, excessive economic risk, and lack of access to finance are the most important limitations to innovation according to Mexican firms.** The innovation survey investigates the factors that represent a major constraint to increased innovation. The most important ones are summarized in Figure 53.

Figure 53: Obstacles to Innovation for Mexican Manufacturing Firms

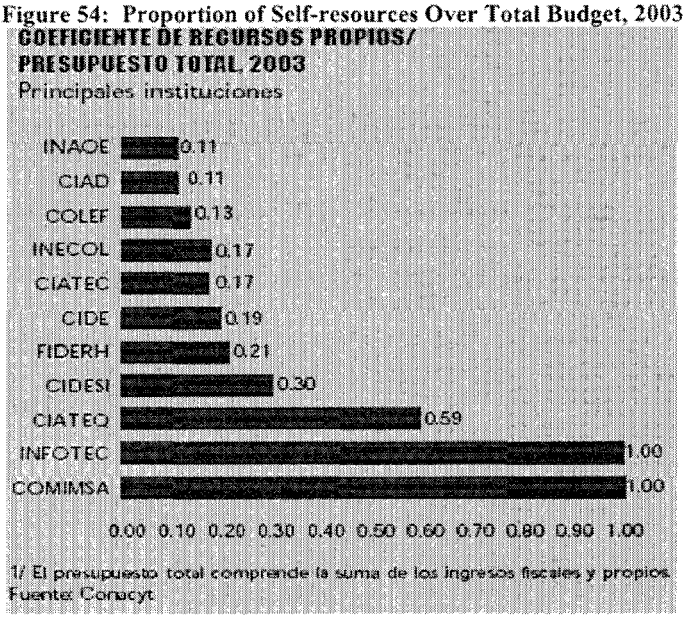


- **Low level of cooperation in the development of new products and processes.** In the period 1999–2000, most new or significantly improved products were developed within the firm; only 15 percent of firms reported having collaborated with other firms. In the development of new processes, cooperative behavior is somewhat more prevalent as 26 percent of firms work with other firms, but a weak environment for entrepreneurship results in few potential high-growth start-ups suitable for venture capital funding. Enterprises are constrained by traditional business values and by lack of a culture of risk taking. Lack of venture capital funding is also a limiting factor for the appearance of technology-based start-up companies. Local and national groups that foster networking among entrepreneurs, angel investors, and venture funds, remain weak.
- **Low Science and Technology skill base.** Investment in human resources follows a similar pattern to that of R&D intensity. In 1995, there were 0.6 researchers per thousand workers in Mexico, compared with 0.8 researchers in China (1.1 researchers in 2002), 1.7 in Argentina, and an average of 5.8 researchers per thousand workers in OECD countries. This is not surprising given the low enrollment in tertiary education. The balance of R&D personnel in industry and the public sector is

greatly skewed towards the public sector, with only 32 percent of all R&D personnel working in industry in 2004. By contrast, the OECD average is 64 percent.

- **Inadequate linkages between public R&D and the productive sector.** Few companies have important links with public R&D institutions (12 percent of innovative firms reported relationships with R&D institutions) or universities (12 percent of innovative firms reported relationships with universities). This implies limited private sector access to basic and applied research, reduced relevance and commercialization of R&D, and a low return to public R&D investments. Lopez-Acevedo (2002) finds that when firms have links with public research institutes, their likelihood of increased technology absorption increases significantly. Similar findings exist for the majority of other OECD countries. Evidence of the low level of public-private interactions in Mexico is provided by the low provision of technological services in the public R&D centers. Figure 54 shows the level of self-financing through the sale of those services (consultancy, testing, R&D contracted projects, etc) in the centers for technological development associated with the National Science and Technology Council (*Consejo Nacional de Ciencia y Tecnología*, CONACYT). Even though the number of projects developed with firms has increased from 1,391 in 2000 to 3,695 in 2003, more progress needs to be made.

Figure 54: Proportion of Self-resources Over Total Budget, 2003



- **Limited international participation and linkages.** Despite being one of the ten largest economies, Mexico has relatively few and scattered links with foreign knowledge centers, only funds 0.25 percent of the world's R&D, and its science base produces only 0.7 percent of new global science and technology (S&T) knowledge, as measured by publications in top S&T journals. The impact index of the Mexican scientific publications for the period 2000–2005 is 2.69 well below many OECD countries, which attain levels above 5, and the world total of 4.54. Mexico's contribution to the global pool of science and technology based knowledge and its integration with other OECD countries' innovation systems is deficient.
- **Heavy reliance on foreign technology.** In 2003, Mexico earned the negligible amount of US$54 million from technology intangibles (patent acquisition, technology licensing payments, protected knowledge, and know-how transfer services), compared with the US$608 million it had to buy from abroad. The dependency ratio measured by the number of non-resident to resident patent applications

is about 24. With a technology coverage rate[112] of 8 percent in 2004, Mexico is at the bottom of OECD countries.

- **High concentration of the S&T activities around Mexico City.** This concentration can be observed in the percentage of total researchers (50 percent), doctoral programs (34 percent), and students in those programs (62 percent) that are located around Mexico City. Also the programs that support R&D and innovation funds and fiscal incentives still reflect a bias in favor of Mexico City, which absorbed 51 percent of total resources in their three first years of operation.

190. **The government is aware of the crucial role that the private sector has to play to boost innovation in the country.** Private sector innovation is at the heart of the new S&T strategy pursued by the Special Plan for Science and Technology (*Programa Especial de Ciencia y Tecnología*, PECyT) hence the goal to increase the proportion of R&D financed by the private sector from 26 to 40 percent of total R&D expenditures in the period 2001–2006. In 2005 this proportion was already about 38 percent. This represents considerable progress for Mexico where private sector involvement in innovation activities has traditionally been very low. However, it is still far from many OECD countries where on average private participation represents 65 percent.

191. **Several National Science and Technology Council (CONACYT) programs provide incentives for private sector competitiveness and business innovation.** CONACYT's work plan has progressively shifted away from supporting pure research toward developing applications that will help firms become more productive. Since 2001, a series of support programs have been launched to address different needs in the innovation strategy of firms, including *sectoral* and *mixed* funds and fiscal incentives. The *sectoral* funds are in collaboration with federal ministries and the *mixed* funds are with state or municipal governments. They both provide transfers to established and start-up companies on the basis of project proposals selected through competitive mechanisms. In the fiscal incentives program, firms that can claim up to 30 percent of their annual investment in R&D projects are given tax credits. Other key programs include public-private innovation consortia and research networks, venture capital and seed capital initiatives, scholarships for researchers to work in firms, and firm incubators and accelerators. See Mexico Competitiveness Development Policy Loan, Report No. 34570-MX for a full description of these programs.

Moving Forward

192. Mexico should seek to increase its productivity through knowledge-based integration into global value chains. Several steps need to be taken to make progress in the building of a coherent innovation system with a more active role for the private sector and stronger academic-industry linkages. Efforts should focus on the following:

- Defining and sustaining a long run S&T strategy that is translated into multi-year budgets which clearly identify national priorities to increase competitiveness and productivity.

- Continuing the strengthening of funding mechanisms and incentives for the National Innovation System across all areas and levels of government. Even though there has been some progress through the creation of the sectoral and mixed funds, synergies and complementarities need to be further exploited. There are still many enterprise support programs under different ministries and state and local authorities that have an indirect impact on technological capabilities since they are geared

[112] The coverage ratio is defined as receipts over payments of the technology balance of payments.

toward upgrading the quality of inputs and outputs. CONACYT must continue leveraging resources by pushing different institutions' innovation agendas.

- Scaling up programs through the consolidation of funding.. The focus should be on programs such as those recently launched by CONACYT that emphasize technology upgrading and development, and speed up the formation of the venture capital industry.,. The regional infrastructure that provides technological services should be strengthened to complement programs that support demand.

- Evaluating more rigorously the success of the programs. Evaluations, independently performed according to an accepted common methodology, are necessary to determine whether programs are in fact helping to improve performance of firms involved in the programs. Evaluation results, translated into design and operational improvements, could also help transform the science system from supply to demand based.

- Facilitating interactions between R&D institutions and industry. The AVANCE (High Value-Added in Businesses with Knowledge and Businessmen) and consortia programs can be viewed as entry points for facilitating such interactions; but more efforts need to be allocated to such programs. More funding is required to make science more relevant to industry by enhancing such links (support programs focusing explicitly on this objective); moreover,, a deep reform is also needed to enhance incentives for research organizations to cooperate with industry. This will require a review of the intellectual property rights system and the establishment of a framework for public institutions to reward staff for success in productive research and links with the productive sector.

- Improving the design and implementation of decentralized funds by strengthening state-level innovation sub-systems; emphasizing the roles played by the state-level science and technology councils and the economic development agencies; establishing regional innovation clusters by enlarging the focus and sphere of the collaborative R&D networks .

- Supporting internationalization policies, by (a) financing activities that strengthen the integration of the Mexican innovation system into the global system and (b) by engaging successful Mexicans abroad in an international knowledge network.

PRESSING IMPROVEMENTS TO MEXICO'S QUALITY SYSTEM ARE NEEDED[113]

193. **Mexico's quality institutional framework can be broken into the following four elements:**

- *A* **standardization system**, through which activities in the public and private sectors are regulated, including health, the environment, consumer safety, commercial information, and industrial, labor, and trade practices. In Mexico, official standards are generated by 11 secretariats and the process is overseen by the General Standards Directorate (*Dirección General de Normas*, DGN) in the Secretariat of Economy.

- *A* **metrology institute** that maintains appropriate measurement standards at the national level. In Mexico, this is done by the National Metrology Center (*Centro Nacional de Metrología*, CENAM).

[113] This section is based on a report by the *Grupo de Economistas y Asociados* (GEA) which was funded by this AAA.

- *A* **national accreditation system** to accredit bodies that assess conformity—testing labs, calibration labs, certification bodies, and verification or inspection bodies. In Mexico, this is done by the Mexican Accreditation Entity (*Entidad Mexicana de Acreditación,* EMA*).*

- **Certification, testing, calibration, and inspection bodies**—collectively known as conformity assessment bodies—that certify businesses in aspects relating to metrology and quality.

194. **These four elements are closely linked.** Calibration laboratories ensure that the measurements performed by testing laboratories and inspection bodies are reliable. Calibration laboratories themselves must demonstrate the accuracy and precision of their instruments, based on their traceability to reference measurement standards held at the national metrology institute (CENAM). The competence of calibration and testing laboratories and of certification and inspection bodies must be evaluated by a national accreditation body (EMA). All aspects of these activities rely on standards. Standards provide the basis for evaluation of all conformity assessment bodies, and define the requirements against which conformity assessment is performed. In sum, conformity assessment provides the vital link between standards and the products, processes, and services themselves.

195. **Standards contribute to economic development in a number of ways.** Standards lower transaction costs since they communicate reliable and consistent information regarding the characteristics and quality of products and processes to consumers. By allowing consumers to differentiate products of different quality, they reduce asymmetric information and promote the creation of high quality markets. They also enhance competition by allowing easy comparison of products and services conforming to a given standard. Standards embody technology and act as a channel for technology transfer for the institutions and firms that adopt them. This raises national productivity and competitiveness. Standards increase the efficiency of the development, manufacturing, and supply of products and services since they facilitate the interfacing of processes and components, allow for flexibility through component substitution, and bring about economies of scale. Finally, standards contribute to the safeguard of the general public and of the environment by establishing requirements for design and performance characteristics.

196. **Nonetheless, there are cases in which standards can have a detrimental effect on economic development.** This occurs when a standard imposes constraints on innovation because producers have difficulties adapting new technologies to the technical requirements of the standard. Furthermore, standards can have anticompetitive effects if only one or a few companies are able to internalize their benefits or control their content. This occurs when the contents of the standards cover technological areas in which a limited number of firms have property rights, exclusive knowledge. or the exclusive resources to utilize a technology.

197. **Despite these opposing effects, empirical evidence suggests that under the right conditions, standards have had an important beneficial effect on growth.** Time-series data for the United Kingdom showed that standards contributed to about 13 percent of the growth in labor productivity in the United Kingdom from 1948 to 2002.[114] Another study on the German economy found that standards contributed to about 0.9 percentage points out of an average overall growth rate of 3.3 percent in the period 1960–1990.[115]

198. **Many of the positive effects of standards on economic growth translate directly into positive effects on trade.** Compatibility and interface standards promote trade by allowing countries to specialize

[114] U.K. Department of Trade and Industry (2005)
[115] Jungmittag, Blind, and Krupp (1999).

in system components for which they are the most efficient. By diffusing market and technological information across borders, standards allow countries to compete in new international markets. They enhance transparency in the market and allow foreign producers to be aware of national preferences and technical specifications and adapt their products and services accordingly. By establishing product and process characteristics or performance, standards reduce transaction costs between business partners in distant countries and reduce information asymmetries. Standards also increase the perception of quality and improve the competitive advantage of firms that adopt them. Finally, when the same standards are used in different countries, they promote trade by enabling economies of scale and allowing countries to exploit their competitive advantage.

199. **However, there are other circumstances in which standards will have no effect on trade or even act as a deterrent to trade.** Standards cannot fulfill their role if they cannot be accessed and adopted throughout an economy. This can occur if standards are not well documented, if they are difficult to find, if they are poorly understood, or if they are protected by intellectual property rights. If each country uses its own idiosyncratic or country-specific, standards, global economies of scale will not be realized and each country may end up focusing exclusively on its domestic market. If products must be adapted to each market to conform to different national standards, additional adaptation costs can hinder trade. Standards can be purposely used as technical barriers to trade when differences between countries are not justified by legitimate health or safety objectives or technological capabilities, or when standards are not properly publicized. Harmonized standards (between countries) can also distort trade if their content strongly favors one trade partner over the other. A country may be placed at a competitive disadvantage if it does not have the technological capabilities, the industrial infrastructure or the natural resource endowments required to comply with a shared standard.

200. **A review of empirical studies based on trade models finds that harmonized standards promote trade and that there is mixed evidence on the role of country-specific (or "idiosyncratic") standards.** In a time-series study of intra-industry trade between the United Kingdom and Germany, Swann, Temple, and Shurmer (1996) find that both country-specific and harmonized standards have a positive effect on exports and imports. Moreover, standards play a positive role in trade performance. The study finds that adopting 100 additional British standards raises UK export to import trade ratio by about 14 percent. In a similar analysis of trade between the United Kingdom and Germany, and in a study of total German foreign trade, Blind and Jungmittag (2005) finds that it is specifically harmonized standards that enhance trade.

201. **Standards in Mexico can be mandatory (*Normas Oficiales Mexicanas*), referential, or voluntary (*Normas Mexicanas*).** The Federal Metrology and Standardization Law was passed in 1992 and reformed in 1997 to accommodate NAFTA. Mandatory (official) standards can be issued by 11 federal government agencies and reference standards can be issued by the Federal Electricity Commission (CFE) and PEMEX. As of June 2005, there were 789 official standards in force and 197 more in progress (Table 26). Also as of June 2005, there were 5,651 voluntary norms in place and 150 in progress. In principle, anyone can propose a voluntary standard, which will then be submitted to one of 30 technical standards committees (the committees are validated by the DGN and supported by 8 national standards bodies) for review.

Table 26: Official Mexican Standards by Agency, June 2005

Agency	In Force	In Progress
SE	110	20
Sectur	8	0
Sagarpa	139	9
Semarnat	107	15
STPS	38	3
Sener	87	23
Sedesol	0	0
SS	195	24
SCT	115	104
Segob	1	0
SSP	0	0
Total	**789**	**197**

202. **Problems with the standards institutional framework include the following:**

- Standards that require physical or chemical measurements frequently do not include adequate consideration of measurement characteristics—for example, traceability and uncertainty—to produce the required level of confidence. As a result, the standards can become non-viable. This is especially the case with voluntary standards.
- Consultative committees and standardization bodies do not have strong enough ties to science and technology institutions. Even when the law requires the participation of academia, their participation frequently does not affect the relevant standard. Academia has demonstrated an increasing interest in standards, but there are currently few incentives to encourage their involvement.
- There are no training programs for standards specialists. Most people learn about standards development through actually participating in the process. This lack of training programs creates inefficiencies in the process.
- In some cases, the agency that issues the standard can be biased toward a particular sector. As a result, the overall interests of society suffer.
- A mechanism to conduct cost/benefit analyses of standards has not been developed. As a result, the mandatory review of standards every five years often occurs without any information about the impact of standards. Hence, the review becomes merely administrative.
- The DGN does not have sufficient resources to carry out all of its mandated functions.
- There is a tendency on the part of both producers and sectoral authorities to generate standards that can serve as trade barriers. DGN's role is to prevent this.

Metrology and Calibration

203. **Metrology is the study of a system of measures.** Scientific metrology is the branch of metrology concerned with developing measurement standards and promoting their acceptance and equivalence. Legal metrology consists of the legislative, administrative, and technical procedures established to regulate the credibility of measurements related to official controls, trade, health, safety and the environment.

204. **The role of a national metrology institute—CENAM in the case of Mexico—is to establish the national measurement system, to maintain, develop, and diffuse measurement standards for basic units, and to diffuse metrological expertise to the economy.** The functions of the institute are to do the following:

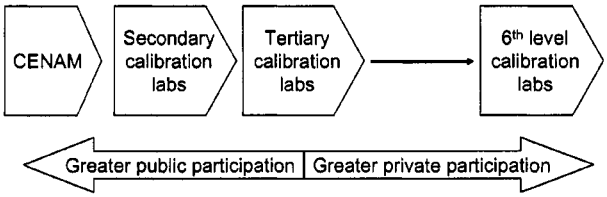
- Establish the national measurement system by adopting a national system of units with a view to incorporating it into legislation.
- Act as a repository for the physical realization or reproduction of national measurement standards.
- Act as the primary scientific metrology laboratory that disseminates the exactitude of its measurement standards to industry and other users via calibration services.
- Disseminate metrological expertise by offering specialized technical consultancy and training services to industry, research institutions, and educational institutions.

205. **CENAM has developed a robust set of measurement standards, but there are some gaps.** Mexico's National Metrology Center (CENAM) has developed 63 national measurement standards to date, which are used as references to ensure that all measurements in the country are uniform, reliable, and in line with international standards. The National Nuclear Research Institute (*Instituto Nacional de Investigaciones Nucleares*, ININ) is in charge of another three standards. Although these standards cover a large part of the measurement requirements of the country, there remain some areas that require development. One example is the measurement of high gas flows in view of the increasing importance of natural gas. Another is the production of certified reference materials—another type of measurement standards; these have a long way to advance. Unfortunately, budgetary limitations make it difficult for CENAM to respond flexibly and rapidly to new measurement challenges.

206. **Calibration involves the determination of the relationship between an instrument's input and the magnitude or response of its output**. It serves to establish the accuracy and precision of a measuring instrument. Secondary calibration laboratories constitute the primary market for calibration from the national institute. They calibrate their own equipment to the national institute's and diffuse their measurements to the downstream market for calibration, which includes industrial producers, testing laboratories, inspection bodies, research laboratories, universities, and other final users. Many conformity assessment bodies require that equipment and measurement reference systems be calibrated, or traceable, to other widely accepted metrological references before they issue a product or system certificate.

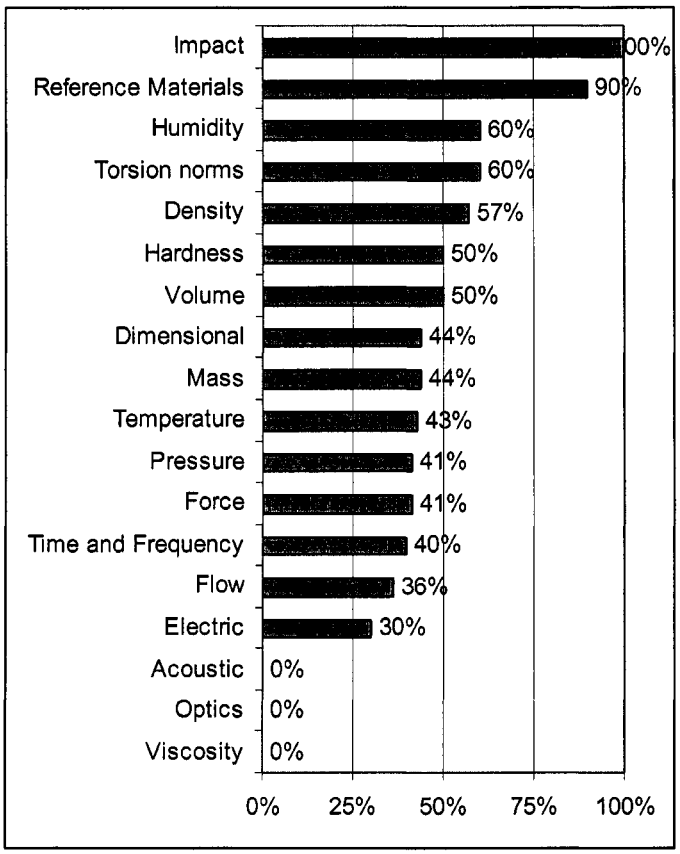
207. **Mexico's metrology and calibration services serve as a public good, and the country needs to develop them further.** Since the costs to develop high-level metrology services significantly outweigh the income received from providing such services in Mexico, public funding is necessary. However, low-level metrology services can be attractive to the private sector. In general, the higher the level in the chain of calibration services, the greater the involvement of the public sector because profitability decreases as one moves up the chain (Figure 55). In Mexico, this chain of services is not yet fully developed, since there is a shortage of participants in different segments, and there are technical calibration deficiencies. In March 2005, 299 calibration labs were registered with the EMA.

Figure 55: Metrology Services Chain



208. **Secondary calibration services have insufficient capacity in Mexico**. As mentioned above, secondary metrology/calibration services (one step down from CENAM) are not profitable, due to the technical requirements of labs, specialized equipment, and highly trained personnel. Secondary labs include research center labs; centers in the SEP-CONACYT network where CONACYT works with the Secretariat of Public Education; academic labs (Instrument centers of UNAM, Laboratorio de Termometría de la Escuela Superior de Físico-Matemáticas del IPN, among others); materials testing lab (LAPEM) of the CFE; and other private sector labs. The secondary service capacity is adequate in some areas, such as electricity, while more development is required in others, such as volume and firmness. Geographic coverage of secondary services is also lacking. About 44 percent of calibration labs are located in Mexico City, Jalisco, and Nuevo León (Figure 56). Currently, some fifth or sixth level institutions are forced to calibrate their measurements directly with CENAM because there are no secondary or tertiary labs in their area that are accredited or have the necessary level of measurement accuracy and precision. This substantially increases the time and costs of the calibration procedures, ultimately causing competitiveness and consumers to suffer.

Figure 56: Concentration of Calibration Labs in Mexico City, Jalisco, and Nuevo León (Share of National Total)



209. **More inter-laboratory comparisons and proficiency tests are needed.** To have a reliable Mexican metrology system, inter-laboratory comparisons and proficiency tests with calibration labs that are integrated in the traceability chain are required. This is a common practice in all developed countries; it consists of appointing a recognized, prestigious lab or regional organization to circulate between different labs to test their measurements against known standard values. In Mexico, this activity is not sufficiently established. Inter-lab comparisons and proficiency tests occur only infrequently, meaning that in some cases, the performance of accredited labs is not reliable. More comparisons are required in order to maintain the confidence of third parties and comply with international standards.

210. **Participating in international inter-laboratory comparisons is a requirement to maintain mutual recognition agreements.** A Mutual Recognition Arrangement (MRA) in metrology provides for the formal recognition of national measurement standards and calibration capabilities. Through measurement comparisons, an MRA establishes the degree of equivalence of national measurement standards maintained by national metrology institutes and thereby guarantees the international acceptance of measurement results that are traceable to the national metrology institute, by the other MRA signatories. Mexico is a member of international accreditation organizations, such as ILAC (International Laboratory Accreditation Cooperation) and APLAC (Asia-Pacific Laboratory Accreditation Cooperation), which require the Mexican Accreditation Entity (EMA) to demand that laboratories participate in national and international inter-lab comparisons and aptitude tests in order to be accredited.

211. **Policies to strengthen the existing metrology system should do the following**:

- Identify deficiencies in the metrology system, including an evaluation of the measurement instruments and other metrology equipment necessary for the future. Once detected, priorities to correct the deficiencies will have to be determined.
- Create an inter-institutional body to unite the Mexican metrology system and make uniform the criteria that apply to legal metrology.
- Prepare a legal metrology framework that reflects the current national and international environment.
- Develop the national calibration system, which is barely outlined in current applicable regulation.

Accreditation

212. **Accreditation is defined as the procedure by which an authoritative body gives formal recognition that an organization or person is competent to carry out specific tasks**. Accreditation is sought on a voluntary basis as a proof of competence in a given area. Accreditation provides certification and inspection bodies, as well as testing and calibration laboratories with a means to signal that they are conducting their work to appropriate standards and that they are able to provide reliable services to support quality in firms. The accreditation body evaluates the personnel and supporting management system of the candidates for accreditation and can request practical tests for laboratories when relevant. These tests take the form of proficiency testing schemes, through which the measurement results of different laboratories are compared (i.e., inter-laboratory comparison).

213. **The Mexican Accreditation Entity (EMA) is the first and, so far, the only private organization with responsibility for accrediting organizations that assess conformity. The** EMA accredits testing and calibration labs and certification, verification, and inspection bodies. Before the creation of the EMA, the DGN had responsibility for accreditation. Reforms to the Federal Metrology and Standardization Law in 1992 and 1997 opened the door for a private, third party organization to take over these responsibilities. EMA began operating in January 1999.

214. **Mexico's market size and subsidies to the EMA have discouraged the emergence of competitors.** The EMA is a non-profit organization whose principal financing sources are fees for accreditation services, dues from associates, use of the EMA brand, training courses, and donations from federal and state agencies and from regional and international organizations. While most other developed countries have a single public institution in charge of accreditation, Mexico has adopted the U.S. accreditation model where a number of private accreditation bodies fiercely compete on the basis of price and service quality. However, subsidies from the public sector give the EMA a significant advantage over potential competitors; hence it has remained a monopoly. It is unlikely that another accreditation body will emerge because of Mexico's market size, sizeable investment requirements, and opposition from the EMA.

215. **High accreditation costs have led to unaccredited competitors**. The high costs associated with accreditation from the EMA, which are substantially higher than U.S. and international prices, have led to the emergence of testing establishments that are not accredited but compete with EMA accredited labs. Such testing establishments are authorized or recognized by different agencies, including SAGARPA and the Secretariat of Health. As a result, they act as *de facto* accredited labs.

216. **The EMA's mix of public and private origins has led to a complex governance structure and slow decision-making.** The Board of Directors comprises four sectors, each of which has an equal

number (9) of votes: the Federal Government (various secretariats); business (represented by various groupings of private sector organizations); users/clients (labs, certification and inspection bodies); and academia and consumer organizations. Given that these four sectors often have conflicting interests, the decision-making process can be slow and there have been delays in reaching agreements that would ultimately benefit the end user: businesses that need conformity assessment services. However, the involvement of all the different sectors leads to greater transparency and impartiality.

217. Besides the Board, the EMA has a General Assembly, Executive Commission, Executive Management, and 11 departments. The departments include certification; inspection; testing and calibration labs; technical and relationships; administration; systems; quality assurance; new projects; operations; promotion and diffusion; and human resources. The organization's size and complexity is another deterrent to the emergence of potential competitors.

218. **To minimize technical barriers to trade, national conformity assessment procedures should be harmonized across countries.** Complying with a standard or a technical regulation is only useful if compliance can be demonstrated to the buyer or the government at reasonable cost. Demonstrating compliance through conformity assessment itself is only useful if the testing and certification requirements are similar in the exporting country and the importing country. If testing laboratories are not recognized abroad, tests on products carried out in an exporting country have to be repeated by a recognized laboratory in each of the importing countries. An adverse test report in the importing country can result in the rejection of an entire shipment. Likewise, if certification in one country is not recognized abroad, domestic firms requiring quality system and environmental management certification for export purposes—for example, ISO 9000 and ISO 14000 registration—need to be certified by organizations in each of the importing countries. To promote the recognition of conformity assessment procedures, many accreditation bodies base their organizational structure and their accreditation decisions on well-recognized international guides and standards.

219. **Mutual recognition of accreditation procedures promotes trade by decreasing transaction costs and eliminating technical barriers**. When accreditation in one country is recognized by other countries, the work performed by that country's certification bodies, inspection bodies, and calibration and measurement laboratories, will be accepted in other countries.

220. **The EMA has been recognized by the main international accreditation bodies, IAF and ILAC.** Membership in the International Accreditation Forum (IAF) and the International Laboratory Accreditation Cooperation (ILAC) enhances an accreditation body's prospect of gaining international credibility. Accreditation bodies must demonstrate that they operate at high international standards in order to join the IAF or ILAC. In this sense, IAF and ILAC membership is a form of assurance that accreditation bodies are competent to undertake their work and are not subject to conflicts of interest. Furthermore, these international organizations facilitate technology transfer in areas related to quality assessment and provide a forum for learning from other experienced accreditation systems.

221. **The EMA is a signatory to various Mutual Recognition Agreements (MRA).** For full recognition, accreditation bodies must establish agreements with other countries, based on mutual evaluation and acceptance of each other's accreditation systems. Membership in an MRA[116] at the bilateral level (with one other country) or at the regional or international levels (with many other countries) is critical to guaranteeing the credibility of the national conformity assessment system. MRAs are based on peer evaluation processes, through which signatories evaluate each others' compliance with the agreed-upon requirements and evaluate the performance of assessment staff. They usually cover

[116] Also referred to as Multilateral Recognition Arrangements (MLA) in the case of the IAF.

specific accreditations types (e.g. quality management system certifiers) or products. Mexico has signed the IAF's Quality Management System (2001), Environment Management System (2004), and Product (2004) Multilateral Recognition Agreements.

222. **The EMA faces the following challenges in the short term:**

- To obtain international recognition for the accreditation of Laboratories and Verification Units, with the aim of having tests conducted in Mexican labs (country of origin) recognized in the destination country.
- To fulfill the new ISO/IEC 17011 standard. Beginning in 2005, the new 17011 standard is applied to all accreditation entities in the world and its completion will become obligatory in 2006.
- To increase domestic promotion of the EMA. The accreditation process is largely unknown in Mexico; hence greater promotion of the importance of accreditation throughout the country should be a priority. Strategic alliances with all three levels of the government and with the private sector in all regions will be necessary to ensure compliance with the appropriate standards.
- To broaden and strengthen EMA's structure so that it can provide accreditation services in areas of high future demand.

Certification, Testing, and Inspection

223. **Third-party certification consists of the provision of assurance by an independent body that a product, service, system, process, or material conforms to one or more standards or specifications.** For many standards, especially quality and safety standards, the incentives for self-enforcement are low and producers have much to gain by claiming that a non-compliant product or process adheres to a certain standard. Furthermore, the highly technical content of some standards may render it difficult for producers to know whether they have appropriately complied with a standard. If there is no means of differentiating products that conform to a standard from those that do not, standards are of limited use.

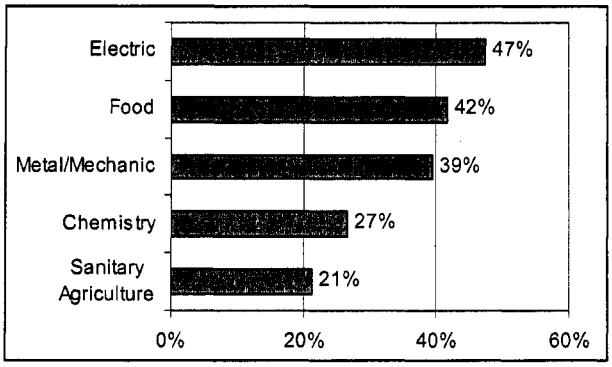
224. **Certification provides benefits for producers of goods and services, consumers, and government regulators and for international trade.** Manufacturers and service providers can have their products or their management systems certified to particular standards to distinguish themselves from less reputable suppliers. Buyers benefit from certification because it allows them to compare and differentiate products and services in terms of quality, safety, or other desirable characteristics. It avoids the costs of having each buyer independently validate the characteristics of the products and services of a supplier and reduces the risk of purchasing faulty products or services. By reducing search costs for global suppliers, certification reduces technical barriers to trade. Certification by third-party organizations is increasingly included in trade contracts (Schuurman 1997). Finally, regulators benefit from certification because it provides them with a system to enforce governmental health, safety, and environmental legislation. In March 2005, there were 38 certification bodies accredited by the EMA.

225. **Testing and inspection help demonstrate that a product or process satisfies certain technical requirements.** Testing involves determining the characteristics or performance of a product or process according to a specified procedure. Inspection is another form of assessment that relies on less sophisticated instruments than testing. Independent testing laboratories and inspection bodies can be contracted by a firm to obtain a test or inspection certificate as evidence that a product or process conforms to certain characteristics. In certain cases, testing and inspection are required for firms to implement a quality control system, such as ISO 9000. The first testing labs in Mexico were created roughly 35 years ago, and in March 2005, there were 362 accredited testing labs and 791 accredited inspection bodies.

226. **There are internationally-accepted standards guiding the operation of certification entities, testing laboratories, and inspection bodies.**[117] To play a credible role in the conformity assessment system, testing laboratories and inspection bodies must display many of the same characteristics as certification bodies, notably impartiality, objectivity, and confidentiality. Objectivity relies heavily on the procedures guiding the evaluation process, the equipment used, and the staff skills and qualifications.

227. **There is a high geographic concentration of testing labs and inspection bodies.** Nearly 40 percent of Mexico's testing labs are located in Mexico City, Jalisco, and Nuevo León (Figure 57). This has translated into price differences for services in the big metropolitan zones versus the rest of the country. Inspection bodies are also concentrated, with 50 percent of them located in Mexico City, Estado de Mexico, Jalisco, and Nuevo León. The only exception is inspection bodies associated with energy efficiency and natural gas, which are linked to CFE and PEMEX distribution locations. The concentration of inspection bodies creates particular problems in cases such as auto-transport, industrial parks, hydraulics, animal health, telecommunications, tourism, and others, where 100 percent of inspectors are located in the above four regions, while demand is spread throughout the country.

Figure 57: Concentration of Testing Labs in Mexico City, Jalisco, and Nuevo León (Share of national total)



228. **Prices for conformity evaluation services are relatively high.** Given that there are relatively few accredited firms in relation to demand, prices are essentially determined in a monopolistic fashion, with price differentials based on type of client and service. Normally travel costs are paid by the client, which puts businesses located outside of Mexico City, Guadalajara, and Monterrey at a disadvantage. Even though accredited domestic firms consider themselves to be cheaper than international competitors within Mexico, conformity evaluation prices are three to four times greater on average than prices in the United States and the European Union. High costs are linked to accreditation costs for certification and inspection bodies.

229. **Conformity evaluation bodies are regulated by several organizations.** Certification, inspection, and testing bodies are regulated by EMA, CENAM, and the DGN, through the accreditation process. A great number of businesses are also certified by the Standards Board (Consejo de Normalización) and others such as ANCE (a domestic group) and AENOR.

230. **Problems in the conformity evaluation process include the following:**

[117] Guidelines for testing and calibration laboratories are documented in the ISO/IEC 17025 standard; guidelines for inspection bodies are documented in the IOS/IEC 17020 standard.

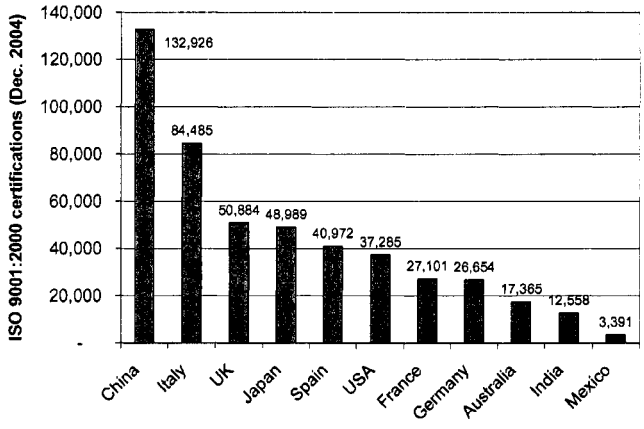
- Current legislation allows people who are being evaluated to be part of the accreditation decision-making process and responsible for their own evaluation activities. This creates an inherent conflict of interest. The situation was justified by the lack of qualified people when the accreditation system was initiated, but now there are plenty of experts from academia, research centers, and CENAM. Hence, the functional separation of the evaluators and those evaluated is viable and necessary.
- Those responsible for evaluation activities often do not have sufficient technical competence in a given speciality, meaning that their results lack credibility. This weakness has been identified and is in the process of being addressed.
- Federal agencies have not been very active in demonstrating the conformity assessment criteria for the standards that they issue.

231. **Demand for conformity assessment services is relatively narrow, meaning that Mexico has a low number of ISO (International Organization for Standardization) certificates.** Demand has been limited to the following four sectors:

- Mexican exporters that need a recognized certificate of quality for their products;
- Foreign firms that export products to Mexico;
- Providers of goods and services to the public sector in Mexico; and
- Giant firms and/or firms listed on the Mexican stock market.

This universe encompasses a very small share of the total formal businesses in the country. For example, only 34,000 export-oriented companies are officially registered, which represents barely 2 percent of the country's total. One manifestation of this is the relatively low, albeit increasing number of ISO 9000 certificates in Mexico (Figure 58). Mexico's ISO 9000 certificates as a share of the Latin America and Caribbean (LAC) region's total—roughly 17 percent in 2004—has not grown appreciably over the last decade (Figure 59a). As a reference, Mexico's share of total LAC GDP was roughly 30 percent in 2004. As shown in Figure 59b, Mexico's certificates as a share of the world total increased during the 1990s, but then stagnated during the early 2000s.

Figure 58: ISO 9000 Certifications, 2004



Source: ISO (2004)

Figure 59a: Mexican ISO 9000 Certificates and Share of Latin American Total

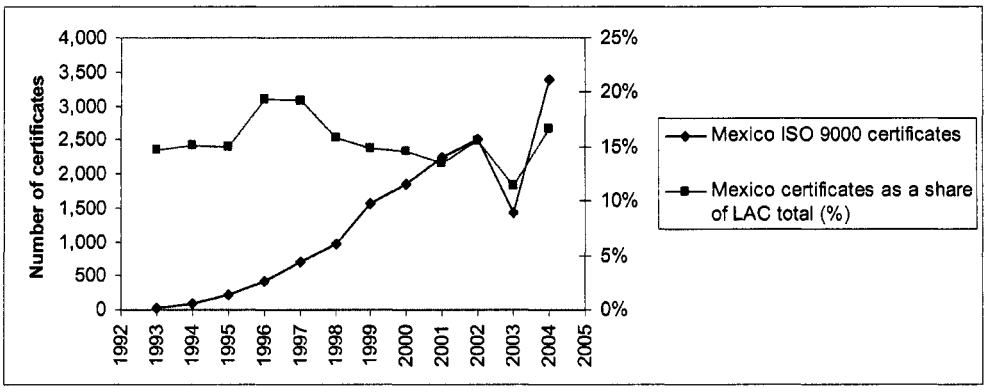
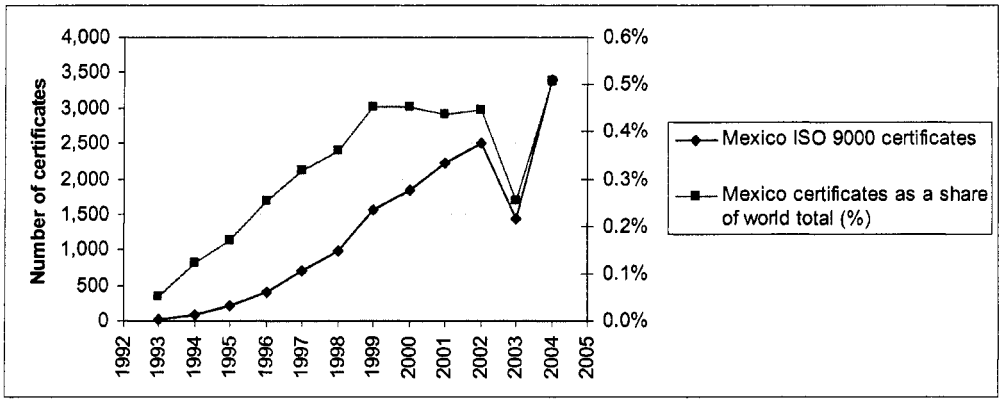


Figure 59b: Mexican ISO 9000 Certificates and Share of World Total



Note: The apparent drop in the number of ISO 9000 certificates in Mexico in 2003 is due to the transition from the old ISO 9000:1994 standard to the new ISO 9000:2000 standard. In the 2003 survey, the ISO 9000:1994 standard was officially replaced by the ISO 9000:2000 standard and Mexico did not report ISO 9000:1994 certificates in the survey, only ISO 9000:2000 certificates. However, in 2003 both ISO 9000:1994 and ISO 9000:2000 certificates were reported in many other countries in the survey, thus giving the impression that there was a drop in the relative number of certificates in Mexico in 2003.
Source: ISO 2001, 2003, and 2005.

232. **The conformity evaluation culture may be less widespread due to high market concentration and informality**. Relatively high concentration in many goods and services markets in Mexico means that there are few firms in each sector that have an incentive to get certified—either to compete in international markets or to deter the entrance of new competitors. The large informal sector in Mexico means that there is no potential demand for certification or testing from a large portion of the economy.

BETTER EDUCATION QUALITY, EXPANDED ADULT EDUCATION PROGRAMS, AND IMPROVED TRAINING PROGRAMS ARE NEEDED

Description and Challenges

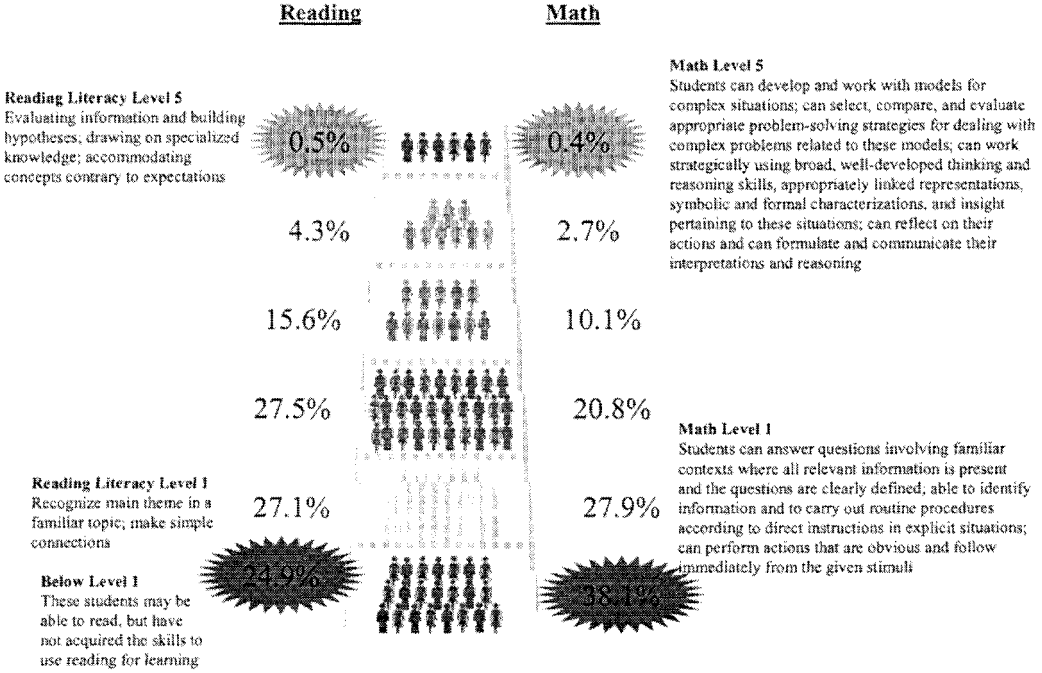
233. **Mexico is not producing the human capital necessary to allow the country to live up to its potential in terms of productivity and competitiveness**. The quality of education, especially learning

outcomes in math and science at the secondary school level, are too low for an OECD country. Also, the system does not produce enough skilled labor through its education system, especially at the secondary and higher education levels. Efforts are needed to produce better quality, and more educated labor, by focusing on reforms at the school level.

234. **Enrollment is low in secondary and tertiary education**. Mexico has made great strides in expanding its education system over the past decades. However, while primary education is almost universal, enrollment rates in secondary and higher education are relatively low—lower than expected given national income, and low relative to major trading partners and other OECD countries. For example, at the secondary level, Mexican enrollment is only 62 percent, as compared with economies of similar size and with other Latin American countries such as Argentina and Chile, with net enrollment rates of 79 and 75 percent. Underperformance at the tertiary level is even starker; Mexico, at 21 percent of 18–24 year olds, is one-third lower than countries with similar income levels. This enrollment gap takes place against a backdrop of high demand for graduates from higher education with rates of return almost double those found in high-income countries.

235. **The system produces students with poor skills**. An even greater challenge is improving the quality of education throughout the system. Mexico's participation in the OECD's Programme for International Student Assessment (PISA) provides a good basis for measuring, benchmarking and assessing the quality of education. PISA provides a measure of reading, mathematics, and science achievement for a nationally representative sample, comparable across countries, and assesses the ability of 15 year olds to apply their knowledge and skills to real-life problems and situations, rather than on how much curriculum based knowledge they possess. Mexico's dismal performance is demonstrated in Figure 60. Less than 1 percent of Mexican students perform at the highest level (Level 5) in either reading or math, while more than half perform at Level 1 or less in both.

Figure 60: Reading and Math Performance of Mexico by Level, PISA



236. **Mexico is far behind competitor countries in education quality**. These results in math are compared below (Table 27) to the other countries participating in the PISA and shows the large gap in performance as regards the quality of education.

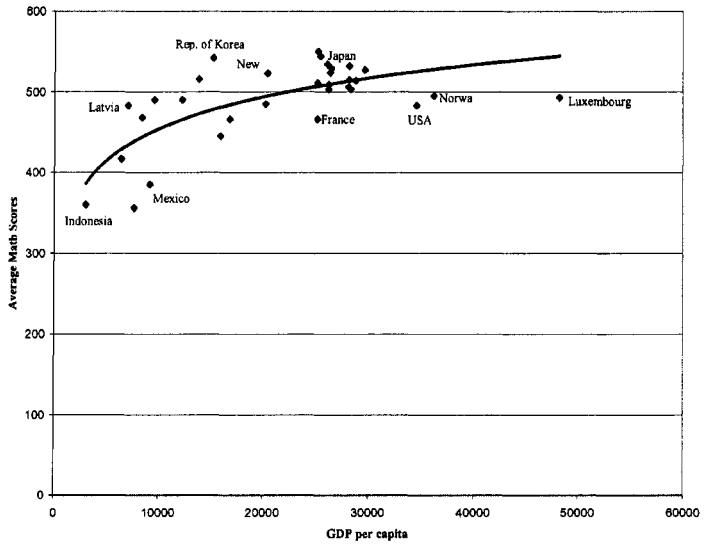
Table 27: Students by Level of Math, selected countries (percent), PISA

Country	Below Level 1	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
Brazil	53.3	21.9	14.1	6.8	2.7	0.9	0.3
Canada	2.4	7.7	18.3	26.2	25.1	14.8	5.5
Italy	13.2	18.7	24.7	22.9	13.4	5.5	1.5
Korea	2.5	7.1	16.6	24.1	25	16.7	8.1
Mexico	38.1	27.9	20.8	10.1	2.7	0.4	0.0
Spain	8.1	14.9	24.7	26.7	17.7	6.5	1.4
United States	10.2	15.5	23.9	23.8	16.6	8	2
Uruguay	26.3	21.8	24.2	16.8	8.2	2.3	0.5
OECD average	8.2	13.2	21.1	23.7	19.1	10.6	4

Source: OECD (2003)

237. **Mexico underperforms for its income level.** While Mexico's level of development is a major factor in explaining the results, in particular relative to other OECD members, its performance in relation to GDP per capita suggests that it is performing far under its potential (Figure 61).

Figure 61: Global Performance in Mathematics and GDP per Capita,



Source: OECD, PISA (2003a); EdStats.

238. **Adult education programs are necessary to raise the skill and knowledge levels of the workforce.** Given the low education quality and enrollment rates, a large proportion of the workforce does not have sufficient education to benefit from training in job skills or to perform efficiently in the knowledge economy. Adult education programs, such as for secondary education certificates, can help. There is evidence that receiving a secondary education certificate leads to higher employability and higher wages, suggesting higher productivity.[118] With complete secondary education the probability of being employed in the formal sector increases, on average, 13 percent for men and 10 percent for women, and their hourly wage increases by almost 64 percent for men (from 1.16 to 1.90 pesos/hr), for women the effect is higher (65%) and the hourly wage rate increases from 1.89 to 3.11 pesos/hr. The effect on wages varies depending on the assumptions used, but recent simulations of potential private benefits derived from the INEA secondary education certificates (described below) show an average internal rate of return of approximately 10.6 percent. This estimate is a low threshold since it does not take into account the possibility of INEA graduates pursuing further education.

239. **Mexico has an efficient adult education program** funded by the National Institute of Adult Education (*Instituto Nacional para la Educación de los Adultos* —INEA). INEA has modernized its out-of-school education program during its 23 years of operation and now utilizes a pedagogic approach based on modules that are flexible and competency-based. The Institute introduced information technology to expand the coverage of its programs and has a large and decentralized operating infrastructure consisting of 445 regional centers, 34,000 learning points, 29,000 learning cycles and 2,500 community learning centers (*Plazas Comunitarias*).

240. **INEA's flexible, module-based program is equivalent in quality to a lower secondary education.** The education model used by INEA is very different from those designed for children and literacy campaigns. INEA uses learning modules for basic competency that cover the secondary education curriculum (grades 7 to 9) and basic practical skills. The program is flexible in terms of schedule and number of modules required to obtain the certification, it gives individuals credit for the knowledge or skills acquired prior to starting the program. Based on the results of an entry test, participants may be able to skip modules that cover competencies they already have. According to assessments of learning outcomes by the National Evaluation Center for Higher Education (*Centro Nacional de Evaluación para la Educación Superior*—CENEVAL), there is no significant difference between the quality of the lower secondary education provided by INEA to out-of-school adults and that provided by the formal school system.

241. **INEA offers a viable strategy to improve education levels of the workforce in the short term.** Each module is supported by a book or several books, articles, leaflets, and even a calculator and a metric tape and references to the other printed materials. The basic focus of all the learning materials used by INEA is constructivist, in the sense that the adult learns new things based on what he or she already knows. Currently there are over 41 modules available for study organized in 8 subject matter groups. Adults interested in completing the twelve-module requirement to attain lower secondary certification can choose modules from the following menu of options: (a) Mathematics; (b) Language and Communication; (c) Science; (d) Family; (e) Youth; (f) Work; (g) Citizenship and Culture; and (h) Preparation for Upper Secondary which covers a more advanced curriculum in Math, Social Sciences, Natural Sciences and Language. Some elective modules include health and human rights topics as well as work-related skills modules.

[118] The analysis uses information from the National Employment Survey (Encuesta Nacional de Empleo, ENE) and INEA's student database. See, Annex 9: "Economic and Financial Analysis." In: World Bank, MX Lifelong Learning Project. Draft Report. August 18, 2004.

242. **SMEs comprise a huge part of the Mexican economy and worker skills and training play a key role in their success.** SMEs make up 99 percent of enterprises in Mexico, employ 64 percent of the workforce and account for over 40 percent of GDP (GOM, Economic Census 1999). These firms face many difficulties, perform below the level of their larger counterparts, and rarely export their goods and services.[119] An assessment by the Secretariat of Economy (2001) identified lack of access to financing and skills as the main weakness of SMEs. The mortality rate of SMEs is high—200,000 SME are created every year but only 70,000 (35 percent) survive two years later. The firms that fail report lack of training and expertise as key reasons for their failure.

243. **Mexico has a proliferation of relatively small SME support programs**. Over the last 15 years, approximately 131 federal programs have been created to support small and medium enterprises (SMEs), 16 of them provide subsidized training to workers or entrepreneurs. Most of these programs seek to improve the productivity and competitiveness of SMEs by encouraging technology upgrading and training. The 10 largest programs reported in the National Survey of Employment, Wages, Technology and Training (ENESTYC) finance needs assessment, training and consulting services and/or knowledge-sharing services.[120] Despite several differences among programs, they share the common goal of improving the performance of individual firms or groups of firms by subsidizing support services for SMEs on a cost-sharing basis.

244. **The CIMO-PAC training program provided by the STPS is the largest in Mexico.**[121] The program provides training services to approximately 332,000 employed workers per year on a cost-sharing basis with the employer. Due to budget cuts and lower efficiency, the number of firms participating in the program has declined sharply, from an estimated 94,000 firms in 2001 to 7,000 in 2005.[122] The firms benefiting from the program are preponderantly microenterprises (70%) and concentrated in the manufacturing sector (49%) and in service industries (41%). The potential positive impact of the program on firm productivity is minimal due to low efficiency, as indicated by overhead figures close to 60 percent, and the small scale of the program.

245. **Apart from CIMO PAC, the extent to which SME programs reach their objectives is unknown due to a lack of rigorous impact evaluations.** The evaluations carried out by program supervisory agencies tend to be qualitative and small in scope, measuring beneficiary satisfaction or reporting coverage indicators (i.e., they are monitoring studies but not impact evaluations.) Few studies measure net program benefits. Two exceptions to this norm are the CIMO-PAC program evaluations carried out by the Secretariat of Labor and Social Security (STPS) in 1995 and 1997 using quasi-experimental designs. But even these failed to account for biases from unobserved firm heterogeneity and self-selection (López-Acevedo and Tan, 2004a). The lack of reliable evaluation limits the capacity of

[119] The 1999 Economic Census reports that only 6.7 percent of SMEs export their goods and services.

[120] The SME programs reported in the 2001 ENESTYC survey by year of creation and supervisory agency are: CONOCER (1995) SEP and STPS; CIMO-PAC (1988) STPS; COMPITE (1997) SE; CETRO - CRECE (1996) SE; FIDECAP (2001) SE: FAMPYME (2001) SE: PAT (1994) BANCOMEXT; MEX-EX (1994) BANCOMEXT; PMT (1998) CONACyT and PAIDEC (1998) CONACyT. A description of these programs is available in López-Acevedo and Tan (2004b).

[121] CIMO-PAC stands for Program of Comprehensive Quality and Modernization (CIMO), re-named in 2001 "*Programa de Apoyo a la Capacitación*—PAC." The program is administered by the Secretariat of Labor (STPS).

[122] Information on the coverage of CIMO-PAC in 2005 was provided by the STPS; 2001 figures are given in Lopez-Acevedo and Tan (2004a).

policymakers to determine program effectiveness and to assess the gains that might accrue from consolidating programs within or across agencies.[123]

246. **Dated evaluations of CIMO-PAC show mixed or positive results.** The empirical evidence collected in 1995 and 1997 by the STPS suggests that the CIMO-PAC program of integrated training and technical assistance (as originally designed) was effective in improving the performance of microenterprises and SMEs.[124] Compared with the control group, participating firms had higher rates of capacity utilization, were more likely to adopt quality control practices, and increased investments in worker training. These improved intermediate outcomes may be associated with increased productivity, but the original analysis did not lead to this conclusion.[125] Re-examining the evidence, Lopez-Acevedo and Tan (2004a) show that because less productive firms self-select in the CIMO-PAC program, the evaluation results were inaccurate. Using a different methodology, the authors show that the effect of the program is positive or mixed when production functions are estimated using first-differences, an econometric technique that controls for the self-selection bias. The government is committed to a systematic evaluation of the impact of the program covering three years of operations (2002–2004) and to using the results of this evaluation to improve program efficiency prior to expanding program coverage. These actions are supported by an IDB loan.[126]

247. **Training seems more efficiently provided by the private sector**. Among the several SME training programs besides PAC, possibly the most important is COMPITE, created by the SE in 1997. COMPITE is now entirely managed, and largely funded, by the private sector. The goal of this program is to improve productivity and product quality in the following ways: encouraging adoption of technology, lowering costs of production, decreasing the size of inventories, increasing response times in productive processes, and optimizing factory layout. Training is based on a methodology used successfully by General Motors to improve its productivity. The first step is an assessment of the firm to determine which course(s) might be the most effective in improving firm performance. Once this is known, firms select the appropriate course from those provided by COMPITE at below-market rate (there are currently 19 different courses available). The courses are organized in three broad areas: (i) Mexican ISO-9000, which certifies the quality of in-firm production; (ii) productivity improvements; iii) business ethics. Each course combines theoretical and practical aspects; upon completion, firms design strategies for improvement using the principles taught in the course and are tested on them. Firms pay nothing for the initial diagnostic, but pay training costs that vary from US$2,800–$3,900 for 4-day workshops to US$ 700–$1,600 for a 2-day workshop. Although COMPITE has not been systematically evaluated, and is still a quite small program, there are indications that it is more effective than federally funded and managed SME training programs.

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[123] Rigorous impact evaluation requires firm-level panel data on both reasonably sized samples of program beneficiaries and a control group of non-participant firms with similar attributes covering pre- and post-program period. This could be done using data collected through the ENESTYC survey carried out by INEGI every two years, if a purposive sample is added to augment sample sizes of program beneficiaries to permit more statistically robust studies of impact evaluation. As a first step in the direction of cross-program evaluation studies the Secretariat of the Econmy (SE) through the Intersecretarial Industrial Policy Commission (CIPI) completed a beneficiary database using information reported by all SME program administrators.

[124] In 2001 the CIMO-PAC program was substantially modified and, therefore, no longer corresponds to the program evaluated in the mid-1990s.

[125] The methodology used in the analysis estimated the program impact on sales using a Cobb-Douglas production function that relates output to different combinations of labor and capital inputs and compared levels of productivity between treatment and control group.

[126] Loan ME-0233 ($300 million) is the first of a three loan program supporting the STPS programs.

Moving Forward

248. **Quality needs to be at the top of the education agenda**. Quality and relevance become an important factor for keeping children in school at the secondary and tertiary levels and linking education more closely to the job market.

249. **School autonomy, accountability and assessment need to be promoted**. PISA results and local experience in states such as Aguascalientes and Nuevo León, which have made the link between education quality and competitiveness, suggest that Mexico needs to continue efforts to move decision-making to the schools, parental involvement is required to help make schools accountable, and performance needs to be assessed and fed back into the system at the school level.

250. **Private financing is needed to overcome the gap in tertiary education**. Expansion through public investment, which represented 0.7 percent of GDP in 2001, is fiscally unsustainable in Mexico, which only recovers 11 percent of GDP through taxes. Private institutions now account for 33 percent of students, up from 21 percent in 1992. Several of the private institutions in Mexico are world class, such as Tec de Monterrey, and some international institutions are moving in (for example, Apollo International and Laureate). However, at 0.2 percent of GDP, private financing of tertiary education in Mexico remains far behind countries such as the United States (1.8 percent), Korea (1.9 percent) and Chile (1.7 percent). Public financing needs to be redirected to provide financial aid to poor students and the broad availability of (income-contingent) student loans would facilitate increased private investment in tertiary education.

251. **More resources are needed to continue the expansion of adult education.** Precise estimates of demand for INEA's secondary education certificates are not available. But the number of certificates grew over the last 10 years by an average rate of 11.5 percent per year. INEA students come from poor and vulnerable groups, such as women, youth, and indigenous peoples (Schmelkes and Kaman 1996).[127] This implies that INEA is tackling both inequity and poverty issues through its adult education programs. Moreover, INEA plans to develop new modules catering to special groups such as indigenous youth. In order to expand program coverage, INEA would need additional fiscal resources, improved internal efficiency and the introduction of incentives to increase effective demand.[128] The Government is already pursuing some of these initiatives, but more needs to be done.

252. **Impact evaluations of SME training programs are needed.** The historical proliferation of SMEs support services in Mexico and the absence of reliable information on their effectiveness, suggests that it is necessary to take stock and formulate a new and comprehensive strategy for supporting SMEs before considering program expansion. For the PAC training program, the necessary elements needed to design such a strategy are as follows: (a) reliable information on SMEs demand for training; (b) information on the costs and benefits of the PAC; and (c) feasibility analyses to identify more efficient ways to deliver training at the firm level. Consideration should be given to involving the private sector as a service promoter and service provider while keeping the government as co-financier and provider of program oversight and evaluation. Once an improved strategy to deliver training services to SMEs is in place, it would be possible to plan for expansion. To achieve these goals, federal funds should be allocated to expand the ENESTYC training module covering not only manufacturing but also services and commerce sectors. Once this comprehensive database is available, rigorous cost-benefit analyses of the larger

[127] Schmelkes, S. and Karlman, J. 1966. "La Educación de Adultos: Estado del Arte. Hacia Una Estrategia Alfabetizadota para México." México: INEA. See also, CONEVyT-OCDE. 2003. Educación de Adultos y Formación para el Trabajo en México: Informe Base.

[128] Program efficiency needs to be significantly increased, as only one of every four adults registered in the INEA secondary education program receives a lower-secondary certificate.

training programs for SMEs could be carried out. The results of these evaluations would provide the basis for a national training policy for SME workers and provide incentives for private sector worker training investments.

IV. ADDRESSING SUB-NATIONAL DIFFERENCES

253. **There are substantial differences in competitiveness across states in Mexico.** Although competitiveness is usually analyzed at the national level, as in the rest of this report, it is important to recognize that there is a wide variety in the competitiveness levels of different cities and states. Studies by the World Bank's Foreign Investment Advisory Service (FIAS)/*Doing Business* and IMCO highlight these differences, suggesting regional priorities for reforms. Sub-national analysis is particularly relevant given that state and local governments have jurisdiction over many investment climate reforms, including procedures to open a business, register property, and enforce contracts.

254. ***Doing Business in Mexico* (2006) is the first state-level report of the World Bank's *Doing Business* series in Latin America.** [129] It investigates the scope and manner of regulations that enhance business activity and those that constrain it. In this project quantitative indicators on business regulations and their enforcement have been created for 12 cities and states that can then be compared with Mexico City as well as 154 countries around the world. The 12 Mexican cities and states are: Aguascalientes, Aguascalientes; Celaya, Guanajuato; Ciudad Juárez, Chihuahua; Guadalajara, Jalisco; Mérida, Yucatán; Monterrey, Nuevo León; Puebla, Puebla; Querétaro, Querétaro; San Luis Potosí, San Luis Potosí; Tlalnepantla, Estado de México; Torreón, Coahuila; and Veracruz, Veracruz.

255. **In the past year, seven of the 12 states reformed in the four areas covered in the report**—starting a business, registering property, getting credit, and enforcing contracts. Changes were made to simplify some aspect of business regulation—from strengthening property rights and reducing taxes, to computerizing and consolidating procedures and easing the burden placed on courts.

256. **When ranked globally on the cost of starting a business, Mexican states vary significantly** (Figure 62). Aguascalientes is the least costly—7.3 percent of state income per capita—and still it ranks 33rd globally in cost to startup. Jalisco follows, costing 10.9 percent, at 52nd place, behind Gabarone (Botswana) and Santiago (Chile). Estado de México ranks lowest at 127th place—far behind Lima (Peru) and Guatemala City. However, it is less expensive to start a business in any of the Mexican states than in Jakarta or Managua. The number of days to start a business also varies across Mexican states, although not as widely as costs. The time spent on start-up in Guanajuato is 29 days, in San Luis Potosí and Jalisco, 41 days, in Estado de México 46, and in Querétaro 52 (Figure 63).

Figure 62: Business Start-Up Cost in Mexico and other selected economies

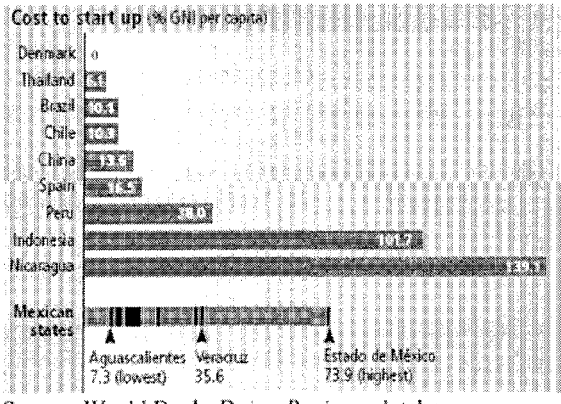
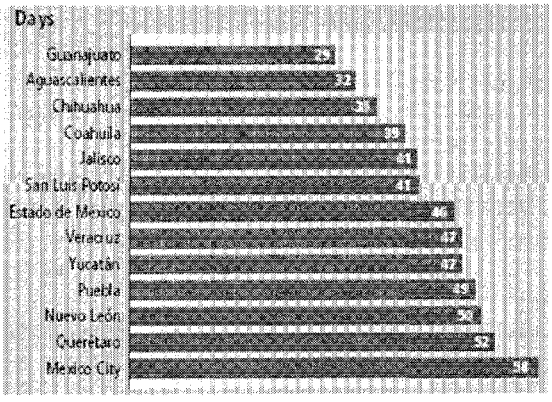


Figure 63: Number of Days to Start a Business (Mexican States)



Source: World Bank, *Doing Business* database.

[129] This paragraph and those following draw on World Bank (2006b), *Doing Business in Mexico*.

257. **Registering property shows similar variance across states.** Securing rights to property is important because it strengthens incentives to invest and facilitates trade. And with formal property titles, entrepreneurs can obtain mortgages on their homes or land. The easiest state in Mexico in which to register property is Aguascalientes, where registration takes 29 days and costs 3.2 percent of property value. Still, this delay is longer than in Madrid, Bogotá, or Bangkok. Property registration in Querétaro takes 94 days—as long as in Bujumbra (Burundi) and slightly longer than La Paz (Bolivia). Other states do better—an entrepreneur in Estado de México spends as many days to register as in Asunción (Paraguay), but still more than in São Paulo. However, at 6.1 percent of property value, the cost to register property in Estado de México is higher than the other Mexican states. (Figure 64 and Figure 65).

Figure 64: Time to Register Property in Mexico and other selected economies

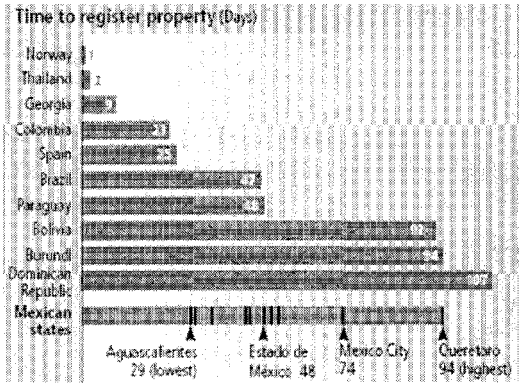
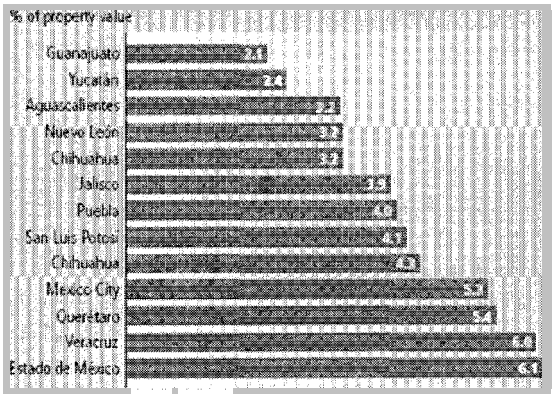


Figure 65: Cost to Register Property (Mexican States)



Source: World Bank, *Doing Business* database.

258. **A new IMCO report also highlights differences across states.**[130] IMCO's work was supported by this AAA and mirrors their analysis done at the national level (see this AAA's background studies at www.worldbank.org.mx for a description). The study measures over 100 indicators in the following 10 areas considered key to competitiveness; they are as follows: 1) reliable and objective legal system (named "Legal" in Figure 67 and Figure 69); 2) environmental sustainability (Environment); 3) inclusive, prepared, and healthy society (Society); 4) stable macroeconomy (Economy); 5) stable and functional political system (Political); 6) efficient factor markets (factors are capital, labor, and energy); 7) world-class "precursor" sectors (i.e., transport, telecommunications, and financial services)[131] (Precursors); 8) efficient and effective government (Government); 9) benign international relations (International Relations); and 10) economic sectors with potential (Economic Sectors—economy based in high value-added processes and with the capacity to push the technology frontier).

259. **IMCO defines competitiveness as the ability to attract and retain investment and finds that investment flows vary substantially across states.**[132] As shown in Figure 66, the state with the lowest investment per worker is Morelos at -$200, and the state with the highest is Mexico City (Distrito Federal) at about $7,000.

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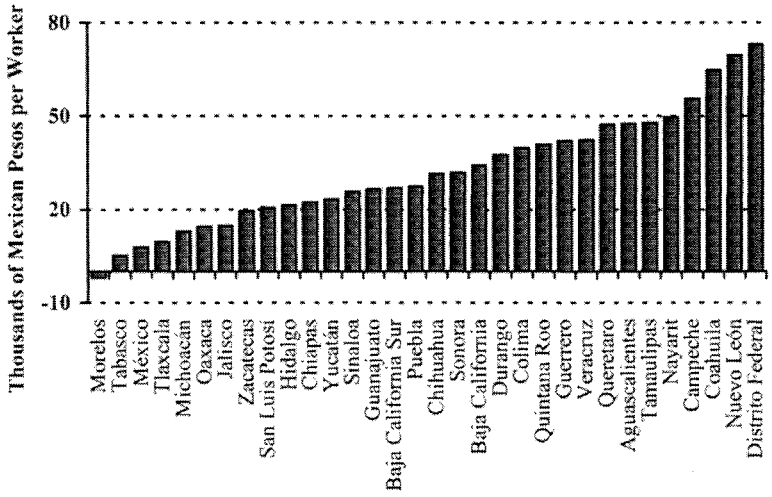
[130] IMCO (2006a). "Situación competitiva de las entidades federativas de México: Diagnóstico y próximos pasos." PowerPoint Presentation.

[131] "Precursor" sectors are those that serve as a foundation for the growth and development of the country.

[132] Interestingly, there is not a strong correlation between the Doing Business ranking and investment per worker. In other words, states that ranked highly (or poorly) according to Doing Business do not necessarily receive the most (or least) investment per worker.

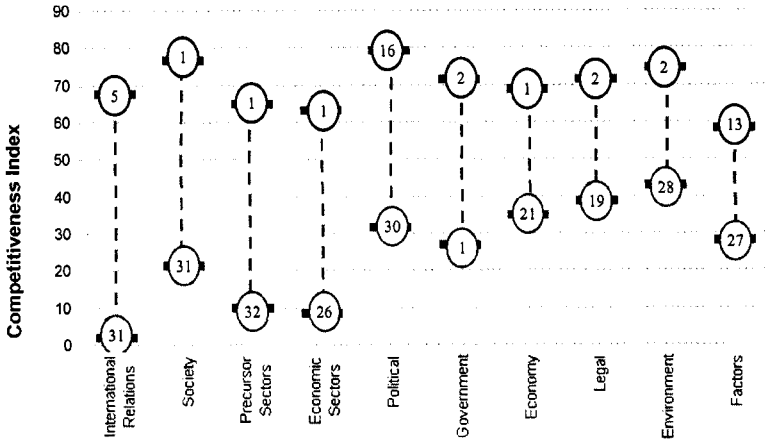
Figure 66: Mexican State-Level Investment Flows per Worker



Source: IMCO (2006a).

260. **There is also a large variation in the relative performance of the different states on IMCO's ten competitiveness factors**. Figure 67 shows indices for each of the ten factors as well as the position of the best and worst ranked state along each factor. For instance, on the "Society" factor—which is based on 17 indicators of a healthy, inclusive, and prepared society—the best ranked state scored a 77 while the worst ranked state scored a 21. Figure 67 also provides information about which state scored best and which worst. In the case of Society, the state with the highest score also held the number one overall competitiveness rank, while the state with the lowest score held the number 31 overall competitiveness rank (see circled numbers). This result is not surprising, but the same does not hold true for other factors. For instance, in the "Political" category—which measures five indicators of a stable and functional political system—the highest scoring state was only the 16th best state in terms of overall competitiveness. Ultimately, the aim of Figure 67 is to show that there is divergence across states along different factors of competitiveness and states that score well on some factors do not necessarily score well on others. This implies that competitiveness priorities are different for different states.

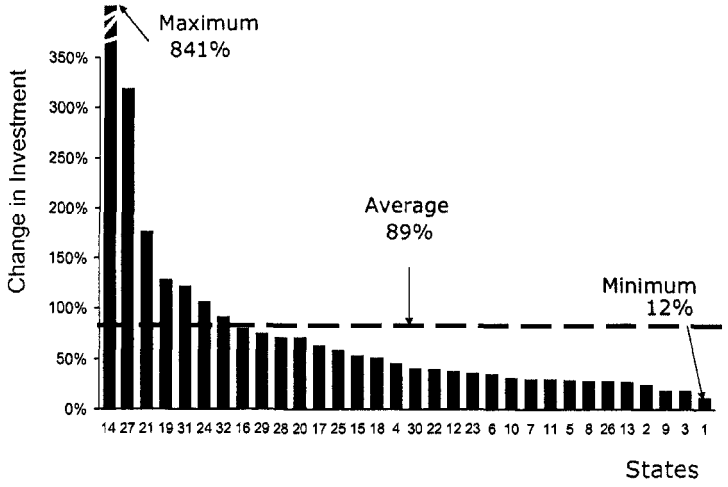
Figure 67: State-Level Variations in Competitiveness Factors



Note: Higher Competitiveness Index scores are better. The circled numbers denote the overall competitiveness ranking of the state that received the highest (top circle) and lowest (bottom circle) score on each dimension. For example, the 5th most competitive state in Mexico received the highest International Relations ranking.
Source: IMCO (2006a).

261. **The possibilities for improvement are substantial, but vary across states.** According to IMCO, a 10 percent improvement in each of the competitiveness factors would result in an increase in investment per worker of 89 percent on average. However, this average masks considerable variation across states: the state with the maximum gain would experience an 841 percent increase in investment, while the state with the minimum gain would only see a 12 percent gain. Surprisingly, it is not always the worst ranked states that stand to gain the most. For instance, the state with the maximum predicted gain ranks 14 in terms of the overall state competitiveness ranking, and the state with the third largest predicted gain ranks 21 (Figure 68).

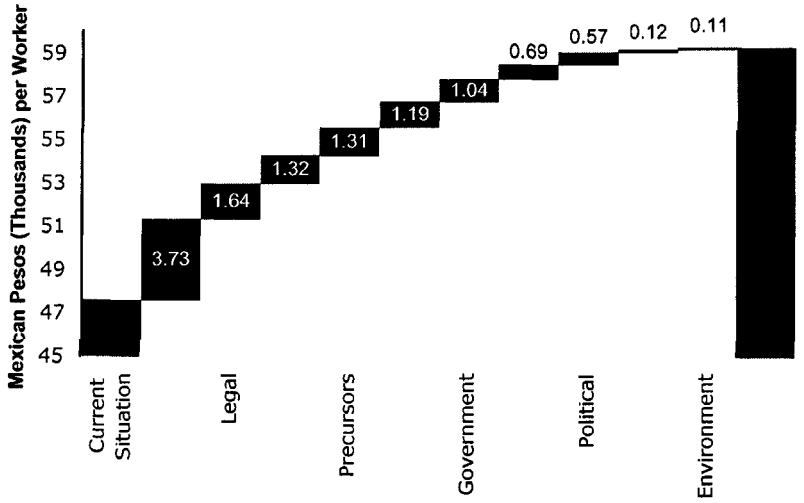
Figure 68: Predicted Improvements in Investment per Worker



Note: The predicted change in investment per worker is due to a 10 percent improvement in the variables underlying the 10 competitiveness factors. The x-axis numbers denote the states' overall competitiveness ranking.
Source: IMCO (2006a).

262. **Improvements in different competitiveness factors have disproportional effects on investment.** Take the state of Aguascalientes as an example. In Aguascalientes, a 10 percent increase in the variables underlying each of the competitiveness factors would yield a 29 percent increase in investment per worker. However, changes in only four factors—Society, Legal, Factors, and Precursors—account for 68 percent of the overall change (Figure 69). Again, this implies different competitiveness priorities in different states.

Figure 69: Breakdown of Factors Contributing to an Improvement in Investment, Aguascalientes



Note: The predicted change in each factor is due to a 10 percent improvement in the variables underlying each factor.
Source: IMCO (2006b).

263. **Benchmarking at the sub-national level can spur competition and generate needed reforms.** Mexico City and the 12 states vary dramatically on *Doing Business* indicators, with Aguascalientes outperforming the rest (Table 28). But a big gap remains between Mexico's best and the ease of doing business in Bangkok or Johannesburg. Similarly, IMCO showed a large variation in investment and different competitiveness factors across states. States may look for best practices within Mexico—for example, by introducing online procedures to register businesses or property—while also aiming for the pace and nature of reform in countries like Colombia, Vietnam, or Georgia. Establishing benchmarks at the sub-national level allows reformers to focus on the main constraints to economic growth. Pressure to reform can come from contrasting how different localities implement identical national level regulations. Much of the inefficiency is in local administrative procedures, which can be changed by a governor or a mayor. And as the news about reforms spreads, there is increased interest to replicate success stories.

Table 28: Doing business in Mexico: where is it easiest?

1 Aguascalientes (Easiest)	8 San Luis Potosí
2 Guanajuato	9 Coahuila
3 Chihuahua	10 Mexico City
4 Jalisco	11 Estado de México
5 Nuevo León	12 Puebla
6 Veracruz	13 Querétaro (Most difficult)
7 Yucatán	

Source: World Bank, *Doing Business* database

V. DOUBLING MEXICO'S PER CAPITA INCOME IN 10 YEARS

264. **Competitiveness improvements could allow Mexico to double its income in ten years, as a number of countries have recently done.** As shown in Table 29, the time necessary for countries to double their income has been steadily decreasing. Particularly impressive has been the fast growers since World War II—for example Japan, China, Thailand, Botswana, Ireland, and Chile.

Table 29: Time to Double Income

Pre-industrial	350 years
Britain (1780-1830)	175 years
Britain in 19th century	65 years
Fast growers since WWII (Japan, China, Thailand, Botswana, Ireland, Chile...)	10 years or less

Source: World Bank (2005j).

265. In order to double GDP per capita over a decade, annual GDP per capita growth rates of at least 7 percent are necessary. Figure 70 shows that the East Asian and Pacific region nearly attained this rate during the 1980s and 1990s, posting average GDP per capita growth rates of close to 6 percent. Meanwhile, Latin America has lagged substantially behind the East Asian performance, and Mexico is no exception.[133] Yet, the fact that other countries have recently doubled their incomes provides grounds for optimism that Mexico can do the same. However, to do so it is necessary to continue boldly addressing competitiveness constraints in Mexico.

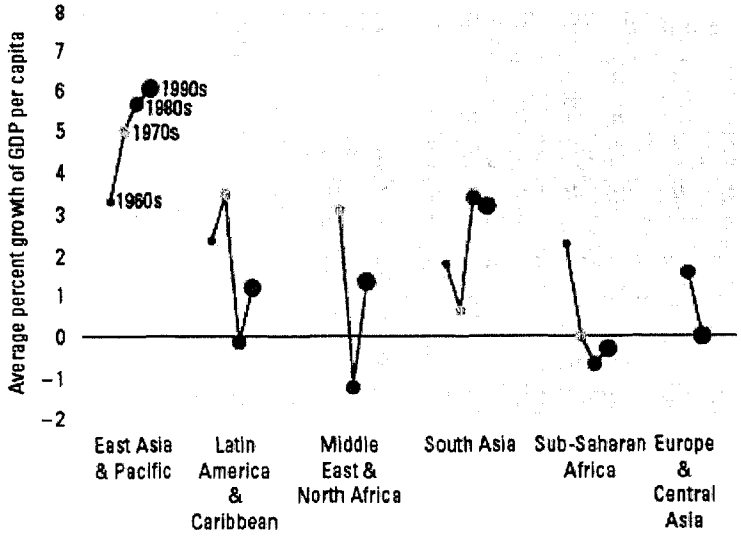
266. **Doubling per capita income can have a tremendous impact on poverty.** Evidence shows that countries experiencing higher rates of economic growth can be expected to reduce poverty faster (see left panel of Figure 11). For example, over the 1981–2000 period, China's poverty rate fell from more than 50 percent to about 8 percent, thanks to an impressive per capita growth rate of almost 8.5 percent a year. Similarly, between 1993 and 2002 Vietnam cut its poverty rate in half, from about 58 percent to about 29 percent, by growing at almost 6 percent a year.[134]

267. In technical terms, cross-country analysis has demonstrated that the average total elasticity of poverty with respect to economic growth is -2.4. This implies that, without controlling for any characteristics of the country, 1 percentage point growth in a country's mean income can be expected to reduce the incidence of poverty in that country by about 2.4 percentage points.[135] There is evidence that relatively high income inequality in Mexico—in 2002 the Gini index was 0.49—could cause the country's true elasticity of poverty with respect to growth to be closer to -1.6 or -1.7.[136] Even based on

[133] Real average GDP per capita growth rates for Mexico were 0.5 percent, 0.6 percent, and 0.2 percent greater than Latin American averages during the 1970s, 80s, and 90s respectively (World Bank, World Development Indicators).
[134] Perry and others (2006).
[135] World Bank (2005g) based on an updated Ravallion and Chen (1997).
[136] This is the author's calculation based on Lopez and Servén's (2005) growth elasticity of poverty estimates, as cited in Perry et al (2006). The Lopez and Servén formula determines growth elasticity according to a country's per capita income, poverty line, and Gini coefficient. For Mexico, the author used the following 2004 data: Rural moderate poverty line per capita (US$ per month) $90; urban moderate poverty line per capita (US$ per month) $135; GNI per capita (US$ per month) $564; rural population (% of total) 24%; urban population (% of total) 76%; total population 103,795,200; share of rural population in moderate poverty 57%; share of urban population in moderate poverty 42%. This data enabled us to calculate a national moderate poverty line of $121 per capita per month (this number is weighted by rural and urban shares). Hence, GNI per capita / poverty line = 4.6. According to

the lower inequality-adjusted elasticity, doubling per capita income could theoretically eliminate poverty altogether. Although this is probably unlikely, it is clear that large growth gains from increased competitiveness would lead to plummeting poverty rates.

Figure 70: Average Growth of GDP per Capita



Note: Data for the Europe and Central Asia Region begin in the 1980s.
Source: World Bank, World Development Indicators (as reported in World Bank, 2004a).

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the Lopez and Servén table, this would equate to a growth elasticity of poverty between -1.6 and -1.7. Data sources include World Bank, World Development Indicators (population and GNI data); World Bank (2005k) for poverty data; World Bank (2005g) for the Gini coefficient.

ANNEX 1: THE COMPETITIVENESS AAA PROGRAM

1. In 2003, the Government of Mexico (GOM) declared increasing country competitiveness to be a key priority of the Fox Administration. This was a response to the modest growth, employment, export, and competitiveness indicators as well as concerns about the country's ability to respond to the pressures induced by advancing globalization, such as competition from China and the end of the textile quota system in 2005. Within its ongoing dialogue with the World Bank, the GOM requested assistance to develop a strategy and an implementation agenda for the overall improvement of country competitiveness. In particular, the GOM requested assistance in identifying the agenda and producing well-focused analytical pieces on key issues to address and facilitate the implementation of that agenda.

2. Responding to that request, the World Bank agreed to cast its assistance in the form of a Programmatic AAA, non-lending TA, to allow for the provision of just-in-time analytical and technical support, and assistance to diagnose and formulate the country strategy, as requested by the GOM, in the area of competitiveness.[137] Pre-programmatic assistance started in FY04 and helped define the GOM's Competitiveness Agenda 2004-2006 (see Annex 2 for a full description of the pre-programmatic work).

3. The GOM agenda, after detailed review of analytical work and consultations with key stakeholders, and the pre-programmatic Bank assistance, focuses on five key areas: (i) strengthening innovation and training; (ii) improving the investment climate; (iii) reducing logistics costs; (iv) improving the energy sector; and (v) financial deepening. That selection was based on consultations and survey results with entrepreneurs, thematic and background reports and analysis, and the realities faced by the authorities. The basic principle behind the selection is to focus on themes and initiatives to improve productivity through the factors of production, and better usage of them, particularly through innovation and technological development, through better functioning of factor markets, reduction of logistic costs (estimated at over 20 percent of product value), and overall improvement of the investment climate (to improve the competitive environment).

4. The Bank's assistance on Competitiveness was structured as a Programmatic Competitiveness and Trade AAA (FY05-08) in three phases: Phase I (FY05); Phase II (support through FY06); and Phase III (FY07-08). The first formal phase of the AAA has supported the design and implementation of the Mexican Competitiveness Agenda through separate pieces of analytical work at the request of the Government. It has also included advocacy presentations and advisory assistance through summary and briefings and background information on relevant competitiveness themes for Mexico. Since its inception, this phase was not supposed to be an encompassing analytical piece on competitiveness; rather it was designed to fill some key knowledge gaps that were necessary for the diagnosis and implementation of the Competitiveness Agenda, and provide a non-lending TA type of assistance to move the Agenda forward.

5. Phase 2 includes additional pieces of analytical work and consolidates what was learned from Phase 1. It also brings the key policy messages into the public sphere. The main elements of Phases 1 and 2 are shown in Box 15. The background studies for this report (see www.worldbank.org.mx) contain more complete descriptions of Phase 1 and 2 activities. Initially, a Phase 3 of the AAA (FY07–08) was planned to deal in depth with specific issues of interest to the next administration. However, given that the World Bank will be engaged in competitiveness dialogue with the next administration vis-à-vis the second and third phases of the DPL, the AAA will close with this report.

[137] The AAA was proposed in the Country Partnership Strategy of the World Bank Group with the United Mexican States, Report No. 28141-ME, March 18, 2004.

Box 15: Main Components of Phase 1 and 2 Assistance

1) *Innovation, Quality, and Training*: Assessment and recommendations regarding quality infrastructure and key weakness of the Mexican Innovation System (the latter in Phase 2); SME programs impact evaluation workshop (in partnership with WBI) (Phase 1).
2) *Investment Climate /Regulatory improvement:* Impact of draft labor law reform on *Doing Business* indicators (Phase 1).
3) *Trade facilitation and Logistics*: Study of the logistics cost and bottlenecks of three supply chains and logistics corridors; development of logistics and transport indicators (Phase 1); analysis of the impact of tariff reforms on trade (Phases 1 and 2); trade facilitation impact study (Phase 2).
4) *Energy*: Presentation on key issues and competitiveness impact (the latter in Phase 2).
5) *ICT and Telecommunications Sector*: Challenges and Opportunities (Phase 2)
6) *Diagnosis and monitoring*: i) IMCO report on competitiveness diagnosis and indicators - baseline and yearly monitoring system (Phase 1); ii) IMCO report on competitiveness at the state level: indicators (Phase 2).
7) *Dialogue, Advocacy and Knowledge Briefings with and for Policymakers and Major Stakeholders*: Contribution to the competitiveness strategy of two state development plans; presentation to various parts of the Executive, Congress and to key private sector organizations; presentation on the "Structure of the China, Mexico vs. USA trade: Winners and Losers, and Selected Cost Structure" (Phases 1 and 2)
8) *Competitiveness Challenges in the Agricultural Sector*: (Phase 2)

ANNEX 2: PRE-PROGRAMMATIC BANK SUPPORT TO MEXICO

BACKGROUND

1. The World Bank worked with the Office of the President, the main counterpart in Mexico, to assist the GOM in defining Mexico's Competitiveness Agenda 2004-2006.[138] This assistance included:

- A report that summarized the findings from focus groups convened in June/July 2003, which identified key obstacles for competitiveness. The focus groups, spread over several states and sectors in Mexico, were a rich, highly interactive and organized way of gathering views from entrepreneurs and government officials. From the information thus gleaned, the most significant and common obstacles - such as infrastructure and logistics, regulatory burden, financing, inadequate innovation and quality - were identified for different industries and locations.

- Background notes and reports as requested by counterparts, and mostly related to specific bottlenecks identified by the focus groups. Topics included logistics, quality and innovation, regulatory reform, human capital, regional development, SME development, financial deepening, and energy reform. The notes contributed to shaping authorities' vision of competitiveness, identifying major competitiveness constraints and possible solutions, as well as bringing these issues to prominence (the President's Office) and suggesting the way forward, as requested by the GOM.

- *A report of the trends, determinants, composition and cost structure of Mexican and Chinese exports to the US.* This was presented to the Office of the President, the Ministry of Finance, and to private sector groups. Key messages from that reports were: a). Mexico is losing ground in several of its 15 largest exports (including passenger cars, computer accessories, apparel and household goods); b) labor costs are on average a very small percentage of total production (and distribution) costs; and c) Mexico is losing export volume even in products for which its proximity to the USA would be expected to give a significant advantage, due to product size or weight (e.g. furniture and household appliances.)

- Presentations to main stakeholders, such as senior officials from both Congress and the Executive and groups of private sector representatives. Topics included: a) the results of the focus group studies, b) the challenges and opportunities related to competitiveness; c) the structure and impact of exports, China vs. Mexico; d) lessons and trends in energy reform; e) on the *Doing Business* 2005 report and competitive challenges, to the Public Credit and Financing Commission of the House of Representatives (Congress) and to the Association of Private Sector Firms (complete list attached below in section 3).

IMPACT

2. The GOM drew on the Bank's support and inputs to develop its Competitiveness Agenda 2004-2006. Given the breadth of issues identified by entrepreneurs regarding the policies and behaviors that constrain firms, the experience and impact suggested from the background reports, and the realities faced by the authorities, priority actions were identified by the GOM. These were based on their impact on

[138] This was based on Mexico's National Development Plan 2001-06, which presents three main objectives: (a) Social and Human Development (education, equity, collective initiative, harmony with the environment, confidence in public institutions); (b) Growth with Quality (macroeconomic management, competitiveness, inclusive development, regional development, sustainable development); and (c) Order and Respect (sovereignty, national security, democracy, federalism, population dynamics, corruption, public security, and justice).

Mexico's competitiveness, the feasibility of implementation (that they only require executive and federal level approval), the horizon for implementation (within President's Fox's term) and the impact (limited) on public sector finances. The Agenda has five major areas which broadly correspond to those identified by the World Bank team. These are: i) improving the regulatory environment and reforming the investment climate; ii) improving infrastructure and reducing logistics costs; iii) strengthening innovation, education and training; iv) financial deepening; and v) securing energy supply. The agenda does not include key impacting reforms such as structural reform in the energy sector (although it does include issues of pricing, incentives and reliability of supply) and labor reform, since these were considered too problematic and difficult to enact. Thus, although the prepared agenda is not complete, it provides an excellent starting point to address competitiveness issues in Mexico.

3. The GOM set up special tasks forces or commissions by topic and selected "champions" to push forward the reforms on each topic. For example on energy, the GOM set up a high-level Grupo de Política Energética that meets monthly. On logistics, the GOM set up a Comisión de Corredores Logísticos that cuts across the public and private sector, to address the reduction of logistics costs.

4. To monitor and evaluate progress on competitiveness, the GOM decided to develop its own country competitiveness indicators, both at national and at sub-national level - states and municipalities - to be issued annually.

5. The presentation on Challenges and Opportunities on Competitiveness and the *Doing Business* 2005 report to the Public Credit and Financing Commission of the House of Representatives was well received, and as a result, the Senate created a new Competitiveness Commission that will review current legislation to propose reforms in order to make Mexico more attractive to trade and investment.

LIST OF REPORT, PRESENTATIONS AND OTHER DOCUMENTS

Reports and Other Documents

Términos De Referencia Para la Preparación y Facilitación de Grupos de Enfoque, June 2003.
Constraints to Competitiveness - Results of Focus Groups Discussions with Entrepreneurs, July 31, 2003.
Doing Business in 2004 – Mexico - Country Profile, January 2004.
Mexico Limitaciones a la Competitividad - Reducción de Costos de Logística, presentation and set of documents on the topic as input for the formulation of Mexico's Competitiveness Agenda 2004-2006, January 2004.
Mexico Limitaciones a la Competitividad - Profundización Financiera, presentation and set of documents on the topic as input for the formulation of Mexico's Competitiveness Agenda 2004-2006, January 2004.
Mexico Limitaciones a la Competitividad - Energía, presentation and set of documents on the topic as input for the formulation of Mexico's Competitiveness Agenda 2004-2006, January 2004.
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Estudio de Cadenas Logisticas - Elección de las Cadenas Logisticas a Estudiar, Instituto Mexicano del Transporte, May 2004.

Comments to the Instituto Mexicano para la Competitividad (IMCO)on Proposed Competitiveness Indicators, July 2004.
Doing Business in 2005 – Mexico - Country Profile, September 2004.

Presentations

Grupos de Análisis para la Identificación de Obstáculos que Dificultan el Crecimiento de los Sectores Productivos, Presentation to the Focus Groups, June 2003.
Competitiveness and Growth – Mexico in the Global Economy – Challenges and Opportunities. Presentation at the CANACINTRA conference, December 2003.
Mexico – Restrictions on Competitiveness – Results from the Focus Groups with Entrepreneurs. Presentation to the Private Sector organized by the Consejo Coordinador Empresarial, December 2003.
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Programas Bienales de Mejora Regulatoria 2003-2005, COFEMER, July 2004.
Competitividad y Política Comercial, July 2004.
Corredores Multimodales, Secretariat of Transport, July 2004
Grupo de Política Energética, Secretariat of Energy, July 2004.
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El Estímulo Fiscal a la Innovación, CONACYT, July 2004.
Electricity Issues in Mexico and Reform Experiences from Other Countries. Presentation to the Secretariat of Finance, September 2003.
Priority Energy Issues for Mexico – Some Cases from Other Countries, Presentation to the Energy Policy Group, September 2003.
Facilitación Comercial, SAT, September 2004.
Reformas a la política y legislación de Competencia, CFC, September 2004.
La Capacitación en la Nueva Cultura Laboral, Secretariat of Labor and Social Prevention, September 2004.
Methodology for Measuring Competitiveness, IMCO, September 2004.
Mexico – Competitiveness and Growth – Challenges and Opportunities. Presentation to the Mexican Congress, September 2004.

ANNEX 3: ANALYTICAL UNDERPINNINGS

1. **This annex provides a rationale for why the AAA subject areas are important.** The subject areas are the result of extensive analytical work that the Bank has done for Mexico over the past two years and other complementary studies done outside the Bank. Selected findings in each of the priority areas are shown in Table 30. The points are discussed in more detail in the relevant sections of the main report. This evidence complements the IMCO impact elasticities shown in Table 31.

Table 30: Analytical Underpinnings—Selected Evidence

Innovation and Technology Development	• Roughly half of cross-country differences in per capita income and growth are driven by differences in total factor productivity (TFP), generally attributed to technological development and innovative capacity (Hall and Jones, 1999; Dollar and Wolf, 1997). • Calculations suggest a social return on R&D of 60% in Mexico (Lederman and Maloney, 2003a). • Mexican firms invest a little above 0.1% of GDP in R&D, compared with 1.5% in the OECD area.
Quality	• A study on Germany found that standards contributed to about 0.9 percentage points out of an average overall growth rate of 3.3% in the period 1960–1990 (Jungmittag, Blind, and Grupp, 1999). • Adopting 100 additional British standards raised the UK's export to import trade ratio by about 14% (Swann, 1996).
Education and Training	• Less than 1% of Mexican students perform at the highest level of international student assessments (Programme for International Student Assessment [PISA] Level 5) in either reading or math, while more than half perform at Level 1 or less in both (OECD, 2003a). These numbers are quite low given Mexico's income levels. • In 2000, 24% of Mexican adults lacked secondary education, even though they had completed primary schooling. • Receiving a secondary education certificate leads to higher employability and higher wages (World Bank, 2004e). • Lack of access to financing and skills are the main weaknesses of Mexican small and medium enterprises (SMEs). Only 35% of new SMEs survive more than 2 years, and the firms that fail report lack of training and expertise as key reasons for their failure (Secretariat of the Economy—Mexico, 2001).
Investment Climate: Regulation	• Modernizing regulatory frameworks could increase productivity by as much as 10 % in lagging sectors (Cotis, 2005). • Starting a business takes 58 days in Mexico, compared with 5 days in the United States. Dealing with licenses takes 222 days at a cost of 159% of income per capita, while it only takes 70 days in the United States at a cost of 17% of per capita income (World Bank, *Doing Business* database). • The cost of the regulatory burden in Mexico is 15% of GDP (IMCO, 2005a).
Competition	• A study of the impact of pro-competitive regulatory reform in several industries in the United States found that annual welfare gains in affected sectors were more than 7%, with 90% of the benefits flowing to consumers (OECD). • Increasing competitive pressure can increase the probability of firm innovation by more than 50% (World Bank, 2004a). • According to a survey of Mexican firms, the two largest obstacles to business development are government monopolies and private monopolies (Centro de Estudios Económicos del Sector Privado [CEESP], 2005).
Trade and Trade Facilitation	• Trade facilitation reforms in Mexico could increase exports by $29.3 billion, equivalent to 21 percent of total Mexican manufacturing exports (Soloaga, Wilson, and Mejía, 2006). • Mexico's global exports would have been about 25% lower without NAFTA, and FDI would have been about 40% less. Also, the amount of time required for Mexican manufacturers to adopt U.S. technological innovations was cut in half with NAFTA (Lederman, Maloney, and

Logistics	Serven, 2003). • Despite the gains from NAFTA, Mexico has been losing export market share within the United States in recent years. Of the top ten types of Mexican imports in the United States, only two—petroleum and total agricultural products—gained market share between 2001 and 2005 (U.S. Dept. of Commerce, see Table 33). • Export-supply capabilities in Mexico were more of a constraining factor for Mexican exports than import-demand conditions in the U.S. (Hanson and Robertson, 2005). • Logistics costs in Mexico are estimated to be 20%, while the OECD average is 9%. A reduction to 12% in Mexico would have a significant impact on economic activity and job creation (Guasch, 2004; Guasch and Kogan, 2003). • Mexico is not capitalizing on its enormous competitive advantage of proximity to the United States because logistic costs are so high: as an example, Mexico spends almost double what the United States does on transport as a percentage of GDP (IMCO, 2005a based on INEGI).
Energy	• Inadequate investments in energy infrastructure have had a significant impact on TFP growth in Mexican manufacturing (Casteñeda Sabido, 2003). • The prices of fuels and electricity in Mexico are among the highest of the world. In contrast with other OECD and developed countries, the prices of electricity, natural gas, fuel oil and other fuels have increased over the last decade. (World Gas Intelligence, EIA, Edison Electric Institute, Eurelectric, among others). • A large portion (64 percent) of electricity subsidies are captured by the non-poor in Mexico (World Bank, 2004f). • The quality of the electricity service is poor compared to other countries. Service interruptions and voltage fluctuations affect the overall productivity levels of industries and prevent the installation of modern electronic equipment (World Bank, 2005d; IMCO, 2005a; and others).
ICT and Telecom	• Countries with higher levels of investment in ICTs experience higher economic and social development growth (OECD, 2004c). • Mexico's level of ICT expenditure (3.1%) as a share of GDP is substantially lower than Latin American countries such as Chile (6.7%), Brazil's (6.7%), Argentina (5.7%), and Peru (6.9%) (World Bank, World Development Indicators, 2003). • Business telephone charges (factoring in installation costs, monthly fees, and per minute rates) in Mexico are over 3 times greater than charges in Argentina and 4 times greater than charges in Brazil.
Agriculture	• Agricultural GDP grew only 1.3% between 1984 and 2004, while total GDP grew 3%. • Agriculture as a share of the total Mexican economy shrank from over 8% in pre-NAFTA era to 5% in 2004. • Public expenditure in agriculture declined from 13.4% to 6.9% between 1990 and 2003. • Out of the top 24 export agricultural commodities from Mexico to the United States, only 9 are increasing market share. The rest are losing market share to competitors. • Negative net trade balance (exports minus imports) for agriculture deepened from $211 million in 1991/93 to $1.3 billion in 2001/03.
Sub-national	• Aguascalientes ranks 33rd globally in the costs to start a business, while the Estado de Mexico ranks 127th (World Bank, 2006b). • The impact on investment per worker of a 10% improvement in competitiveness variables ranges from 841% to 12%, depending on the Mexican state (IMCO, 2006a).

2. **The AAA-supported themes are roughly in line with the GOM's Competitiveness Agenda.** After the Fox administration declared increasing country competitiveness to be a key priority in 2003, the Bank helped the GOM craft a Competitiveness Agenda. The agenda was completed in 2004 and drew on numerous studies, surveys, and consultations in Mexico, combined with broader regional analyses. Ultimately, actions included in the Agenda were based on their impact on Mexico's competitiveness, the feasibility of implementation, the horizon for implementation, and the impact on public sector finances. With all that taken into consideration, the GOM's Competitiveness Agenda converged to the following

subject areas: (i) improving the investment climate, (ii) strengthening innovation, education, and training, (iii) reducing logistics costs and improving trade facilitation, (iv) improving the energy sector, and (v) financial deepening. While the agenda does not include key high-impact and politically sensitive reforms such as structural reform in the energy sector (although it did include issues of pricing, incentives, and reliability of supply), tax reform, and labor reform, it provides an excellent starting point to address competitiveness issues in Mexico. It also has served as a vehicle for dialogue with the private sector.

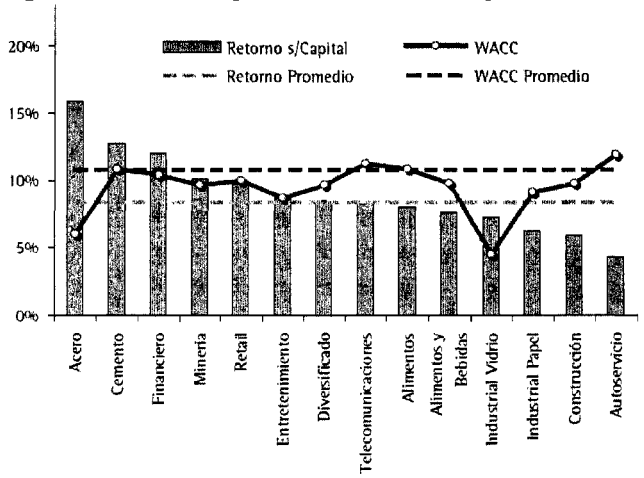
3. Work on the Competitiveness Agenda led to the ongoing Programmatic AAA (FY05-08). Analyses within the AAA and preparation of the First Programmatic Competitiveness Development Policy loan (July 2005 - February 2006) have reaffirmed that the Competitiveness Agenda subject areas should indeed be priorities. As a result, the AAA-supported themes are roughly in line with the Mexico Competitiveness Agenda. The following discussion considers alternative ways of identifying obstacles to competitiveness, as well as a more detailed examination broken down by factor markets and total factor productivity (TFP).

Growth Diagnostic

4. **One way to analyze the obstacles to competitiveness in Mexico, and hence the appropriateness of the areas this AAA (and the Mexican agenda) supports, is through a "growth diagnostic" conceptual framework.** This framework, developed by Hausmann, Rodrik, and Velasco (2004), aims to identify the binding constraints to growth. While the diagnostic has not been comprehensively applied to Mexico, it does provide guidelines. The framework is based on the drivers of investment and uses a decision tree to first ask whether growth is constrained by low returns on investment, the high cost of finance (both local and international), or both. The cost of finance (reflected particularly in very limited access) is a key issue in Mexico, considering that the share of credit to the private sector as a percentage of GDP is about 17 percent, while it is 63 percent in Chile, 98 percent in Korea, and over 100 percent in many East Asian countries. This issue is addressed separately through a Development Policy Loan (DPL) on the financial sector.

5. Turning to the returns on capital, an analysis by IMCO shows that low returns are a large part of the story. Based on an analysis of the 33 largest companies on the Mexican stock market (BMV), IMCO found that, on average, profits did not cover the cost of capital (Figure 71). Specifically, only 6 of 14 sectors had returns that exceeded their cost of capital. Moreover even in absolute terms, the returns to capital appear low. They are in the 5-12 percent range, which is similar to the yield on government bonds in Mexico. The growth diagnosis framework provides guidance into the critical issues that are keeping those returns so low. And this AAA supports measures that ought to improve the returns to capital.

Figure 71: Cost of Capital and Returns on Capital in Mexico

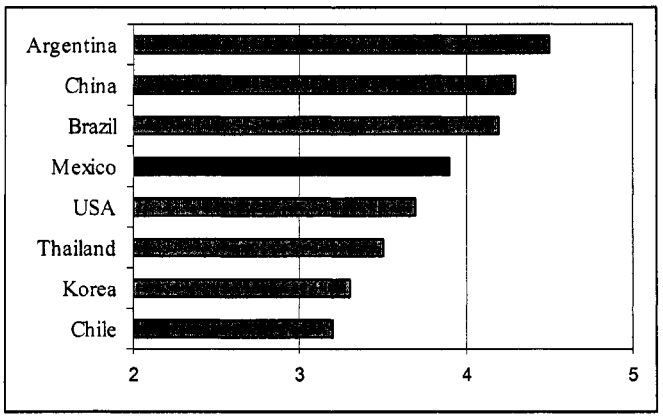


Note: WACC stands for Weighted Average Cost of Capital. *Promedio* means average.
Source: IMCO with data from Bloomberg, 12/17/2004. 33 companies that compose the main Mexican stock market (*Bolsa Mexicana de Valores*) index (IPC).

6. **The growth diagnostic framework goes on to identify a number of possible drivers to low private returns on domestic investment**: a) high micro or macro risks; b) lack of innovation and R&D; c) large externalities, spillovers, or coordination failures; d) high tax rates and/or inefficient tax structure; and e) insufficient infrastructure, high transport, energy, telecommunications or shipping costs (see **Annex 4** for a diagram of the framework). The macro environment has been stable in Mexico for the last decade, making it unlikely to be a binding constraint. Micro risks, such as from corruption and crime, could potentially be binding constraints. Indeed, they came up in competitiveness focus groups held in Mexico and the World Economic Forum's executive opinion survey. However, they are not covered in this AAA since there is another Bank analysis of this subject.[139] Other micro risks, such as property rights and judicial reform (contractual enforcement, are handled through two other Bank operations—a housing DPL and a judicial reform project. Lack of R&D / innovation is certainly an issue in Mexico and is addressed by this AAA. Tax rates and regulations are seen as a constraint with significant impact (Figure 72), but the issue has also been looked into in another Bank analysis.[140] Constraints associated with infrastructure and transport and shipping costs are addressed in the logistics, trade facilitation, and energy components of this AAA.

[139] The Mexico Institutional and Governance Review.
[140] The Mexico CEM: Challenges and Prospects for Tax Reform.

Figure 72: Tax Burden



Note: Scores are a response to the survey question: "The overall tax burden on your enterprise, including all associated costs (tax rates plus administrative and time costs, penalties, etc.), is estimated as (in percent of net revenues) (1=0-4 percent, 2=5-15 percent, 3=16-25 percent, 7=81-100 percent)."
Source: World Economic Forum (2005).

Impact Analyses

7. **A complement to the growth diagnostic framework is an impact study conducted by the Mexican Competitiveness Institute (IMCO).** The IMCO (2005a) study, which was part of Phase 1 of this AAA, develops a model to assess Mexico's competitiveness and establishes priorities among themes in terms of impact on investment (gross capital formation) per worker. From that model, "point elasticities" are estimated, giving the impact on investment per worker of a ten percent improvement in the respective independent variables (Table 31). As shown, the high-impact themes are the competition environment, taxes and tax regulations, regulatory and investment climate, education and innovation, trade facilitation, transport and logistics, corruption, finance and energy. These impact estimates provide guidelines for priorities to be tackled in order to increase Mexico's competitiveness. In consequence, this AAA (and the Mexican Competitiveness Agenda) analyzes policies in most of those themes.

Table 31: Constraints to Competitiveness

Subject areas	variables behind each subject area
1) Competition environment	7.5 %
2) Taxes and tax regulations	7.1 %
3) Regulatory and investment climate	6.8 %
4) Education	6.0 %
5) Trade facilitation and transport / logistics	5.8 %
6) Corruption	4.7 %
7) Innovation	3.8 %
8) Finance	3.6 %
9) Energy	2.7 %
10) Labor market	1.9 %
11) Macroeconomic environment	1.0 %

Note: The percentages are point "elasticities" which reflect the impact on investment per worker of a 10 percent improvement in the variables behind each subject area.
Source: World Bank extrapolation of IMCO subcomponent elasticities.

8. It should be noted that the impact numbers in Table 31 are for single effects or isolated improvements in each category. A broad package of reforms across most of the high-impact categories could have a positive bundling effect. In other words, **the interaction between the individual variables should create an overall impact that is substantially larger than the sum of the individual improvements.**

9. **IMCO's variables come from a wide variety of sources.** There is an average of over 6 underlying variables per subject area. Examples include:

- *Competition environment*: The extent to which free competition is allowed in the markets (EIU); an index which measures the degree to which public policies help the competitiveness of businesses (UN); promotion of competition (EIU); national businesses in the Forbes World 500 (Forbes).

- *Regulatory and investment climate:* Regulatory quality index (World Bank); index that measures how difficult it is (administratively) to open a business (Fraser Institute); a measure of whether business managers spend substantial amounts of time on bureaucratic issues with the government (Fraser Institute).

- *Trade facilitation and transport / logistics*: Length of the paved highway network (km per capita—CIA World Factbook; port infrastructure (number per 1,000 km of seaboard—CIA World Factbook); cargo capacity of the marine fleet (tons per GDP—CIA World Factbook).

- *Innovation*: R&D spending as a percentage of GDP (World Bank); income per capita from royalties and licenses (UNDP); level to which basic, technological, scientific and human resources satisfy enterprises (IMD International).

- *Energy*: Unit cost of electricity USD per 000 KwH—U.S. Department of Energy); energy infrastructure (KwH) per capita (CIA World Factbook); index of liberalization of the energy sector (IMCO).

10. **The conclusions of the impact elasticity calculations are supported by two other relatively comprehensive reports**: a Competitiveness Focus Groups report and the World Economic Forum's (WEF) *Global Competitiveness Report 2005-2006*. The focus group report is based on the written and verbal responses of over 90 businesspeople in Mexico from a range of economic sectors in 2003. The WEF report contains information about the most problematic factors for doing business in Mexico. These sources are "soft" in the sense that they are based mostly on subjective evaluations of entrepreneurs, while the IMCO analysis is "hard" in the sense that, by and large, it uses hard factual data and provides quantitative estimates of impact. It is reassuring that the correlation between the hard and soft studies is quite high (over 80 percent).

Factors Markets and Total Factor Productivity

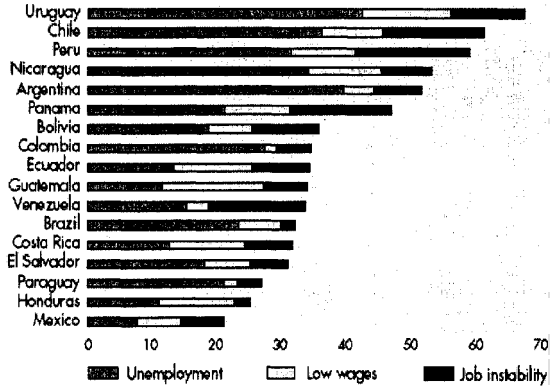
11. **A complementary framework to the growth diagnostic to elicit key elements and priorities for competitiveness/productivity is to look at the factors of production, their markets, and how well the factors are used.** National output is determined by the quality and quantity of inputs—labor (human capital), capital, and infrastructure—as well as a residual known as total factor productivity (TFP). TFP, which can also be thought of as know-how, is determined by some combination of innovation/knowledge and investment climate characteristics. Well-functioning factors markets and the efficient use of factors of productions are key for competitiveness and increasing productivity and growth. A brief summary of those themes is provided in the following sections, further bolstering the analytical underpinnings for the AAA agenda. Detailed rationalizations for specific policies within each subject area discussed in the Policy Areas section.

Labor

12. **Labor regulations are relatively rigid.** Labor regulations were identified as a constraint in the WEF executive opinion survey. *Doing Business in 2006* gives Mexico a 60 out of 100 (higher numbers mean more rigid regulation) on both its "Rigidity of hours index" and its "Difficulty of firing index." In contrast, Chile scored a 20 on each of these indices. As part of Phase 1 of this AAA, the World Bank estimated the impact of a proposed labor law reform in 2004. The analysis found that the proposal to relax the regulation of working hours alone would cause the "Rigidity of hours index" to drop from 60 to 40. Partly as a result of strict labor regulation, Mexico has a large informal sector, and competition from the informal sector was one of the complaints of entrepreneurs in the focus groups. IMCO has also highlighted a number of labor market shortcomings.

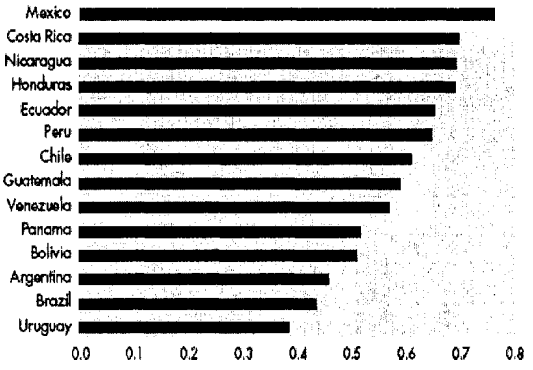
13. **Despite these shortcomings, labor does not emerge as one of the top constraints.** This is corroborated by the IMCO quantitative estimates (Table 31) and other studies. An IDB (2004) study shows that the Mexican labor market performs well relative to other labor markets in the region, with little adverse impact on unemployment and mobility. Figure 73 shows that Mexican's consider unemployment, low wages, and job instability to be less of a problem than every other country in the Latin America sample. The same IDB report also shows that Mexico has the best "quality of labor relations" and "overall efficiency in labor market performance" in the region (Figure 74). Partly because labor is not a top constraint and partly because the subject of labor reform is extremely politically sensitive, major structural reforms in labor markets are not covered by this AAA.

Figure 73: The Most Important Problem, by Country (Percentage of respondents)



Source: Latinobarometer (2001).

Figure 74: Summary Measure of Overall Efficiency in Labor Market Performance (Index, 0-1)



Source: IDB calculations based on household survey data; Latinobarometer (1997); World Economic Forum (2001).

14. **Labor productivity is impacted by the quality of human capital, which is largely determined by education and training.** This AAA concentrates on adult education and training (e.g., SME support) programs, while traditional education issues (primary/secondary/tertiary) are addressed through a series of separate Bank projects. The WEF survey named an "inadequately educated workforce" as one of the most problematic factors for doing business and the average education attainment of the Mexican adult population is very low—7.6 years—compared with 11-12 years for other OECD countries. IMCO also considers the education shortfall to be a factor that stunts Mexico's competitiveness, with the prospects for the poor being particularly dismal: the poorest 10 percent of the population averages only 4 years of formal education. Ideally, SME support programs can help overcome education shortfalls. However, a 2004 World Bank study[141] (associated with this AAA) highlighted several shortcomings in existing Mexican SME programs, including a pressing need for impact evaluations.

Capital

15. **Credit and capital markets are not very effective in Mexico.** A telling indicator is the level of domestic credit to the private sector, which was a paltry 17 percent of GDP in 2004. In comparison, values in many East Asian countries are over 100 percent. Not surprisingly, all the surveys highlight that issue. Both the focus groups and the WEF executive survey identified it as the most problematic factor. The IMCO study shows that while relatively small improvements have an impact, the big payoff comes with significant improvements in that sector. Given the importance and complexity of this topic, it is being handled as a separate Programmatic Finance and Growth DPL, which was presented to the Board in March 2006.

Infrastructure

16. **There is ample evidence of the strong impact of infrastructure on economic growth and poverty. Yet, Mexico lags behind in that area relative to its major partners and competitors.** Calderon and Serven (2004) have shown that if Mexico were to improve its infrastructure stock and quality to the levels of Costa Rica (the region's infrastructure leader), Mexico's GDP would increase by 1.7 percentage points and inequality would be significantly reduced. Thus, not surprisingly, various components of infrastructure have been identified as highly problematic by several sources. The focus groups considered distribution, transport costs and logistics to be an important competitiveness

[141] World Bank (2004b).

constraint. They considered railroads to be limited and costly, roads to be slow, expensive, and unsafe, and airports and ports to lack capacity for high load volumes. A 2005 study by the U.S. International Trade Commission confirms that Mexico falls short on a number of indicators of logistics quality, especially when compared with Chile and countries in East Asia. Their evidence comes from a survey of 51 countries which derived scores for customs, airports, seaports, regulation, burden of security procedures, and availability of complementary resources. With the exception of airports, Mexico falls in the bottom 35 percent of the countries surveyed on all of these measures (Table 32).

Table 32: Indicators of logistics quality

	Customs Score	Regulatory Score	Airport Score	Seaport Score	Availability of complementary resources	Burden of security procedures
Spain	5.00	1.45	5.08	5.77	4.96	5.80
Malaysia	5.39	2.65	3.82	4.98	5.10	5.19
South Korea	5.50	2.94	4.49	4.83	5.11	5.00
Chile	5.86	1.35	4.51	5.45	5.20	5.83
India	5.86	2.14	4.93	6.33	6.40	6.50
Argentina	6.10	2.20	5.84	6.58	5.33	6.67
Mexico	**6.13**	**3.66**	**4.37**	**6.03**	**6.53**	**6.78**
China	6.19	4.00	4.95	5.25	6.67	6.44
Thailand	6.43	3.43	4.88	5.50	6.07	5.83
Brazil	6.52	3.78	5.61	7.40	7.47	7.43

Note: Lower scores are better. Results based on a questionnaire. The customs score includes all information on the quality, efficiency, and cost of customs procedures, whether specific to airports and seaports or not specific to any mode. The regulatory score captures the presence or absence of certain restrictions, their impact on costs and productivity, the degree of transparency of regulation, and the degree to which foreign firms receive the same treatment as domestic firms. The airport score summarizes the speed and cost of processing cargo through airports, both overall and for individual cargo procedures. The seaport score summarizes the speed and cost of processing cargo through seaports, both overall and for individual cargo procedures, including the cost of repositioning equipment. The complementary resources score captures the presence of complementary resources such as labor, financing, and inland transport. The security burden score captures the effect of security procedures on efficiency.
Source: U.S. International Trade Commission (2005).

17. A separate piece of empirical work has shown the importance of infrastructure in transport costs and trade flows. Specifically, an analysis of bilateral trade data showed that a deterioration of infrastructure from the median to the 75th percentile raises transport costs by 12 percentage points and reduces traded volumes by 28 percent.[142]

18. **Mexico's high logistics and transport costs are hurting competitiveness.** The Mexico focus groups highlighted the absence of intermodal facilities ("dry ports") that would improve logistics management and reduce the cost of transporting goods, especially exports. Customs laws were seen as very complicated and difficult to comply with. The data supports this assessment: logistics costs in Mexico are over 20 percent of product value, compared with an average of 9 percent for OECD countries.[143] A reduction of those logistic costs to a level of twelve percentage points would have significant impact on economic activity and job creation, as shown elsewhere. Elevated transport costs and times have also led to high inventory levels for businesses: during the 1990s, Mexico had 90 percent higher raw materials inventory levels on average than the U.S.[144] IMCO finds that Mexico is not

[142] Limao and Venables (2001).
[143] Guasch (2004).
[144] Guasch and Kogan (2003).

capitalizing on its enormous competitive advantage of proximity to the U.S. because transport costs are so high. Indeed, Mexico spends almost double what the U.S. does on transport as a percentage of GDP.[145]

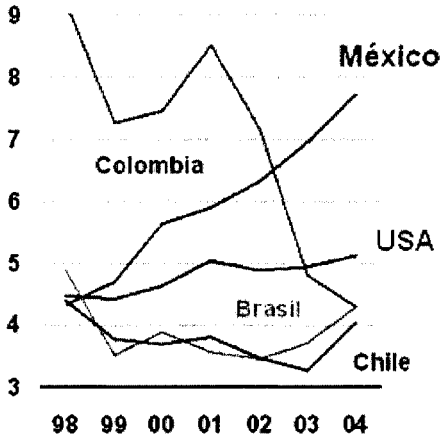
19. **Improvements in the energy sector are needed, but reforms remain controversial.** Over the last decade, different groups have called for the implementation of far reaching reforms in the energy sector as a necessary condition to attract sufficient private financing, improve efficiency, lower costs, and expand the sector's contribution to the federal budget and the economy. While a national consensus has not been reached with regard to the nature and extent of energy sector reforms, the GOM has gradually taken conservative steps to allow limited private sector participation and improve transparency and regulatory accounting.

20. **High energy costs and quality of service issues hurt productivity.** Energy costs comprise 10.5 percent of the total production costs of manufacturing industry products (as an aggregate). This is comparable to labor costs which are in the range of 4-20 percent. High energy prices were identified as a constraint (although not a top one) by the focus groups and unit electricity costs in Mexico in 2002 were higher than *every* other country in IMCO's list of 44 comparator countries. Moreover, while in most countries energy prices have dropped in the last five years, they have increased in Mexico. It should be noted, that while most of the discussion in Mexico (as in the China debate) focused on labor costs, for many products in manufacturing, energy costs as a share of total costs are larger than labor costs. Quality of service is particularly poor for SMEs, which often experience variations in frequency and voltage and interruptions in service. High energy prices and poor quality then translate into reduced SME competitiveness. Large enterprises have fewer quality problems because they are generally served by more reliable, high-tension wires. The AAA's approach in the electricity sector is informed by the World Bank's Infrastructure Public Expenditure Review for Mexico, which was completed in September 2005.

21. A summary of the primary issues in the energy sector is as follows:

- *Price.* The prices of fuels and electricity in Mexico are among the highest of the world. In contrast with other OECD and developed countries, the prices of electricity, natural gas, fuel oil and other fuels have increased over the last decade. (Figure 75) Steady price increases have had serious effects on the costs of production across different industries. In the manufacturing sector, the average costs of energy as a percentage of total production costs increased annually by 2.25 percentage points over the period 1995-2002.
- *Subsidies.* A large portion (64 percent) of energy subsidies are captured by the non-poor in Mexico.[146] Those funds would be better used to provide for urgent social needs.
- *Quality.* The quality of the electricity service is poor compared with other countries. Service interruptions and voltage fluctuations affect the overall productivity levels of industries and prevent the installation of modern electronic equipment. Electricity transmission and distribution also needs to be improved considerably to reduce losses.

Figure 75: Electricity Prices (USD¢ / kWh)



Source: Consejo de Coordinadores Empresarial (2005) based on national sources

[145] The original source is INEGI, BTS as reported in IMCO (2005a).
[146] World Bank (2004f).

- *Capacity*. To meet projected demand, large investments in new capacity are needed.

22. **There are also issues in the telecom sector impacting productivity.** Mexico's telecommunications sector grew considerably as a result of the privatization of Telmex in the early 1990s and the gradual sector liberalization that began in 1995. The Fox administration's efforts to transform Mexico into a knowledge economy, mainly through its e-Mexico initiative, have also resulted in notable improvements in e-government. However, despite having been the early reformer in LAC (after Chile), Mexico lags behind all OECD countries and many Latin American countries in terms of wide-spread access to telephone and broadband internet infrastructure. Telecommunications prices are much higher in Mexico than in similar countries. This holds true for business and residential telephone monthly subscription fees, residential telephone connection charges, and the cost of a three minute local call. The installation and monthly service charges for businesses to lease a local line (known as a local loop) in Mexico City are also high compared with other major cities in Latin America.

Trade facilitation

23. **Mexico has seen substantial gains from trade, but it is losing export market share in the U.S.** Exports to the U.S., particularly since NAFTA, have been an important pillar of the Mexican economy. Research suggests that Mexico's global exports would have been about 25 percent lower without NAFTA, and FDI would have been about 40 percent less. Also, the amount of time required for Mexican manufacturers to adopt U.S. technological innovations was cut in half with NAFTA (see Box 16 for lessons from NAFTA).[147] Despite the gains from NAFTA, Mexico has been losing export market share within the U.S. in recent years. Of the top ten types of Mexican imports in the U.S., only two—petroleum and total agricultural products—gained market share between 2001 and 2005 (Table 33). The largest falls were seen in communications equipment, computer equipment, motor vehicles, and audio/video equipment. China was the biggest gainer in all but one of the categories where Mexico registered a loss.

Table 33: Mexico's Principal Exports to the U.S.

	Mexican Share of US Imports (%)			Biggest Gainer	
	2001	June 2005	Difference	Country	Percentage Point Diff.
Petroleum	10.1	11.0	0.9	Venezuela	1.9
Auto parts	27.4	26.9	-0.5	China	2.4
Motor vehicles	17.1	12.4	-4.7	Korea	2.1
Household appliances	25.2	24.5	-0.7	China	6.4
Audio and video equipment	28.1	23.7	-4.4	China	9.7
Communication equipment	23.1	17.3	-5.8	China	15.1
Computer equipment	14.3	9.2	-5.1	China	29.5
Clothing and accessories	13.0	9.1	-3.9	China	12.6
Electronic components	10.9	8.6	-2.3	China	7.8
Agriculture products	22.4	24.2	1.8	Brazil	2.5
Total	**11.5**	**10.4**	**-1.1**		

Source: U.S. Department of Commerce, compiled by BBVA Bancomer.

24. **Exporting has been shown to improve productivity.** A separate study found that the productivity of non-*maquiladora* plants in Mexico that start exporting grows substantially in the 2-3 years prior to entering the export market. Their productivity continues to grow relative to that of exporters and non-exporters for at least 2-3 years after entry, suggesting that learning-by-exporting effects exist. Newly

[147] Lederman, Maloney, and Serven (2003).

entering *maquiladoras* also seem to improve their performance in the years after entry. The study also found that export experience is a significant determinant of productivity growth: each year of exporting experience is associated with a 4.5 percent rise in TFP.[148]

25. **Trade facilitation efforts stand to be improved.** Despite the changes wrought by NAFTA and the benefits of exporting, the U.S. market is not always easily accessible, especially for smaller firms and those far from the border, and costs to comply with export procedures can be high. *Doing Business in 2006* reports that "time for export" is 18 days in Mexico, double the number of days in the U.S. Focus groups also identified the lack of mechanisms to facilitate exports as a major constraint.

Box 16: The Lessons from NAFTA

A recent World Bank study, "Lessons from NAFTA for Latin America and the Caribbean" (Lederman, Maloney, and Serven (2003)) highlights the following lessons:

- NAFTA can be credited for boosting Mexico's growth in the post 1994 period. By inducing a reciprocal reduction in trade barriers and locking-in the reforms of recent years, it has yielded a positive impact on trade flows, foreign direct investments, and growth of industrial productivity. It is also responsible for the creation of many new jobs and some reduction in poverty rates of recent years in Mexico.
- Despite the positive growth effect, NAFTA has not sufficed to guarantee income convergence among North American countries. This reflects mainly pending items in Mexico's policy agenda including institutional gaps (i.e., corruption and rule of law), deficiencies in education (both coverage and quality), a passive innovation policy, the lack of critical infrastructure (especially in lagging regions) and some weaknesses in macroeconomic policy. The experience has demonstrated that while positive, an FTA with a developed partner is not sufficient to increase growth on a sustainable basis unless an agenda of complementary reforms is pursued.
- NAFTA benefits have been concentrated in states in the North and Center of Mexico. Southern states have not seen much of an impact, due to key deficiencies in institutions, education and infrastructure.
- Contrary to some predictions, NAFTA has not had a devastating effect on Mexico's agriculture. In fact, both domestic production and agricultural trade rose during the NAFTA years. The negative effects did not materialize because aggregate demand expanded rapidly in both Mexico and the U.S. in the latter half of the 1990s, some segments of Mexican agriculture recorded substantial increases in productivity (esp. irrigated lands), and outdated subsidies were transformed into targeted efficient programs (e.g., Procampo) which delinked transfers to farmers from current and future production levels.
- Mexico's experience also shows that there are some key remaining barriers to trade that have limited the growth potential of certain sectors. In particular, restrictive rules of origin affecting clothing exports to the U.S. market seem to have limited the ability of Mexican exporters to take full advantage of NAFTA preferences.

Source: World Bank (2005b).

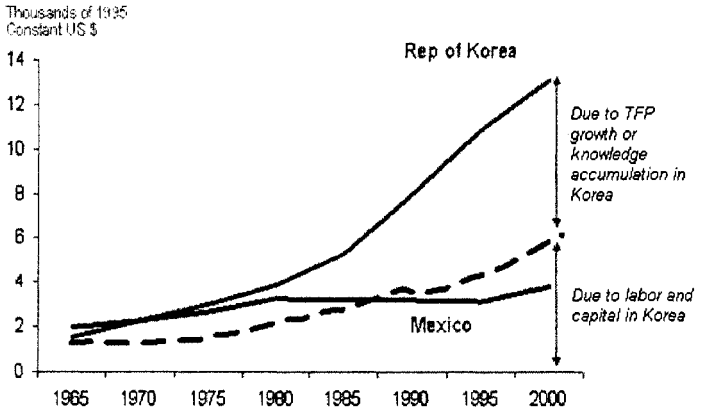
Total Factor Productivity: Innovation and the Investment Climate

26. **Total Factor Productivity (TFP) growth—a critical determinant of overall growth—has been limited in Mexico.** Over 1960-2000 the bulk of the differences in growth between countries (45–90 percent) was accounted for by TFP—the productivity contributions above those made by physical and human capital.[149] A recent study on Mexico supported these results, finding that swings in growth have been mostly accounted for by changes in the contribution of TFP, as opposed to factor inputs.[150] The bad

[148] World Bank (2000).
[149] World Bank (2004a). See also Lederman and Maloney (2003a), Hall and Jones (1999), Dollar and Wolf (1997).
[150] Faal (2005).

news is that the contribution of TFP to GDP growth was negative on average in Mexico between 1980 and 2003, although there has been an improvement since 1996 (see Figure 8). A separate study found that national learning capacity, as proxied by TFP, has accounted for the vast majority of the difference in output between Korea and Mexico since 1960 (Figure 76). Korea developed its national capacity to absorb knowledge in the 1970s and 1980s, whereas Mexico did not.[151]

Figure 76: GDP per Capita Growth: Korea vs. Mexico



Source: Knowledge for Development Program, WBI, as cited in World Bank (2005c).

27. Early growth research emphasized technological progress in explaining TFP, suggesting that differences in growth rates were driven by differences in the technologies adopted. The dramatic acceleration in income levels among the fast growing countries over the last 200 years can be understood by improvements in technology. "Technology" in this sense, however, is not limited to scientific breakthroughs of the kind that might merit a patent. It can also include more modest advances, as well as new and better ways to organize production processes, interact with consumers, or distribute goods.

28. Recent research has emphasized that TFP can also be understood to encompass more than just differences in technology. The broader environment in which firms operate—in other words, the investment climate—matters too. A better investment climate can directly improve productivity by reducing unjustified costs and risks flowing from government policies and behaviors. By making it more attractive to develop and adopt new and better ways of doing things, a better investment climate will help productivity through its impact on technology as well.[152]

29. **Labor productivity levels and growth are quite low by OECD standards.** A separate way to measure productivity is through labor productivity, or GDP per hour worked. Mexico has the second lowest GDP per hour worked of all OECD countries, which equates to a -70 percentage gap with respect to U.S. levels (Figure 77). Growth in labor productivity has also been low. GDP per hour worked grew only 1.3 percent annually between 1995 and 2004 in Mexico, making it the fourth worst performer in the OECD (Figure 78).

[151] World Bank (2005c).
[152] World Bank (2004a).

Figure 77: Productivity Levels—Percentage Gap with Respect to US GDP per Hour Worked, 2004

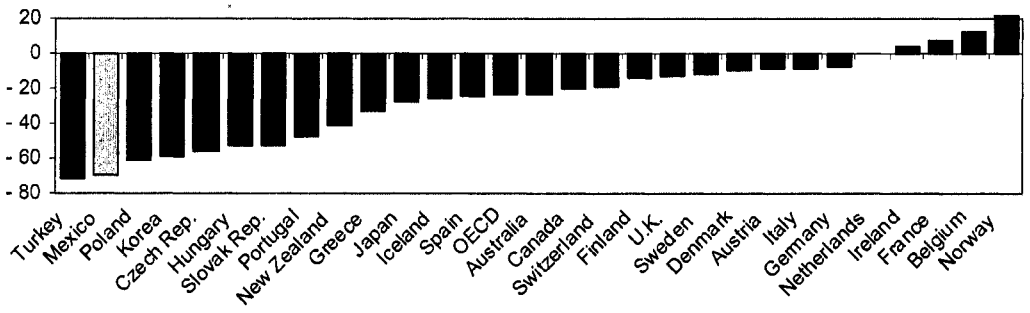
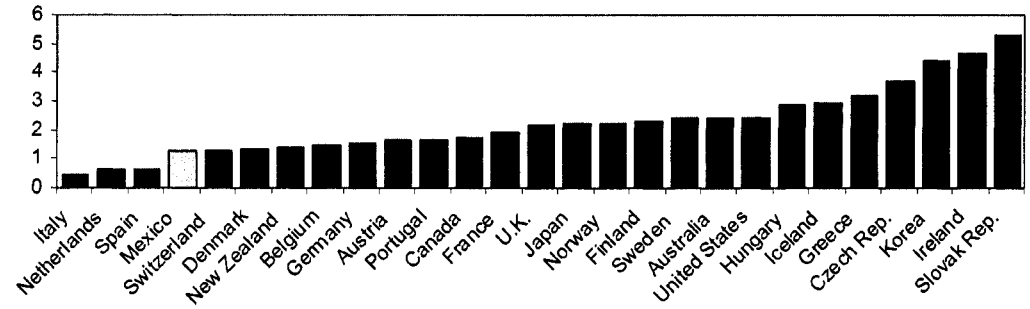


Figure 78: Growth in GDP per Hour Worked, 1995-2004 (percentage change at annual rate)

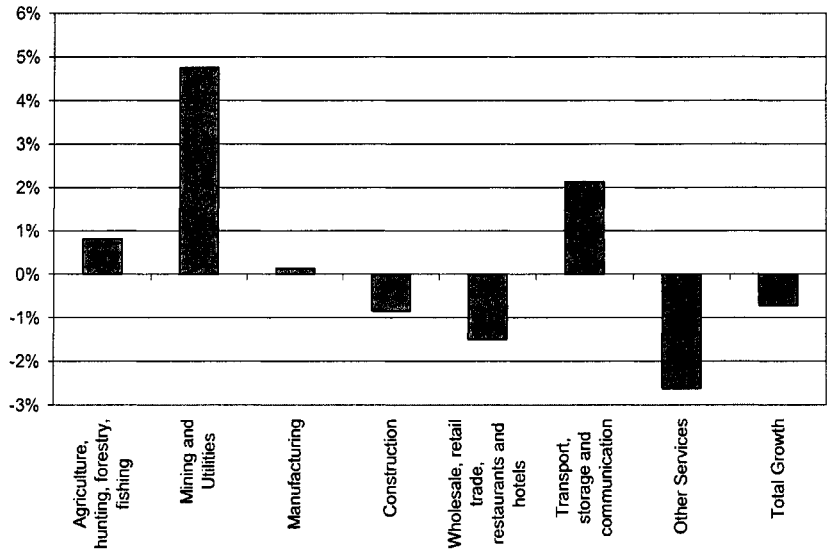


Source: OECD Science, Technology, and Industry Scoreboard, 2005.

30. **Labor productivity growth varies dramatically by sector.** A separate analysis breaks labor productivity growth down by sector and finds that the mining and utilities and transport, storage, and communication sectors were the only ones that showed annual labor productivity growth of more than 1 percent over the period 1990-2004. Meanwhile, wholesale, retail, trade, restaurants, and hotels, construction, and other services all had negative productivity growth, yielding negative total growth during the period 1990-2004 (Figure 79).[153]

[153] Note: these numbers may be incompatible with those in Figure 78.

Figure 79: Annual Labor Productivity Growth in Mexico, 1990-2004



Source: World Bank calculations based on XI Censo General de Población y Vivienda, 1990, INEGI; and Encuesta Nacional de Empleo, 2004, INEGI.

31. Based on the above productivity evidence, this AAA covers measures to encourage innovation and technology adoption and improve the investment climate through better regulation and competition.

Innovation and Technology Development

32. **Innovation is critical and Mexico could play a more active role in fostering it.** According to a recent World Bank flagship report, "technological innovation is a key source of economic, income, and employment growth. This premise has been validated by theory and empiricism and by now has been accepted by most countries."[154] Another World Bank flagship finds that what distinguished the successful resource-abundant countries (Australia, Canada, and the Scandinavian countries) from the disappointing LAC experience was precisely their ability to learn from abroad—their national innovative capacity.[155] Current research has classified the Mexican national science and technology (S&T) learning model as one of "passive FDI-dependent learning." This means that the country does not undertake significant efforts to facilitate local absorption and dissemination of foreign S&T knowledge, e.g. by upgrading local workers' capabilities or by targeting the kind of FDI most relevant to the country's long-term technological learning interests. This contrasts with "active FDI-dependent learning" countries, such as Ireland and Singapore, that have a proven ability to actively facilitate and promote technological learning from FDI.[156] Finally, entrepreneurs in the focus groups noted the lack of government support for R&D. This AAA is also complemented by the Innovation for Competitiveness loan to Mexico (approved in May 2005).

[154] De Ferranti and others (2003). *Closing the Gap in Education and Technology.*
[155] De Ferranti and others (2002). *Natural Resources to the Knowledge Economy.*
[156] Soubbotina (2005).

Regulation

33. **Regulation deficiencies were highlighted as a key issue in several sources.** The focus groups complained about the high numbers of norms and regulations, as well as frequent changes to them, which create uncertainty and provide opportunities for corruption. The WEF survey found that inefficient government bureaucracy was one of most problematic factors for doing business in Mexico. *Doing Business in 2006* found that starting a business takes 58 days in Mexico, compared with 5 days in the U.S. Dealing with licenses takes 222 days at a cost of 159 percent of income per capita, while it only takes 70 days in the U.S. at a cost of 17 percent of per capita income. IMCO also identifies regulation as a problem, ranking Mexico 36 out of 45 countries in terms of ease of opening a business. According to COFEMER (*Comisión Federal para la Mejora Regulatoria*), the cost of regulation in Mexico amounts to about 15 percent of GDP. COFEMER calculates that the benefits of potential deregulation could reduce this cost to 5 percent of GDP.

34. A final piece of evidence regarding regulation comes from a study of the contribution to economic growth of changes in different structural policies. The study analyzed the contribution to the projected change in Mexico's growth rate—during the period 2000-2010 versus the period 1991-1999—of an improvement in the government burden to the 75th percentile of Latin America and the Caribbean. Specifically, the study found that reducing the government burden in Mexico would add 0.15 percentage points to per capita output growth during 2000-2010 with respect to the 1990s.[157]

Competition

35. **Improving competition yields a variety of benefits.** Barriers to competition benefit some firms but deny opportunities and increase costs to other firms and to consumers. They also weaken incentives for protected firms to innovate and improve their productivity. Increasing competitive pressure can increase the probability of firm innovation by more than 50 percent.[158] Therefore, reforms to enhance competition could have significant effects on growth. A study of the impact of pro-competitive regulatory reform in several industries in the United States found that annual welfare gains in the part of GDP affected by reform were more than 7 percent, with 90 percent of the benefits flowing to consumers.[159] Increasing competitive pressure can increase the probability of firm innovation by more than 50 percent. According to IMCO's research, a 10 percent improvement in the variables that compose the "competition" dimension could increase investment per worker in Mexico by 7.5 percent (Table 31).

36. **Competition in Mexico is less than optimal.** Deficiencies in statutory authority and judicial review processes constrain the Federal Competition Commission's (CFC) ability to address anticompetitive conditions effectively and efficiently. The CFC's decisions and proceedings are open to *amparo* actions ("protection appeals")[160] from dissatisfied parties, which can take many years to resolve. Even if the CFC's orders survive the "*amparos,*" the imposed fines are not collected by the CFC but rather by the fiscal department of the municipality of residency of the fined party. From 1993 to September this year, only 3.3 percent of the total amount fined by the CFC has been collected, while 72 percent is under reconsideration and 20 percent is under *amparo* and fiscal nullity action.

37. According to IMCO's research on the impact of 10 dimensions on investment for 45 economies, Mexico ranks 33 in terms of level of competition and formality of the markets. Furthermore, according to

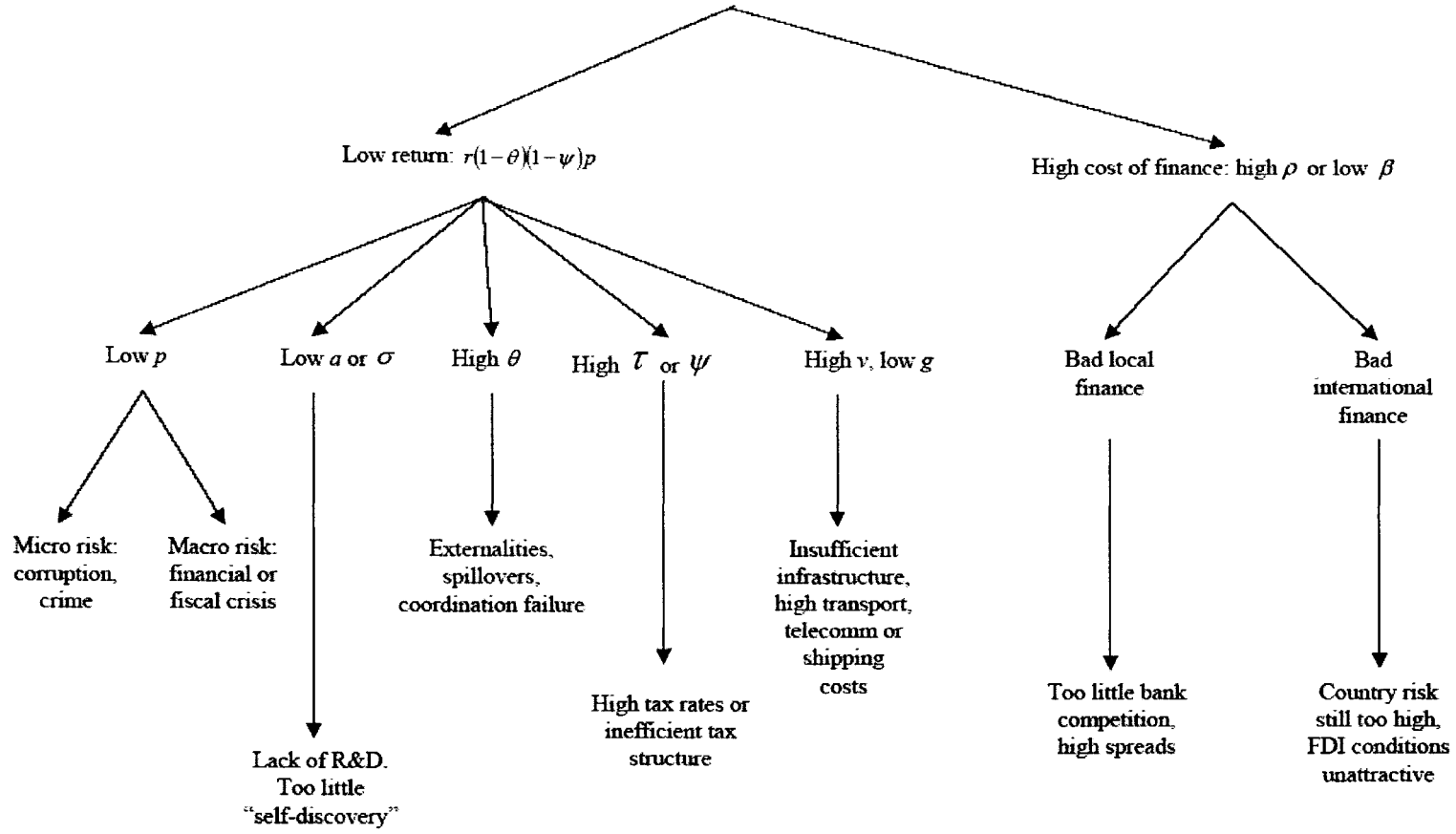
[157] Loayza, Fajnzylber, and Calderón (2005).
[158] World Bank (2004a).
[159] OECD, Regulatory Policies in OECD Countries: From Interventionism to Regulatory Governance.
[160] An *amparo* is a remedy against acts by any authority that violate any of the individual guarantees recognized by the Mexican Constitution. It is available in all legal matters and may be invoked in criminal, civil and administrative trials.

a recent governance survey, the two largest market obstacles to business development identified by firms are government monopolies and private monopolies. The Global Competition Review 2003 ranking of competition regimes in 25 countries ranks Mexico near the bottom with a score of 2.25, in a rating from 0-5, only above Greece (2.0) and Argentina (1.5) since Mexico's competition regime is considered to be severely undercut by courts.

ANNEX 4: GROWTH DIAGNOSTIC FRAMEWORK

PROBLEM: LOW GROWTH

Growth condition depends on comparison of private returns and costs: $\frac{r(1-\theta)(1-\psi)p-\rho}{1-\beta}$, where $r=\left[\alpha^{\alpha}(1-\alpha)^{1-\alpha}a(1-\tau)v^{-(1-\alpha)}\right]^{1/\alpha}(1-\sigma)^{-1}$



Source: Hausmann, Rodrik, and Velasco (2004)

ANNEX 5: THE MEXICAN ENERGY SECTOR

I. Overview and Challenges of Energy Sector in Mexico

Hydrocarbons Sector

1. The energy sector in Mexico has been essential to the economic strategy of the country since the nationalization of foreign oil companies and the creation of PEMEX in 1938. After the international oil crisis in 1973-1974, the government decided to increase investments in oil exploration and production. With the discovery of new oil fields during the early 1980s, Mexico shifted from being an oil importer to becoming a net oil exporter. In 2004, Mexico ranked as the world's fifth-largest oil producer (including crude, lease condensate, natural gas liquids, and refinery gain), behind Saudi Arabia, Russia, the US and Iran.[161] Today Mexico is a major non-OPEC oil producer and has one of the largest oil utilities of the world (PEMEX).

2. Despite the success and significant oil revenues, PEMEX is the world's most indebted oil company, with a net debt of about 32 billion USD (2003). Historically, the Federal government has relied on PEMEX for about one third of its budget, with PEMEX and its subsidiaries turning over an estimated 60% of their annual revenues to Treasury (Hacienda) for the financing of key social and infrastructure programs on health, education and other. Both PEMEX and the national budget are therefore highly vulnerable to fluctuations in international oil prices and other shocks affecting the oil market.

3. Overall, PEMEX's financial obligations to the government complicate the implementation of a sound program of investments and capital expenditures, which is considered essential to sustain efficient production levels and increase proven hydrocarbon reserves. Reforms to the institutional and fiscal structures that link PEMEX to Hacienda as well as measures to promote private sector participation in the industry have been proposed by several administrations. However, these proposals have found little congressional support.

Natural Gas

4. Mexico has the sixth-largest natural gas reserves in the Western Hemisphere (after USA, Venezuela, Canada, Argentina and Bolivia). Yet, over the last decade the domestic demand for natural gas has outpaced the national production due mainly to the gradual installation/construction of natural gas based electricity generating plants (OCGTs, CCGTs). Today, Mexico imports about 15-20 percent of its domestic demand for natural gas from the US and it is becoming increasingly vulnerable to price fluctuations. The increasing dependence on natural gas imports and associated high prices has led the Fox administration to prioritize the implementation of a strategic plan aimed at increasing domestic natural gas production and lowering dependence on imports (Strategic Gas Plan). The plan includes the following measures:

- Increase natural gas production through Multiple Service Contracts
- Diversify natural gas supply import sources and increase LNG imports
- Reduce the flaring of associated natural gas
- Expand natural gas transport, distribution and storage facilities (strengthen interconnection capacity of pipeline grid with US)
- Allocate more exploration funding to increase proven reserves

[161] Preliminary estimates, first three quarters 2004; EIA, DOE, 2004. Mexico Country Analysis Brief.

5. Mexico's downstream natural gas market has been open to private investors since the passage of the 1995 Natural Gas Law. The constitution was modified to allow private companies to become involved in natural gas transportation, storage, and distribution.

Liquid Petroleum Gas (LPG)

6. Mexico has the highest domestic and commercial consumption per capita of LPG in the world and it is ranked fourth in the world in terms of the volume of demand. The country's consumption has grown at 5.3% over the last decade and—due to the gradual penetration of natural gas—it is projected to increase at least 3.1% per annum. More than 80% of Mexican households rely on LPG, distributed to the final user either in portable small tanks or through tank-trucks that supply directly to stationary tanks. Today Mexico imports about a third of LPG demand, in an international market characterized by high price volatility. PEMEX's LPG production reports a negative growth rate of 0.55 percent per annum. The volume of imports, which are subject to permits,[162] is therefore expected to increase. Since February 2003, the LPG price has been determined by a decree issued by President Fox, which will be in effect until December 2006. Under this decree, in 2005 price increases were controlled between 0.75 and 1.75 percent per month. For 2006, prices for final users will increase at a rate of 4 percent.

Electricity Sector

7. The electricity sector in Mexico is characterized by a capacity stock that includes 8,250 MW of gas based independent power production (IPPs), 10,268 MW of hydroelectric capacity, 22,691 MW of thermoelectric capacity (including fuel oil and diesel), 2,600 of coal based power plants, 1,365 of nuclear capacity and 2.18 MW of wind generation for a total installed capacity of 46,137 MW as of 2005. The national interconnected system has about 45,000 km of transmission and distribution lines.

8. Mexico has two electricity companies: Luz y Fuerza del Centro (LFyC) which serves the Mexico City metropolitan area (roughly 5 million users) and the Federal Commission of Electricity (CFE) which serves the rest of the country. Despite the strong technical capabilities of the Federal Electricity Commission (CFE), one of the largest state-owned utilities in Latin America, the sector presents a number of challenges on the technical efficiency and quality of service fronts and across segments. In addition, as in the case of PEMEX, CFE's interdependence with Hacienda complicates the financing structure and the decision making process regarding investments and consequently the sustainability and future evolution of the company.

9. One of the most important concerns of internal and external analysts focuses on the tariff structure and the level and design of the electricity subsidy. For instance, the residential electricity subsidies are highly regressive. The upper middle income households (income deciles 6, 7, 8) receive the majority of the consumption subsidy. Despite steady tariff increases over the past 15 years, average tariff levels do not cover the costs of providing the service. The overall degree of cost recovery has been quite stable averaging about two thirds of total costs in the period 1997-2003. In general, it is recognized that the system lacks a coherent national policy framework for setting –and linking- electricity tariffs, subsidies and cost-recovery goals. Since the early 1990s, different governments have proposed different models for the liberalization and reform of the power sector. However, these proposals have been the source of great political debate, public opposition and congressional rejection.

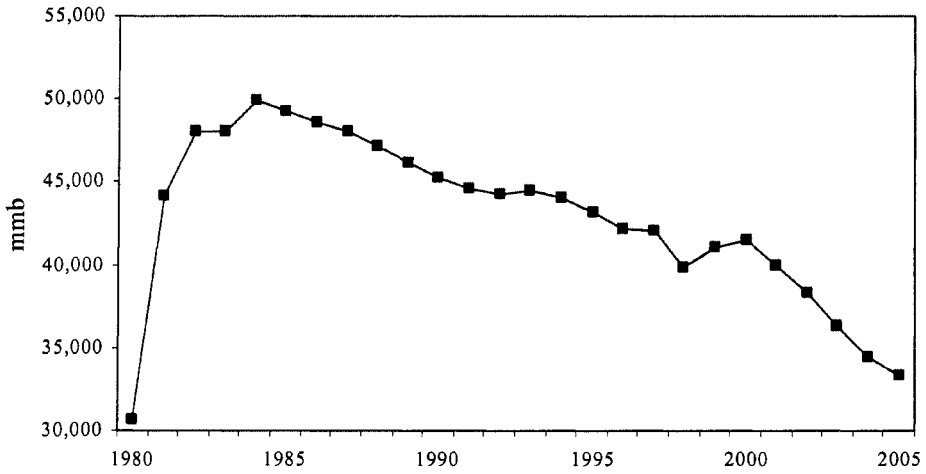
[162] LPG imports are subject to permits from the Secretaria de Economia. Until August 2001, only PEMEX had a permit. However, SENER and the Secretaria de Economia issued the criteria for the expedition of new permits. Still, today PEMEX is the only LPG importer.

II. KEY CHALLENGES OF THE ENERGY SECTOR

Energy sector bottlenecks will have important fiscal and macroeconomic impacts

10. The oil sector in Mexico plays a major role in economic policy. As explained before, Mexican oil export revenues account for around one-third of government income every year. Overall, PEMEX contributes about 60 percent of its income to the federal government in royalties and taxes. Despite the high revenues PEMEX is faced with a huge debt burden and lacks the capital resources to invest in the modernization of the sector. One of the major bottlenecks to the future sustainability of the energy sector is the systematic decline of proven—developed and undeveloped—hydrocarbon reserves as well as increased uncertainty regarding the size of potential reserves (Figure 80).

Figure 80: Total Reserves Crude Oil (Thousand Million Barrels)



11. In 2005, PEMEX reported proven hydrocarbon reserves of only 14.8 mmb. The International Energy Agency (IEA) has estimated that crude oil production in Mexico will decline to 4.1 mmb by 2010 and 2.7 mmb by 2030 when the expected internal demand can reach 3.5 mmb (i.e. assuming an annual demand growth rate of 2 percent). For the first time this year, the Cantarell reserves—the world's third largest oil field and the supplier of 60% of total oil production in Mexico—will have a production fall of about 6 percent.

12. The sustainability of the oil stock will in fact depend on new investments that allow the exploration and production of potential national oil fields. These investments can only be triggered through either private sector participation—with mechanisms that allow a sound risk management and that do not add to the country's growing contingent liability—or debt financing.

13. The possible consequences of reduced hydrocarbon reserves and the gradual deterioration of the energy industry are two-fold. On one hand, a reduction in oil revenues will have a direct impact on public finances and fiscal stability thereby reducing public expenditures with the possibility of inducing an economic recession and increasing the country indebtedness level. On the other hand, increased fuel and petrochemicals imports as well as exposure to volatile international fuel prices will have direct impacts on the competitiveness of productive and commercial activities across the economy, including the electricity sector.

14. Unless Mexico implements a strategic plan that gradually substitutes the fiscal dependence on oil revenues for other sources of income, the systematic fall in hydrocarbons reserves and an increased reliance on hydrocarbons imports will signify, without question, a bottleneck to economic and social development.

Investment Projects under PIDIREGAS Increase the Country's Contingent Liabilities[163]

15. With the intention of promoting new mechanisms for long term investment in energy infrastructure, on December 1995 the Congress approved reforms to the General Law on Public Indebtedness (*Ley General de Deuda Publica*) and the Budget, Accounting and Federal Public Spending Law (Ley de Presupuesto, Contabilidad y Gasto Publico Federal). The reforms allowed private participation through the implementation of an instrument known as PIDIREGAS, which became operational in 1997 (PIDIREGAS means "Long-term productive infrastructure projects with deferred impact in the recording of expenditure" according to its Spanish acronym).

16. PIDIREGAS projects are investments by public sector enterprises such as CFE and PEMEX that use long-run private financing to create infrastructure capable of generating revenue, and with a budgetary impact that is deferred to subsequent fiscal years.164 Since 1997, a growing number of public investment projects have been financed under the PIDIREGAS scheme. In fact, PIDIREGAS has become the main financial instrument for infrastructure development in the energy sector. In 2004, for instance, PIDIREGAS represented 92% of total PEMEX investments.

17. However, PIDIREGAS projects are regarded as public Mexican debt and therefore private analysts and financial consultants perceive the risk associated with this instrument as equivalent to the risk on the country's sovereign debt. In other words, PIDIREGAS projects signify a contingent liability to the country. According to SHCP165, as of December 31, 2004, total liabilities of Direct PIDIREGAS Projects amounted to US$ 22,155.7 million, of which 80.1 percent corresponded to PEMEX and the rest to CFE. Table 34 below shows the participation of total PIDIREGAS debt as a proportion of Mexico's GDP. Note that it has increased from 1.2 percent of GDP in 1998 to 4.9 percent of GDP as of end-March 2004.

Table 34: Participation of PIDIREGAS Debt as a Proportion of GDP

	PIDIREGAS	Domestic	External
1998	**1.2**	0	1.2
1999	**2.3**	0	2.3
2000	**2.8**	0	2.8
2001	**2.7**	0	2.7
2002	**3.9**	0	3.9
2003	**5.2**	0.4	4.7
2004 (end of March)	**4.9**	0.8	4.1

Source: IMF. Mexico: Selected Issues, IMPF Country Report No. 04/418, December 2004.

[163] This section is largely based on the consultant report: Samaniego Breach, Ricardo. 2005. Mexico Infrastructure Public Expenditure Review: Targeted Issues in the Electricity Sector, The World Bank February 2005.
[164] See Samananiego (2005) for a detailed description of different types of PIDIREGAS (i.e. direct and conditioned).
[165] See SHCP, Informes sobre la Situación Económica, las Finanzas Publicas y la Deuda Publica, cuarto trimestre de 2004.

18. At the same time total net augmented debt[166] was almost constant and represented 45 percent of GDP in 1998 and 45.4 percent in 2003. In fact, the participation of PIDIREGAS in Mexico's net augmented debt grew from 2.7 percent in 1998 to 11.5 percent in 2003.

19. Table 35 also shows the importance of PIDIREGAS liabilities in Public Sector Borrowing Requirements (PSBR).167 In 2003 they represented 1.1 percentage points of GDP out of total PSBR of 2.5 percent of GDP. The approved budget for 2004 estimated an increase of PIDIREGAS liabilities to 1.5 percent of GDP out of a total PSBR of 2.7 percent of GDP. According to SHCP, fiscal pressure from investment projects financed by the private sector (PIDIREGAS-type schemes) will more than double from 1.1 percent of GDP in 2003 to 2.4 percent in 2008. In 2005 alone, energy infrastructure financed through PIDIREGAS reached 144 billion pesos.

Table 35: Public Sector Borrowing Requirements, 2003-2004 (% of GDP)

	2003	2004 (approved)
I. PUBLIC DEFICIT EXCLUDING VRP	0.4	0.3
A. Budgetary revenues	23.7	22.7
Oil related	7.9	7.1
Non-oil related	15.8	15.6
B. Net budgetary expenditures	24.2	23.0
Programmable	17.7	16.4
Non programmable	6.4	6.6
C. Non-budgetary deficit	-0.1	0.0
I. PUBLIC DEFICIT INCLUDING VRP*	0.6	0.3
II. ADJUSTMENTS	1.9	2.4
PIDIREGAS	1.1	1.5
IPAB	0.3	0.3
Registry corrections	0.1	0.1
Debtor support programs	0.0	-0.1
FARAC**	0.0	0.1
Financial intermediation	0.5	0.5
III. PSBR (I+II)	2.5	2.7

* VRP is the Voluntary Retirement Program of the Public Sector.
** FARAC is the trust fund created for the toll road restructuring program
Source: SHCP

[166] The traditional definition of public debt covers debt under direct budgetary control and is used for the purpose of budgetary legislation. Specifically, it covers the domestic debt of the federal government and the external debt of the public sector, including public, development banks, and a portion of the PIDIREGAS debt (an amount equivalent to amortization obligations for the next two year is recorded in the traditional debt upon completion of individual PIDIREGAS projects). The Public Sector Augmented Debt encompasses all government and public-sector guaranteed debt, thus covering the entire non-financial public sector as well as the public development banks. The components of the augmented debt are reported on a quarterly basis, for information purposes. Budget laws set legal approved ceilings for most of them on an annual basis. (Source: IMF. Mexico: Selected Issues, IMPF Country Report No. 04/418, December 2004).

[167] In 2001, Hacienda (SHCP) began officially using a Public Sector Borrowing Requirements or PSBR broader measure of the deficit. Budget documents include amortization and interest on the debt incurred in connection with direct PIDIREGAS projects that have been completed. The PSBR includes all direct PIDIREGAS investment expenditure (net of amortization) plus the accrued interest on direct liabilities (net of interest expenditure included in the budget). With respect to conditioned PIDIREGAS projects, investment and debt service are not included in the PSBR, nor accounted for as debt in public debt statistics. Outlays for these projects are recorded as operating expenses on a cash basis once services are provided.

20. Although there is no explicit limit or ceiling on PIDIREGAS debt *ex ante* (the only mention in Mexican laws is that PIDIREGAS deserve special treatment and are subject to Congressional approval[168]), budget laws set legally-approved ceilings for most items of public debt—including PIDIREGAS—on an annual basis. According to SHCP, the scheme of infrastructure investment financing through PIDIREGAS has already reached a limit and it will soon be necessary to find alternative means of financing.[169] Indeed, the solution to the financing of required investments in the energy sector will require strategic measures and instruments that do not increase the stock of country's contingent liabilities.

Fuel Pricing Policies Have an Impact on Competitiveness

21. Fuel pricing in Mexico is established by the government and results in the over and under-pricing of specific fuels and fuel products, which create market distortions with important economic and environmental consequences. Low levels of productive efficiency, due in part to the fact that PEMEX lacks the resources to modernize its refining capacity, have a direct impact on fuel costs and the volume of fuel imports.

22. Relative to true demand, there is a shortage in Mexico of light products (e.g., diesel oil) and a surplus of heavy products (mainly fuel oil). Subsidized fuel oil promotes the maintenance and dispatch of old generating capacity in the electricity sector, leading to lower efficiency and reliability with direct effects on competitiveness across the economy. The over-pricing of diesel and gasoline on the other hand increases the operating costs of the industrial and commercial sectors, also with effects on competitiveness.

III. Description of Relevant Programs and Strategies

Energy Sector Program

23. The Energy Sector Program 2001-2006 (PROSENER) defines the general policies and strategic lines of the Fox's administration for the electricity and hydrocarbons sectors. The program rests on seven principles which include 1) national ownership, 2) security of supply, 3) social contract, 4) sector modernization, 5) private sector participation, 6) sustainable development, and 7) commitments to future generation.

The program outlines the following nine strategic objectives:

1. Ensure appropriate security-of-supply levels in a system with international quality standards, competitive prices and world class public and private companies.
2. Offer a solid judicial framework to develop the energy sector, providing economic agents with judicial security and certainty, ensuring at the same time national ownership and State leadership.
3. Foster the participation of Mexican enterprises in energy infrastructure projects.
4. Increase the use of renewable energy sources and promote energy efficiency and conservation or savings.
5. Use nuclear energy – and pacific applications - in a safe way maintaining the highest international standards.
6. Become a sector leader in risk prevention for productive operations.

[168] Mexican laws concerning PIDIREGAS may be obtained at www.diputados.gob.mx/leyinfo.
[169] See "Muestran Pidiregas agotamiento: SHCP", *Reforma*, September 15, 2004.

7. Become a sector leader in environmental protection.
8. Become leaders in the generation, development, assimilation and application of scientific and technological knowledge, as well as on the development of highly qualified human resources to promote the sustainable development of the sector.
9. Increase and strengthen the international energy cooperation and participate in the supply and demand sides of global energy markets.

24. The PROSENER describes in detail what actions would be followed during the period 2000-20006 to achieve the ten objectives. Specific strategies are listed in Box 17 below:

Box 17: Prosener 2000-2006 General Strategies

PETROLEUM INDUSTRY

1. Transform PEMEX's industrial complexes and productive chains into a world class petroleum industry
2. Increase hydrocarbons reserves and establish a program of exploration-exploitation-extraction while protecting the environment
3. Strengthen PEMEX's refining capacity
4. Ensure the necessary volume of natural gas supply at competitive prices
5. Promote structural changes in the LPG market to ensure sufficient supply
6. Design and implement policies to strengthen PEMEX's petrochemical industry
7. Evaluate the international oil policy of the country and, design and implement negotiation strategies to maximize revenues from oil export operations
8. Develop a culture of excellence and continuous improvement within State owned enterprises
9. Design a new fiscal regime that allows PEMEX to generate profits, conduct necessary investments, and guarantee an annual income to supply the fiscal sector
10. Improve instruments of regulation to enhance and complement the existing regulatory framework with the intention of adjusting to the changes occurring in the natural gas and LPG industries and the experience of permit holders
11. Promote the participation of the social and private sectors in the refining industry in order to complement the supply needs of oil products in the medium to long term
12. Promote the implementation of legal and regulatory frameworks to increase the certainty of public and private investments in order to guarantee the expansion of the electricity sectors as needed

ELECTRICITY INDUSTRY

1. Promote the liberalization of the sector
2. Promote a State policy that a) redefines and distributes subsidies targeting the poor, b) supports generators that protect the environment, c) supports rural electrification projects
3. Adopt labor best practices to achieve better coordination between workers, managers, and users
4. Extend the electricity service to areas with high poverty levels
5. Promote a change in the fiscal regime of electric enterprises
6. Provide legal certainty to participants in the sector and contribute to ensure State ownership and management
7. Promote the development electric and thermal self-supply projects in both the social and private sectors, particularly in the industrial sector and the government
8. Develop programs, projects and actions to exploit renewable energy sources
9. Develop programs, projects and actions to promote energy savings
10. Maintain and improve the technical capacity of human resources and materials to ensure security of nuclear and radioactive installations
11. Include legal and feasible technological solutions to the problem of radioactive waste
12. Strenghten the judicial framework of the nuclear industry
13. Maintain and strengthen the Laguna Verde Emergencies Plan of External Radiology (PERE)

GENERAL TO THE ENERGY SECTOR

1. Promote complementarities between public spending and private investment in activities allowed by present and future legislation in order to guarantee a sustainable economic growth
2. Promote the legal and regulatory changes necessary to increase social and private sector participation in the national energy sector. Create conditions of certitude, clarity and transparency in the activities of all participants while guaranteeing national ownership and State mandate in priority areas
3. Strengthen the security, quality and safeguard processes of energy installations
4. Strengthen the regulatory framework to increase industrial safety across the sector
5. Develop an energy sector environmental policy
6. Maintain and strengthen a policy of cleaner fuels
7. Improve regulatory compliance associated with environmental practices and protection
8. Promote socially sustainable projects
9. Mitigate greenhouse gas emissions
10. Promote and increase investment in research and technology development in the sector
11. Consolidate a group of high level researchers to work in the energy sector institutes and build capacities
12. Participate and adopt leadership positions in international fora and promote key strategic alliances with other countries
13. Plan, design, and conduct technical and economic cooperation projects with the USA and Canada and the NAFTA commissions and working groups as well as with other countries, regions and international agencies
14. Implement a model of quality and innovation to transform the sector into a competitive system that promotes the country's economic development, social welfare and government efficiency
15. Improve the transparency and public disclosure (rendicion de cuentas) with regards to the use of public resources in the energy sector

Program of Investments Electricity Sector (POISE)

25. The Federal Commission of Electricity (CFE) prepares every year a prospective ten year program of works and investments for the electricity sector (known as POISE). This program is used to negotiate the annual CFE budget with Hacienda for congress approval. The POISE program integrates security-of-supply and diversification policies considering least cost economic and financial considerations. The program is based on a number of models used internationally to plan the evolution of electricity sectors. CFE has also developed its own domestic models to simulate scenarios and the future composition of the capacity stock.

Program of Investments Natural Gas Sector

26. The Mexican Petroleum Company PEMEX also prepares every year a ten year program of works and investments. The program includes an in-depth analysis of the dynamics of international natural gas markets as well as an evaluation of the demand and supply sides of the domestic market. The program place special emphasis in natural gas savings, energy efficiency, cogeneration and other considerations.

Energy Regulatory Commission (CRE)

27. In 1993, the GOM created by decree the CRE as an advisory body on gas and electricity issues. In October 1995, the Energy Regulatory Commission Act (LCRE) transformed CRE into an autonomous agency in charge of regulating the natural gas and electricity industry. The CRE has a budget determined by SENER and SHCP and has technical and operational autonomy. However, despite the number of key tasks entrusted to CRE,[170] the commission does not have the authority to establish tariffs nor attributions

[170] CRE is empowered to perform the following tasks: a) Participate in the setting of tariffs for wholesale and final sale of electricity, b) Issue permits to generate electricity under the schemes allowed by the Electricity Law, c) Review and approve the criteria for determining fees related to public electricity service, d) verify that entities

for regulating the efficiency and performance of incumbent utilities (i.e. PEMEX, CFE). As of today, the CRE has not been vested with enough independent authority to define the rules for market operations, set tariffs and regulate natural monopolies. However, the CRE does have authority to establish natural gas tariffs.

Federal Commission for Regulatory Improvement (COFEMER)

28. With the reforms to the Administrative Procedures Federal Law in May 2000, COFEMER was created as an autonomous body of the Ministry of Economy. The COFEMER mandate includes the review of the federal regulatory framework, the evaluation of regulatory practices and the promotion of regulatory improvement and sound reforms across sectors. COFEMER's mission is two fold: ensure transparency in the regulatory process and ensure the balance between regulatory costs and benefits. The commission uses four important instruments to conduct its activities: a) a Federal Registry of Formalities and Services (RFTS), b) Collaborative Agreements with States and Municipalities and the Accelerated Business Start Up System (SARE), c) Regulatory Impact Analyses (RIAs) and d) Regulatory Reform Programs (PMRs).

COFEMER Agreement

29. On August 11, 2005, the Federal Official Gazette (DOF) published the COFEMER agreement that establishes the rules to present programs associated with regulatory improvement across sectors and decentralized government bodies of the Federal Public Administration. For the energy sector the agreement establishes the actions included in Box 18.

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responsible for the public electricity service purchase electricity at lowest cost and offer optimum stability, quality, and safety of electricity service, e) approve the methodologies for calculating payments for the purchase of electricity used in public service, and f) approve the methodologies for calculating payments for electricity transmission, transformation and delivery services. In the natural gas sector, CRE is empowered to grant permits for transportation, storage, and distribution of natural gas and LPG pipe transportation and distribution; approve tariffs and issue the methodology to determine rates for those services, and issue first hand sale price methodology of natural gas and LPG.

Box 18: COFEMER Agreement August 11, 2001

National Competitiveness Agenda, Energy Sector

SENER with the support of COFEMER and in close coordination with CRE, will conduct the following activities:

I. Modify the regulatory framework of the Electricity Law (LSPEE) with regards to economic transfers on new connections. Industries requesting the electricity service have to provide CFE with economic transfers (*aportaciones*) to compensate for embedded costs associated with line extensions and other works. New measures clearly define rules for the imposition of economic fees or transfers.

II. Perform independent transparent regulatory accounting of electricity tariffs and other works and services, based on best international practice. This measure will disclose the economic and operative performance of each of the plants that compose the generating stock as well as the fixed and variable costs associated with the transmission and distribution segments.

III. Implement transparency measures and public disclosure (rendicion de cuentas) focused on State owned electricity enterprises and subsidiaries (CFE, LFC). These include the disclosure of a) dispatch rules and operations, b) short and long run marginal costs and c) managerial, economic and quality of service indicators (among others) to SENER, SHCP and CRE.

IV. Implement transparency measures and public disclosure (rendicions de cuentas) focused on State owned oil enterprises and subsidiaries (PEMEX): This includes a) the implementation of performance and benchmarking indicators (managerial, fiscal and economic efficiency, technical, environmental and other) for each of the sub-sectors.

V. Facilitate the interconnection of permit holders in the electricity network and establish policies to foster self-supply options. This measure will support private sector initiatives for self-supply and facilitate the provisions for grid interconnection.

VI. SENER will issue new dispositions to regulate the quality of processed natural gas and commercialized basic petrochemical products: thereby ensuring minimum quality standards for raw materials key to the manufacturing of diverse products.

VII. Derived from the actions and outcomes of previous activities I-VI, SENER will determine the need to prepare proposals for the modification of the regulatory framework of the Electricity Law (LSPEE) and the rule of law, specifically Article 27 of the Constitution on the oil sector.

VIII. On transparency: In consistency with the Transparency Law, all information derived from previous actions will be publicly disclosed.

30. CRE is in charge of regulatory accounting for the natural gas sector. Currently, it is not in charge of regulatory accounting for the electricity sector, but it could be if a new CRE law is passed. In particular, the COFEMER agreement sets the basis for a number of unprecedented actions including the implementation and oversight of a transparent tariff policy in the electricity sector.

IV. KEY ISSUES RELATED TO COMPETITIVENESS[171]

- The contribution of energy costs to the total production costs of manufacturing industry products (as an aggregate) is 10.5 percent. This is comparable to labor costs, which are in the range of 4 – 15 percent.
- For energy intensive industries (such as cement, glass, steel, aluminum and others), energy costs represent between 8 and 60 percent. In Mexico, 30-40 percent of total production costs of the cement industry represent expenditures in electricity and fuels.

[171] This section draws on interviews from: Arizmendi, Nelson. Presidente de la Comision de Energeticos, Confederación de Camaras Industriales (October 2005); Newell, Roberto, Instituto Mexicano de Competitividad, Mexico (October 2005); Abdel, Guillermo, Centro de Estudios de Competitividad, ITAM, Mexico (October 2005); and Lelo de la Rea, Francisco, Centro de Estudios Economicos Sector Privado, Mexico (October 2005).

- The quality and price of the products from energy-intensive industries are of fundamental importance, as they are used as raw materials in the manufacturing of diverse other products. For instance, the price of cement in Mexico is about two times the price in the US, the European Union and other countries around the world.

- In contrast with other OECD and developed countries, the prices of electricity, natural gas, fuel oil and other fuels have gradually and substantially increased over the last decade. The prices of fuels and electricity in Mexico are among the highest of the world.

- Steady increases in energy prices have had serious effects on the costs of production across different industries. In the manufacturing sector (which is not necessarily energy intensive), the average costs of energy as a percentage of total production costs increased by 2.25 percent points over the period 1995-2002.

- The quality of the electricity service is poor compared to other countries. The quality of the electricity service delivery has important effects on the competitiveness of companies. For instance, service interruptions and voltage fluctuations affect the overall productivity levels of industries and prevent the installation of modern electronic equipment which requires robust service delivery.

- Over the last five years there has been a steady fall in the number of energy-intensive processing facilities. This has been largely attributed not only to the increasing costs of energy, but to the uncertainty levels regarding availability of natural gas and other fuels.

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