

Turbocharging Mexico's Innovation Economy

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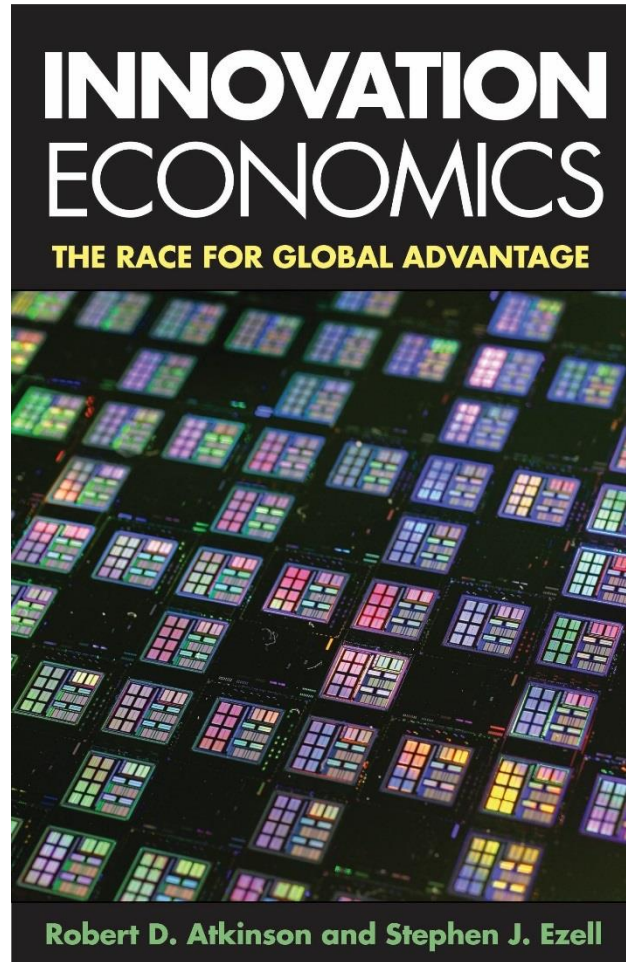
About ITIF

- Independent, nonpartisan research and education institute focusing on intersection of technological innovation and public policy, including:
 - Innovation and competitiveness
 - IT and data
 - Telecommunications
 - Trade and globalization
 - Life sciences, agricultural biotech, and energy
- Mission to formulate and promote policy solutions that accelerate innovation and boost productivity
- Ranked by University of Pennsylvania as top science and technology think tank in United States and number two in world

Today's Presentation

- 1 How Countries Can Best Maximize Innovation
- 2 How Mexico Can Get Key Innovation Policies Right
- 3 Turbocharging Life-Sciences Innovation in Mexico

Innovation Economics: The Race for Global Advantage



Rob Atkinson

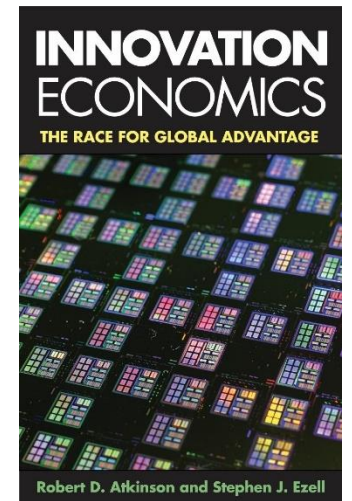


Stephen Ezell

Yale University Press
September 2012

Get the “8 I’s” of Innovation Policy Right

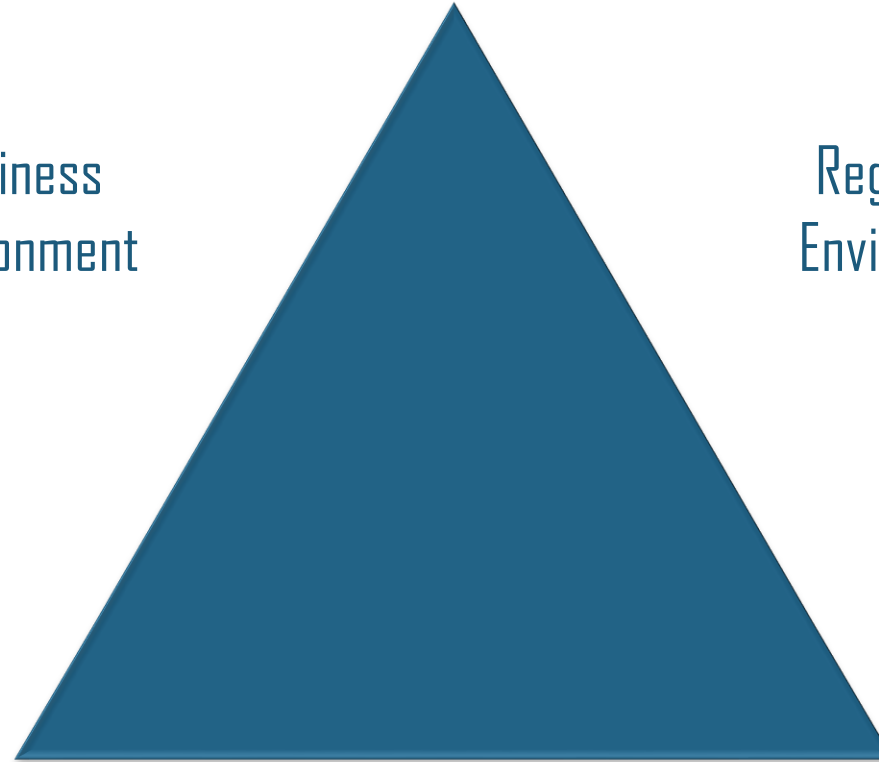
1. Inspiration
2. Intention
3. Insight
4. Institutions
5. Investment
6. Incentives
7. Intellectual Property
8. International



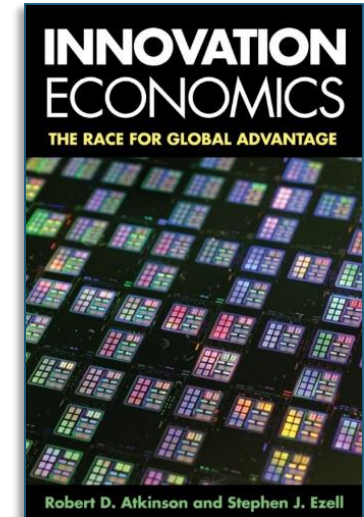
Get the “Innovation Triangle” Right

Business
Environment

Regulatory
Environment



Innovation/Technology Policy
Environment



Business Environment



1. High levels of entrepreneurship
2. Access to risk/venture capital
3. Embrace dynamic churn and change (e.g. creative destruction)
4. Cultural willingness to experiment and take risks
5. Strong management skills in enterprises

Regulatory Environment



1. Transparency and rule of law
2. Protection of intellectual property (and other property rights)
3. Ease of starting a business
4. Pro-competition regulatory policies
5. Flexible labor policies

Innovation/Technology Policy Environment



1. Funding for research, especially commercially oriented research
2. Incentives to invest in R&D, capital equipment, workforce training
3. Universities strong not just in liberal arts but engineering
4. Supporting technology transfer from academia to industry
5. Strong STEM education system

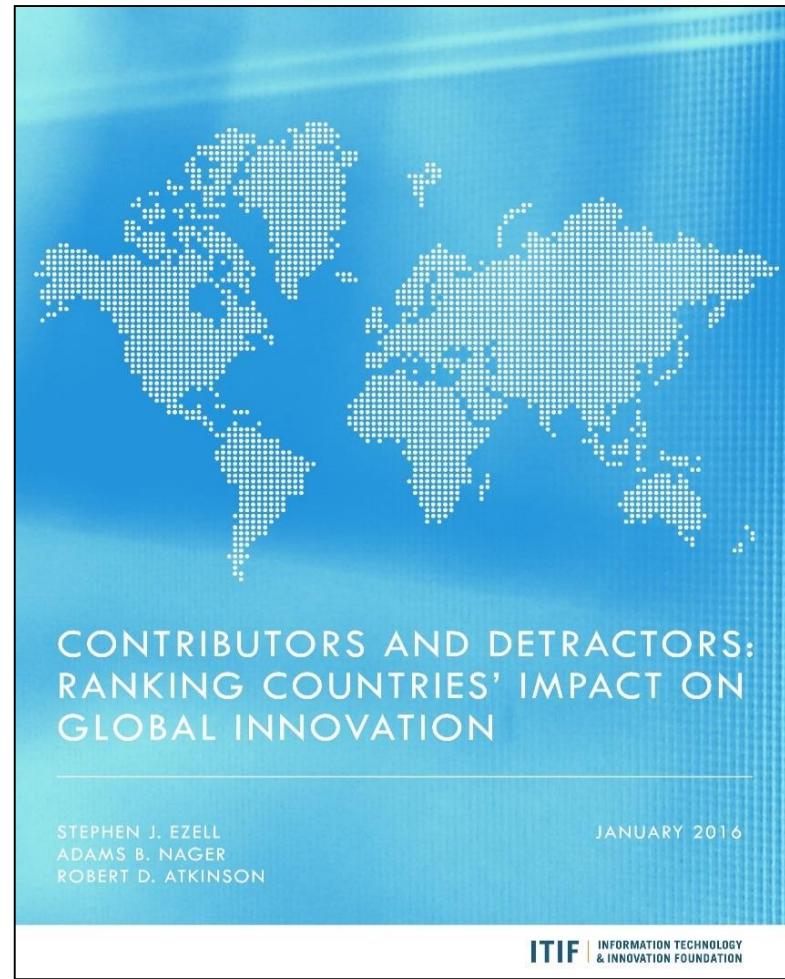
The Distinct Nature of Innovation-Based Industries

1. They compete by inventing *next-generation* products and services.
2. They embody and depend on intellectual property.
3. They are characterized by very high initial fixed costs (e.g., R&D/design), but low marginal costs...which
4. Means they need access to large global markets.

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How Does Mexico Rank on Global Innovation Indices?



Top 3

Overall

1. Finland
2. Sweden
3. United Kingdom

The Americas

10. United States
25. Canada
40. Chile
41. Brazil
45. Colombia
46. Costa Rica
48. Peru
- 50. Mexico**
56. Argentina



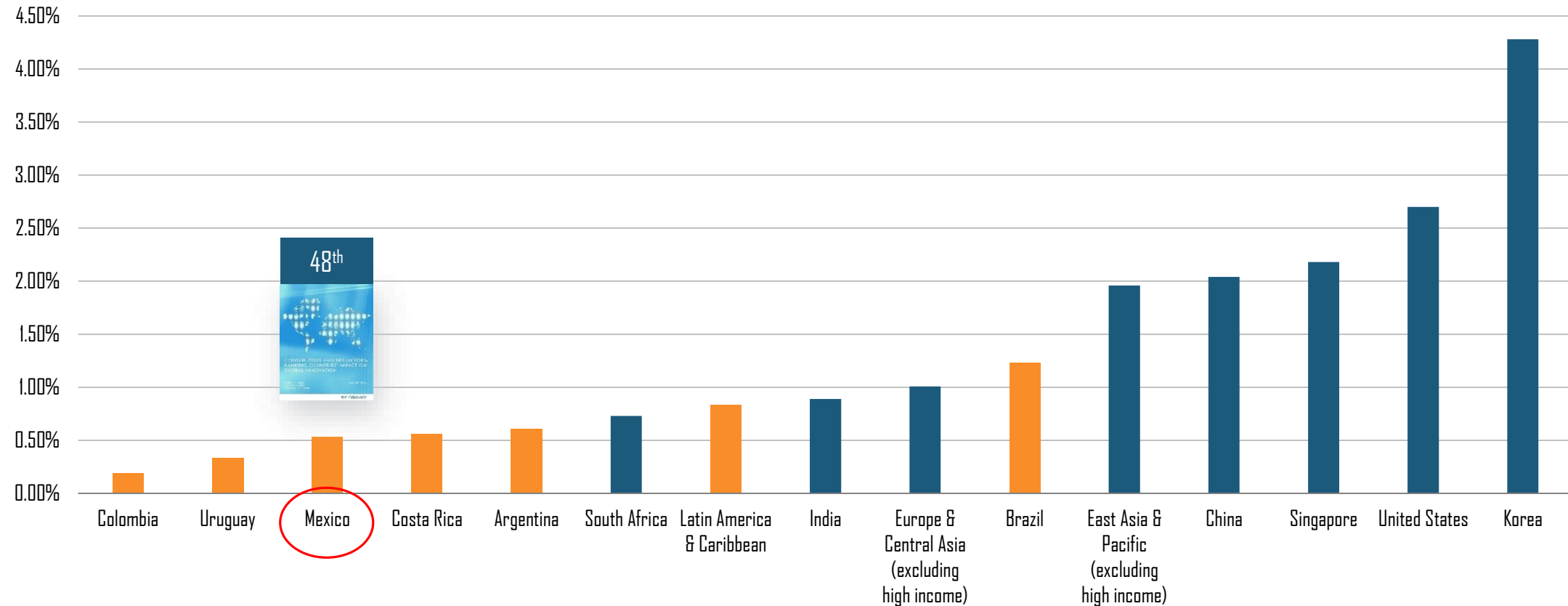
Key Innovation Priorities for Mexico

1. Increase investment in research and development.
2. Leverage tax policy to stimulate R&D and innovative activity.
3. Increase investment in education.
4. Continue to bolster and support entrepreneurship.
5. Strengthen IP rights.
6. Continue to embrace trade and FDI liberalization.

Increase Mexico's National R&D Intensity



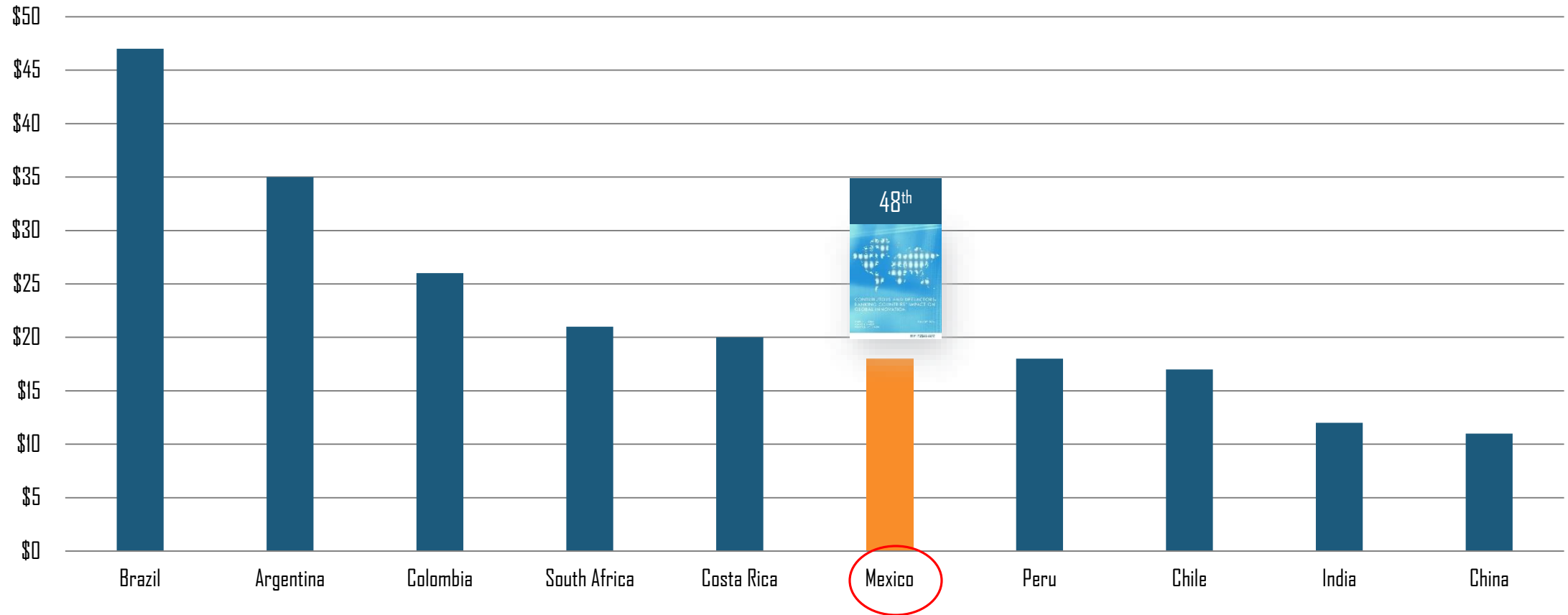
R&D Investment as a Share of GDP



Increase Government Funding of University Research

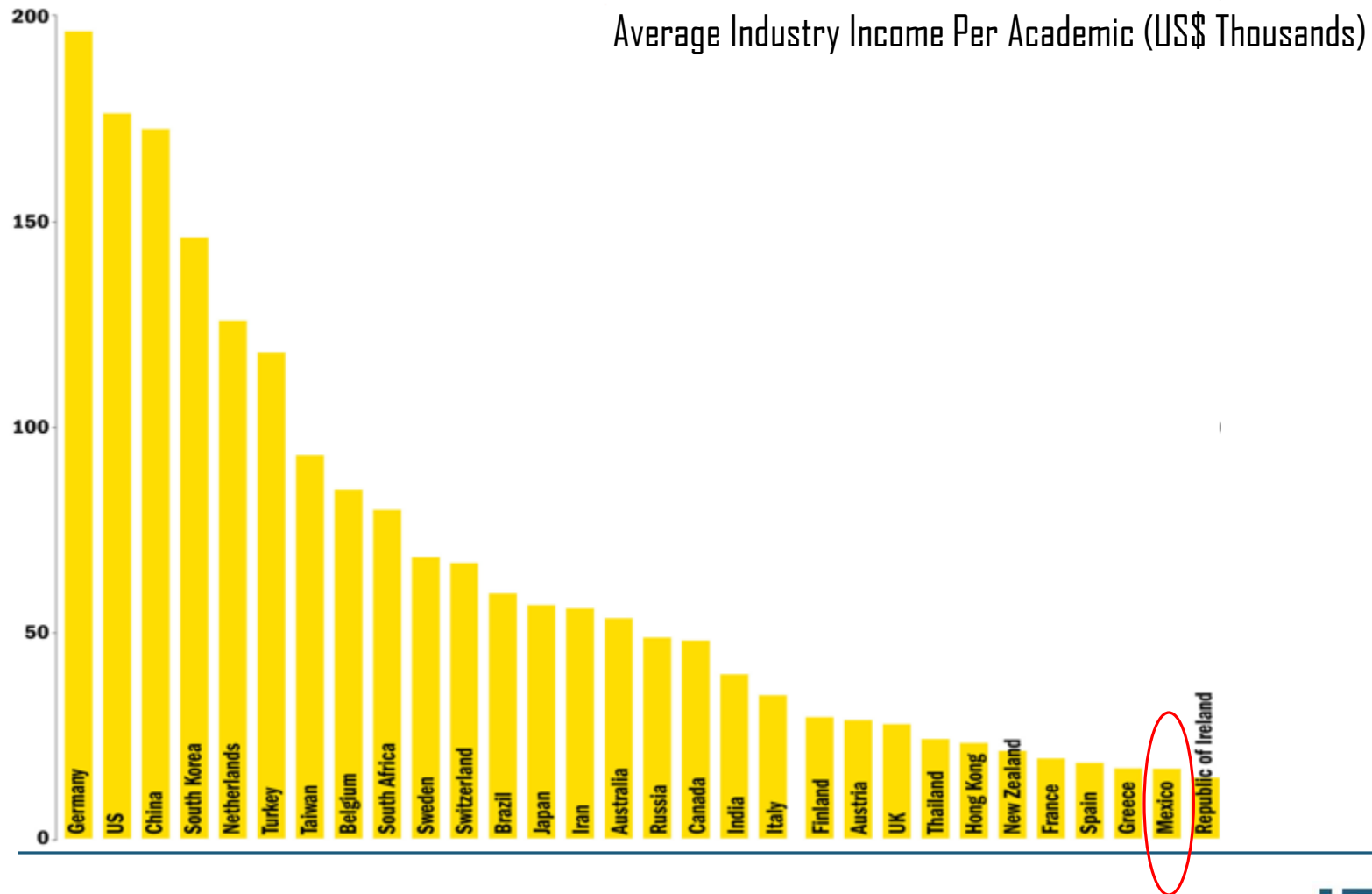


Government Funding of University Research (per capita)



Source: ITIF, *Contributors and Detractors: Ranking Countries' Impact on Global Innovation*, 2016

Increase Industry-Funded University Research

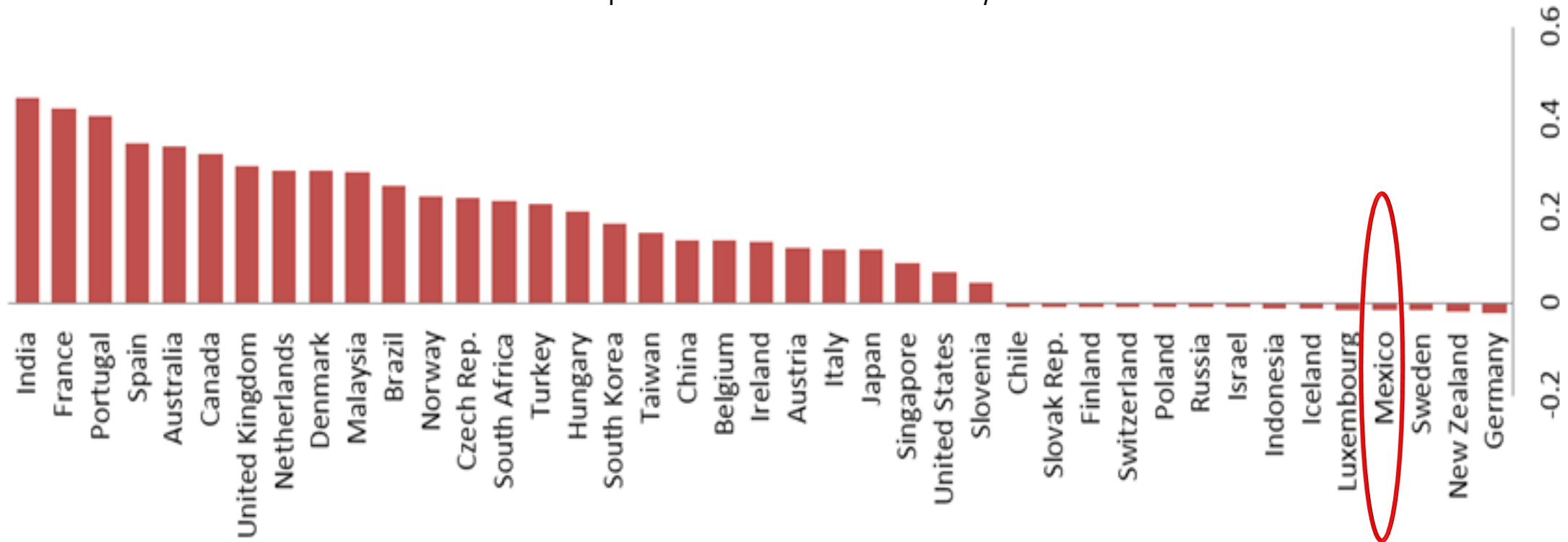


Source: THE DataPoints © THE data@timeshighereducation.com.

Effective Tax Policies Can Help Spur Mexican R&D



Comparative R&D Tax Credit Generosity



Source: We're 27th! The United States Lags Far Behind in R&D Tax Credit Generosity



Effective Tax Policies Can Help Spur Mexican R&D

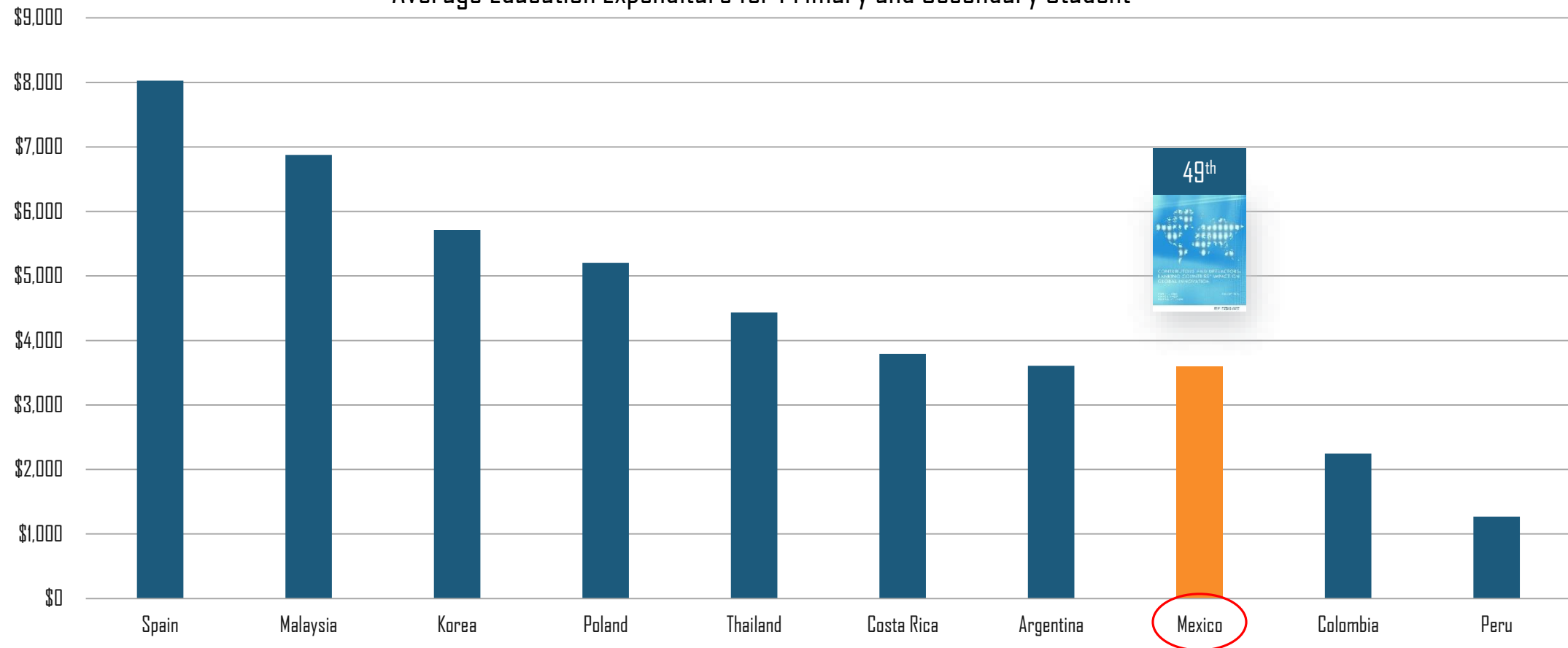
- ✓ Generous R&D tax credits (e.g., Brazil, China, India, Malaysia).
- ✓ Robust collaborative R&D tax credits (Chile, Thailand, Turkey).
- ✓ Patent boxes (China, Hungary).

Sources: ITIF, *Creating a Collaborative R&D Tax Credit*, ITIF, *Patent Boxes: Innovation in Tax Policy and Tax Policy for Innovation*

Invest More in Human Capital/Education



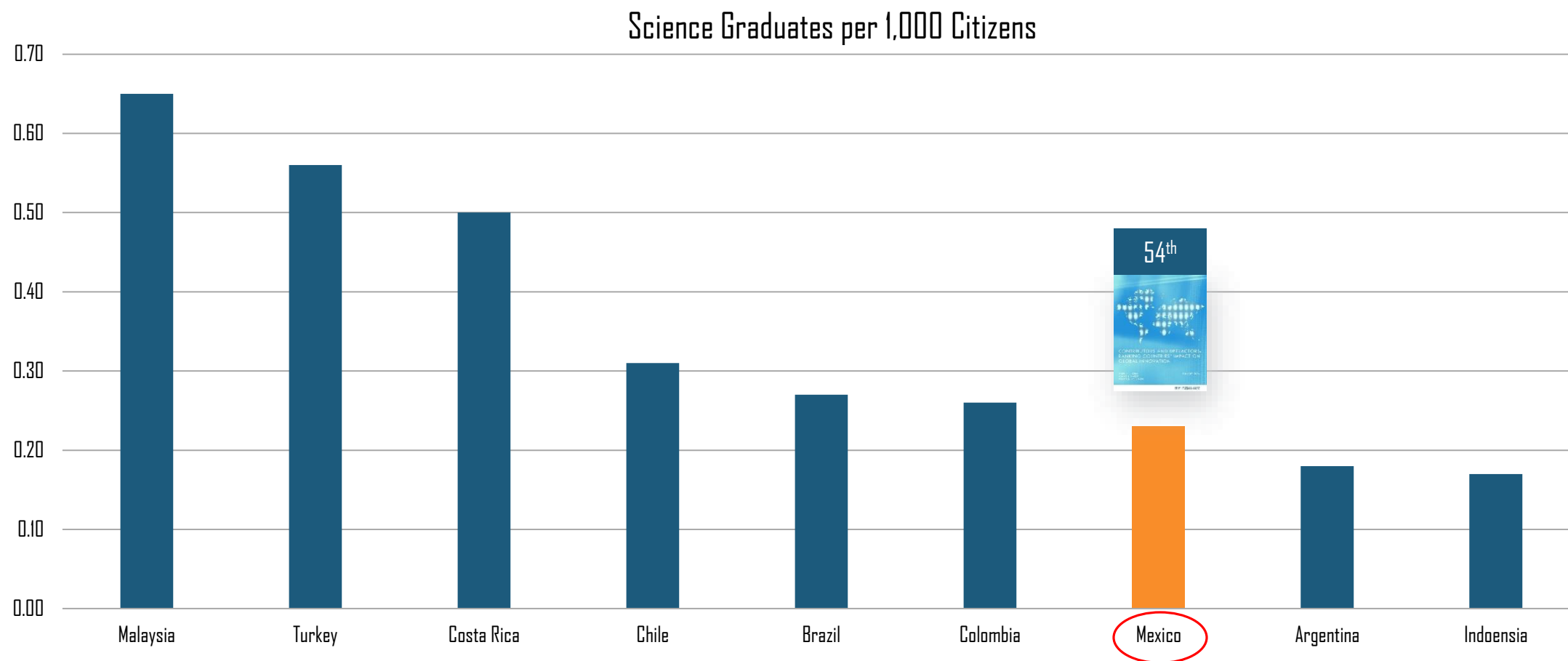
Average Education Expenditure for Primary and Secondary Student



Source: ITIF, *Contributors and Detractors: Ranking Countries' Impact on Global Innovation*, 2016



Increase the Number of Science Graduates



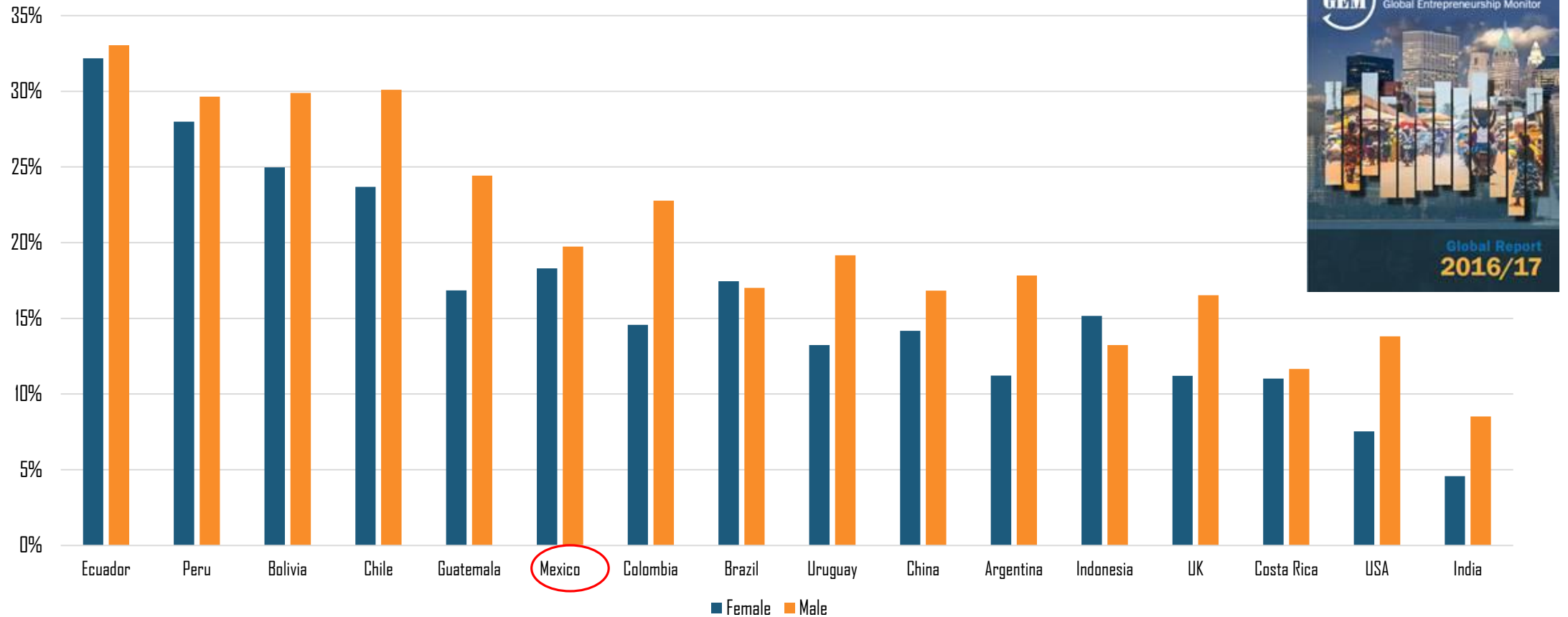
Source: ITIF, *Contributors and Detractors: Ranking Countries' Impact on Global Innovation*, 2016

How Mexico Is Supporting Entrepreneurship

- Launched the National Entrepreneur Institute.
- Introduced a joint Entrepreneurship and Innovation Council to "strengthen the North-American high-impact entrepreneur ecosystem."
- CONACYT University and Technology Transfer Centers Program.
- Universities increasingly embracing/teaching entrepreneurship.

Women Remain an Underutilized Innovation Resource

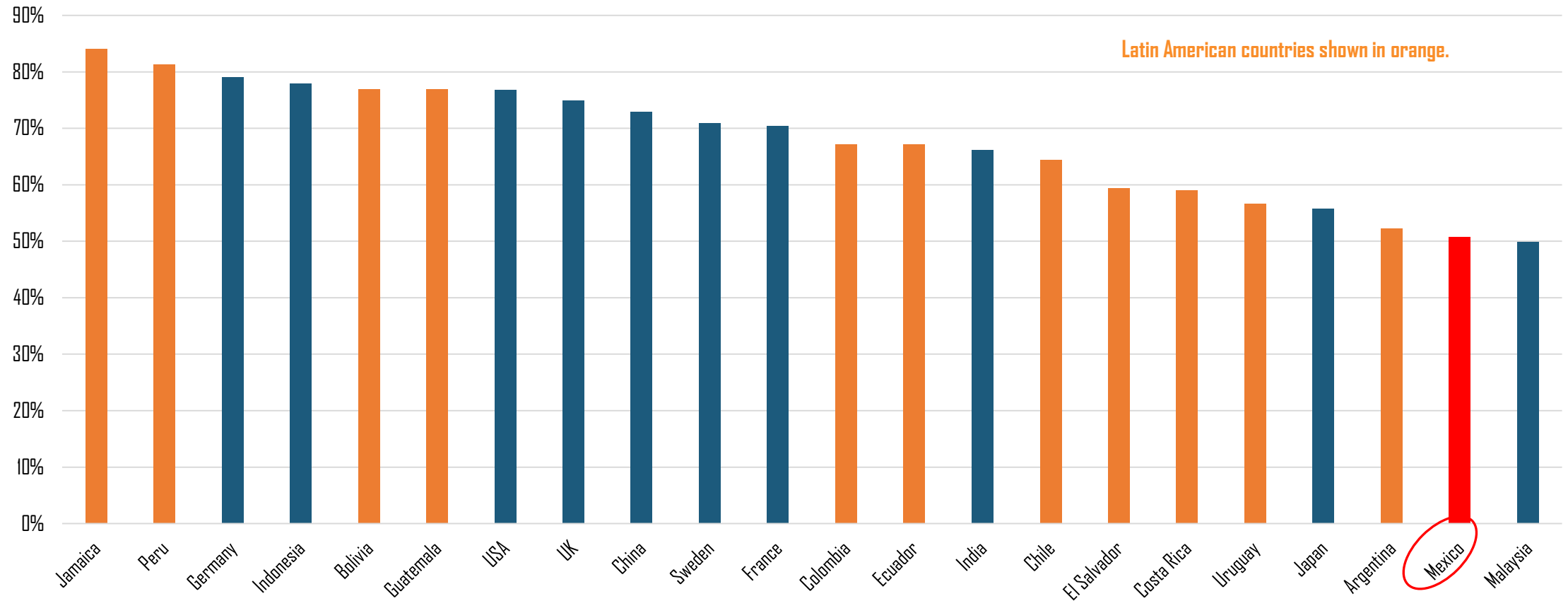
Total Early-Stage Entrepreneurial Activity, Select Countries



Source: 2015/2016 Global Entrepreneurship Monitor Report

Encourage Entrepreneurship and Risk Taking

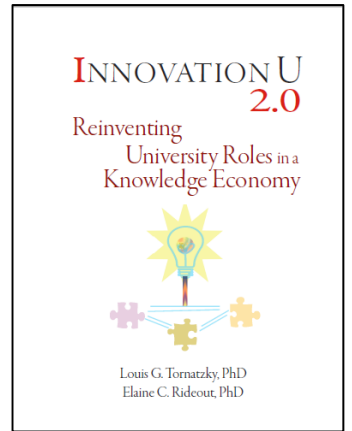
"Successful Entrepreneurship Enjoys A High Societal Status"



Source: 2015/2016 Global Entrepreneurship Monitor Report

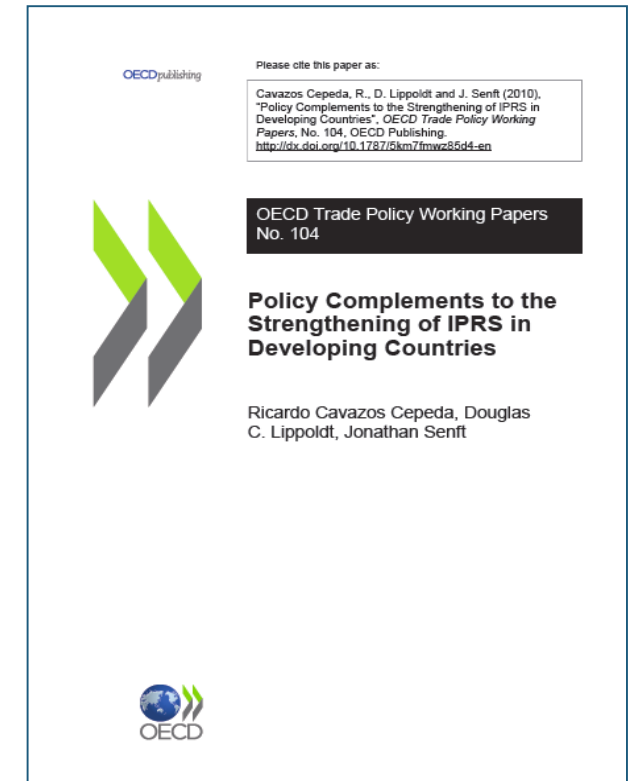
Reform University Policies to Spur Innovation and Entrepreneurship

- ✓ Give academic researchers ownership rights of IP deriving from government-funded research (e.g., "Bayh-Dole").
- ✓ Give students rights to the IP they invent at universities.
- ✓ Increase *permeability*. Take faculty members' commercial experiences into account in tenure decisions; allow faculty to suspend tenure to pursue commercialization opportunities.
- ✓ Support the development of university incubators.
- ✓ Develop university entrepreneurship rankings.



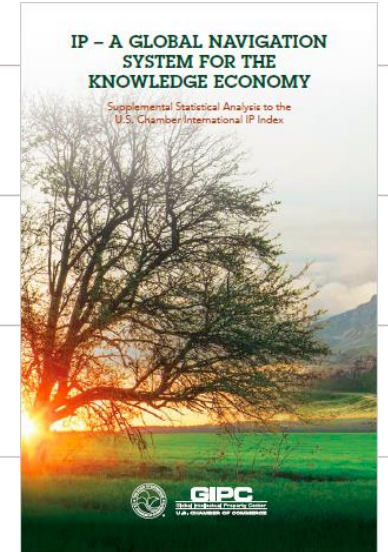
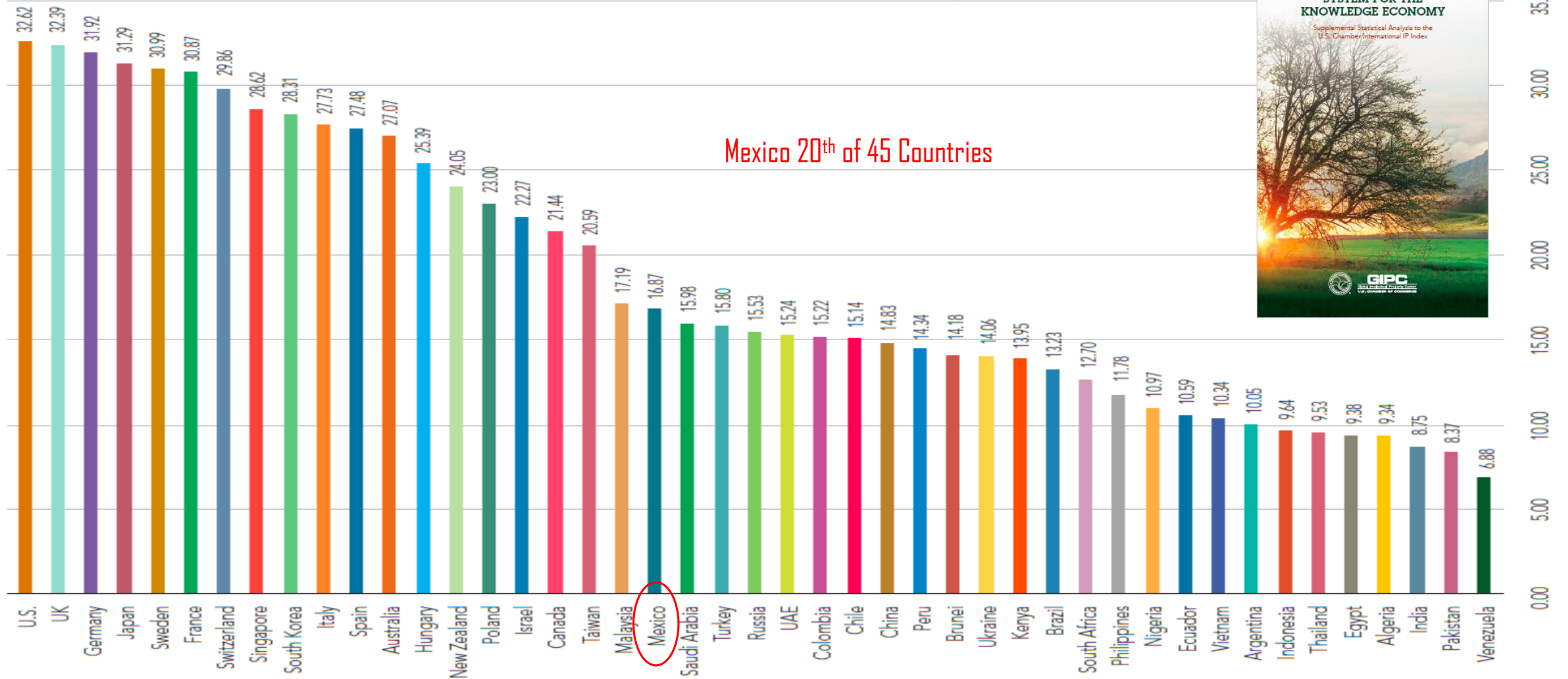
IPRs Are Vital to Innovation, As They:

1. Create incentives for domestic innovation.
2. Enable a virtuous cycle of innovation.
3. Induce knowledge spillovers that help others to innovate.
4. Promote the international diffusion of technology, innovation, and knowhow.
5. Boost domestic levels of exports, R&D, and FDI.



Strengthen Intellectual Property Rights Protections

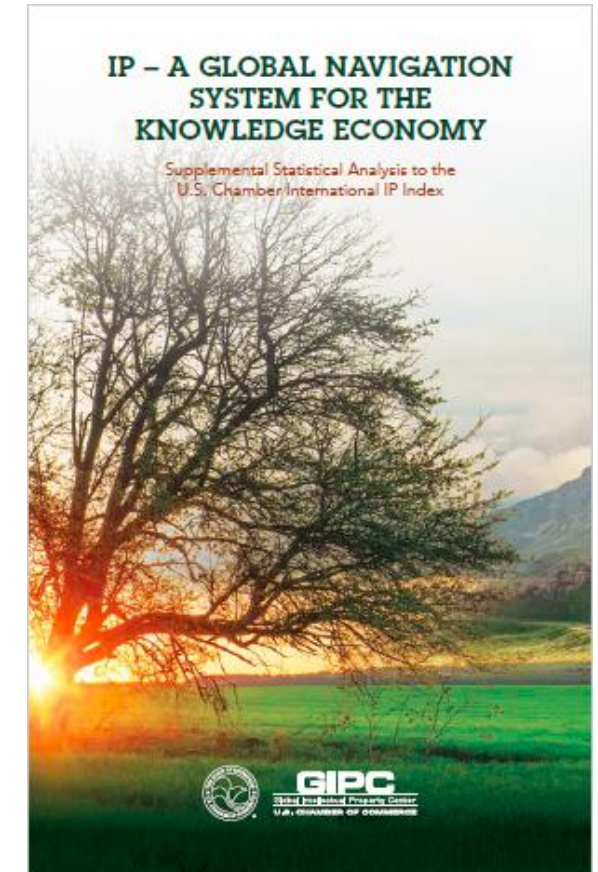
2017 GIPC International IP Index Rankings



Leadership in Biotechnological Innovation Requires Robust IP Protection



Source: Global Intellectual Property Center, *IP-A Global Navigation Center for the Knowledge Economy*

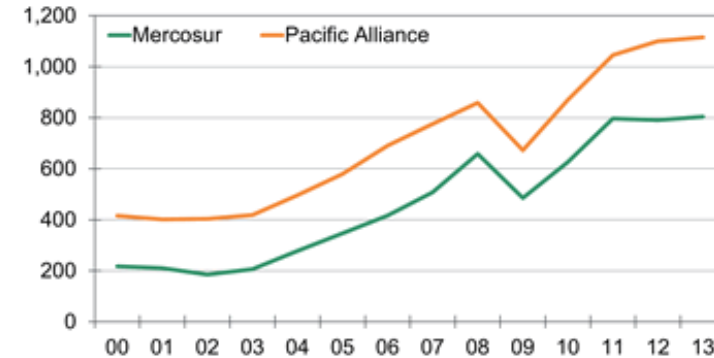


Mexico Leading the Charge for Trade Liberalization



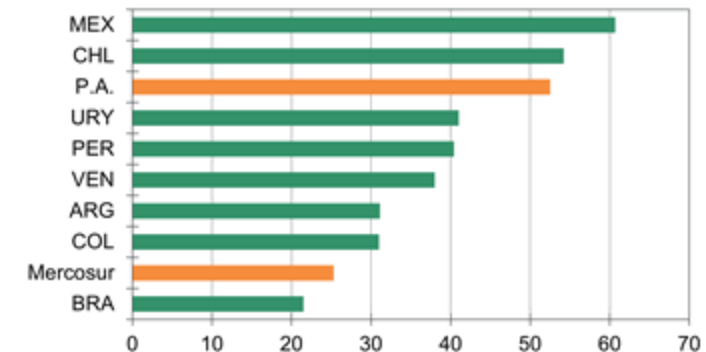
Pacific Alliance Exports Top Mercosur's

Total trade (exports + imports), USD bil



Pacific Alliance Boasts an Open Economy

Overall trade over GDP, %



Source: The Economist; Moody's Analytics/Economy.com

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Why Life-Sciences Innovation Matters

- Helping citizens live longer, healthier lives generates economic benefits.
 - Improvement in U.S. life expectancy from 1970 to 1990 added \$2.8 trillion to U.S. productivity.
 - This equaled \$12,000 per U.S. citizen, per added year of life expectancy.
- Opportunity cost of missing work (especially for chronic diseases)
 - Keeps many out of work, lowers productivity, contributes to absenteeism.
- Eliminating heart disease valued at \$48 trillion, curing cancer \$47 trillion; Alzheimer's disease will cost \$1 trillion a year by 2050.

Mexico's Robust Life-Sciences Sector

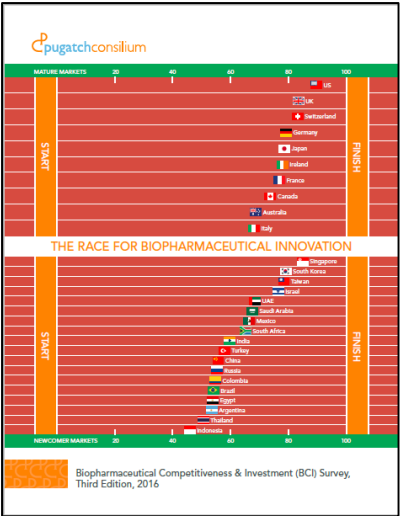
Mexican pharmaceutical industry

Mexico has the 2nd largest biopharmaceutical market in Latin America and the 11th largest in the world.

Proportion of GDP	1.2%	Growth of 0.7% from 2007
Proportion of Manufacturing GDP	6.8%	Significant manufacturing sector in Mexico
Direct Jobs	86,277	37% linked to manufacturing
Indirect Jobs	313, 605	Includes jobs in other companies from which the pharmaceutical industry buys goods or services
Sector growth	4.3%	Between 2007 and 2013
Economic units	718	Companies located mainly in Mexico City, Jalisco, Estado de México and Puebla.
Multinational biopharmaceutical industry	20 of 25	Top multinational biopharmaceutical companies operate in Mexico
Investment in R&D	US\$500m by 2025	Increase of US\$160m from 2015
Biotechnology drugs	65% by 2030	Proportion of patent applications for new medicines

Sources: Mexican Health Review 2015, Marketline, INEGI, COFEPRIS, Denue and CANIFARMA. Courtesy Fundacion IDEA.

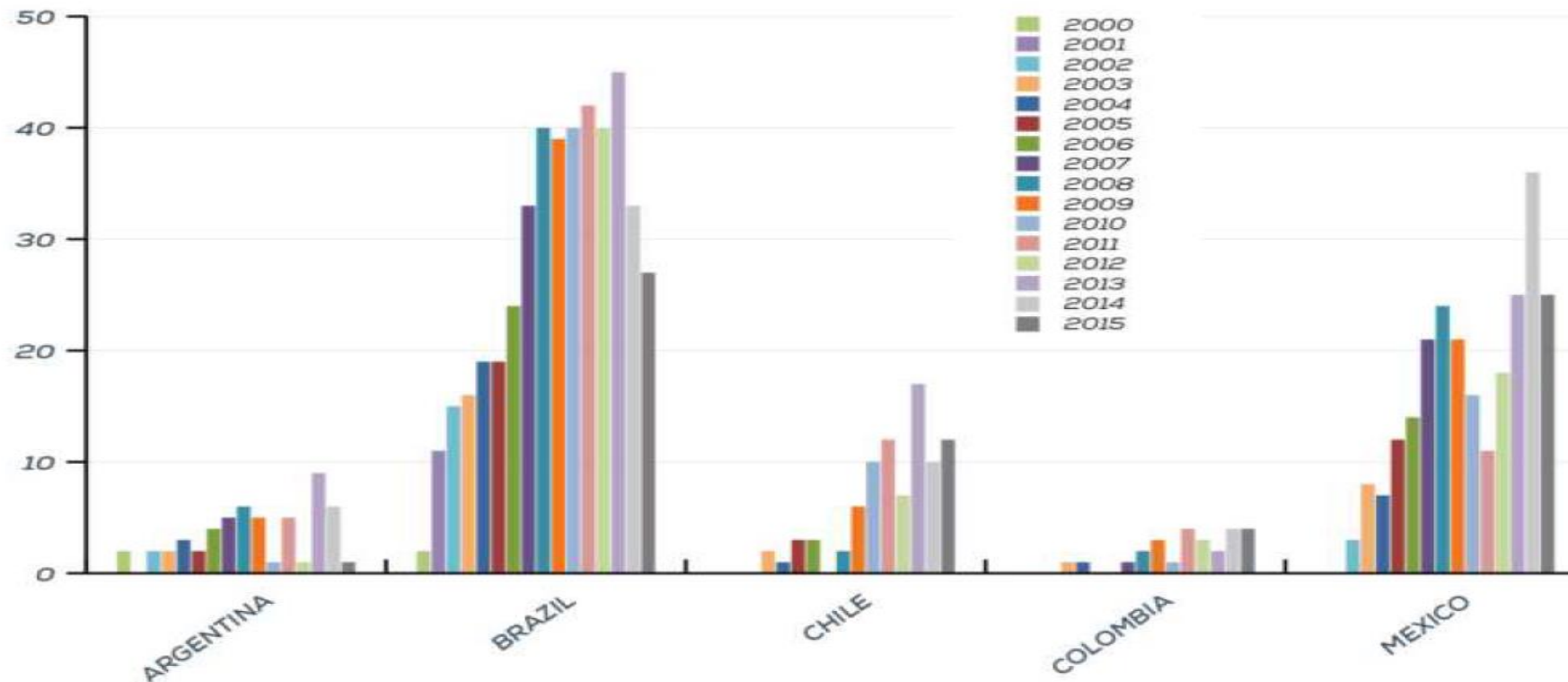
How Mexico's Life-Sciences Sector Fares Globally



Source: *The Race for Biopharmaceutical Innovation: BCI Survey 2016*

Increasingly Fertile Environment for Life-Sciences Innovation

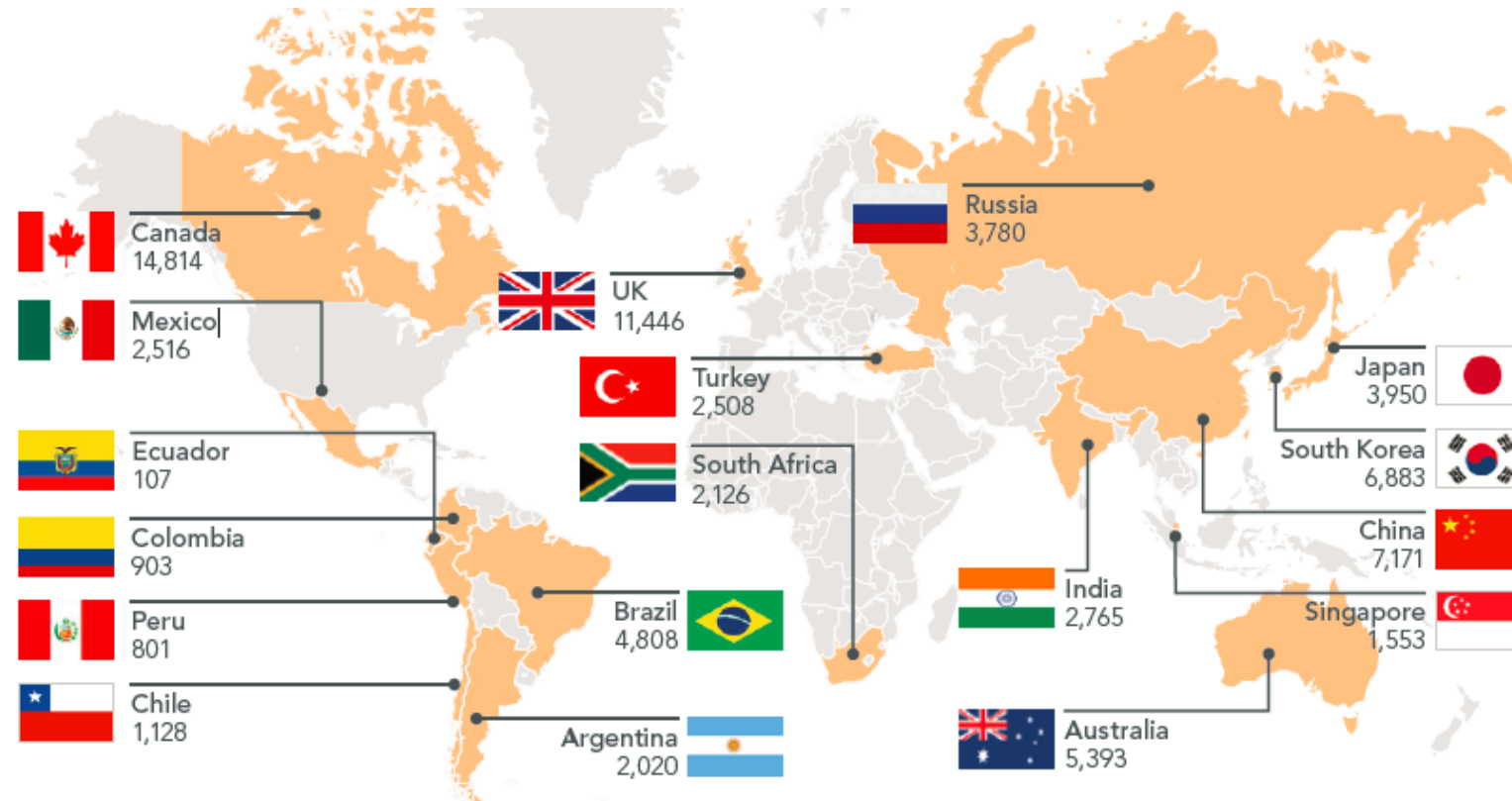
Pharmaceutical Patents Filed Through Patent Cooperation Treaty, 2000-2015



Source: WIPO; The Geneva Network

Increasingly Fertile Environment for Life-Sciences Innovation

Absolute Number of Clinical Trials to Date, Global Comparison 2016

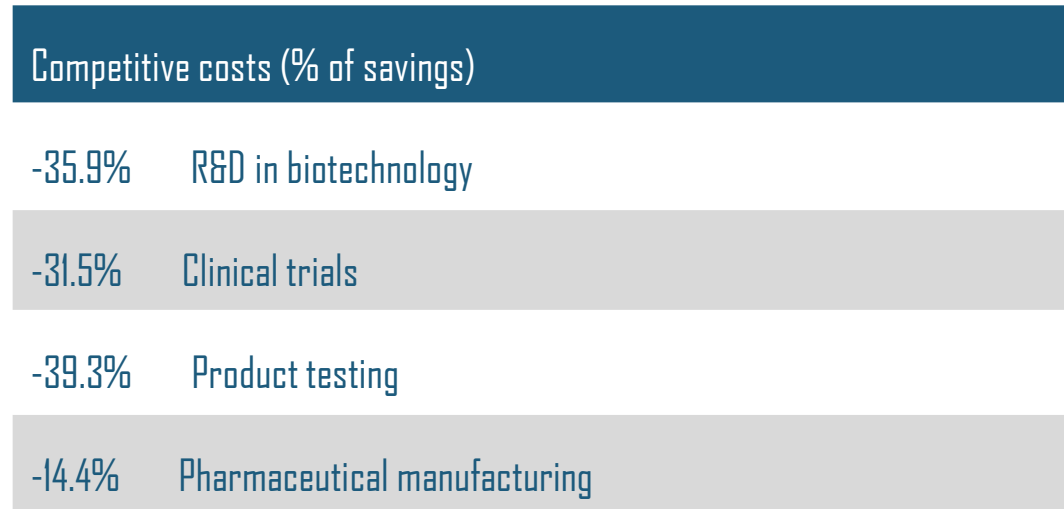


Source: Clinicaltrials.gov, 2016 (Note: data is based on number of clinical trials registered in the database in January 2016)

Source: *Pugatch Consilium, Developing the Biotechnology Sector*

Life-Sciences Innovation Strengths in Mexico

- A cost-competitive environment for life-sciences innovation.

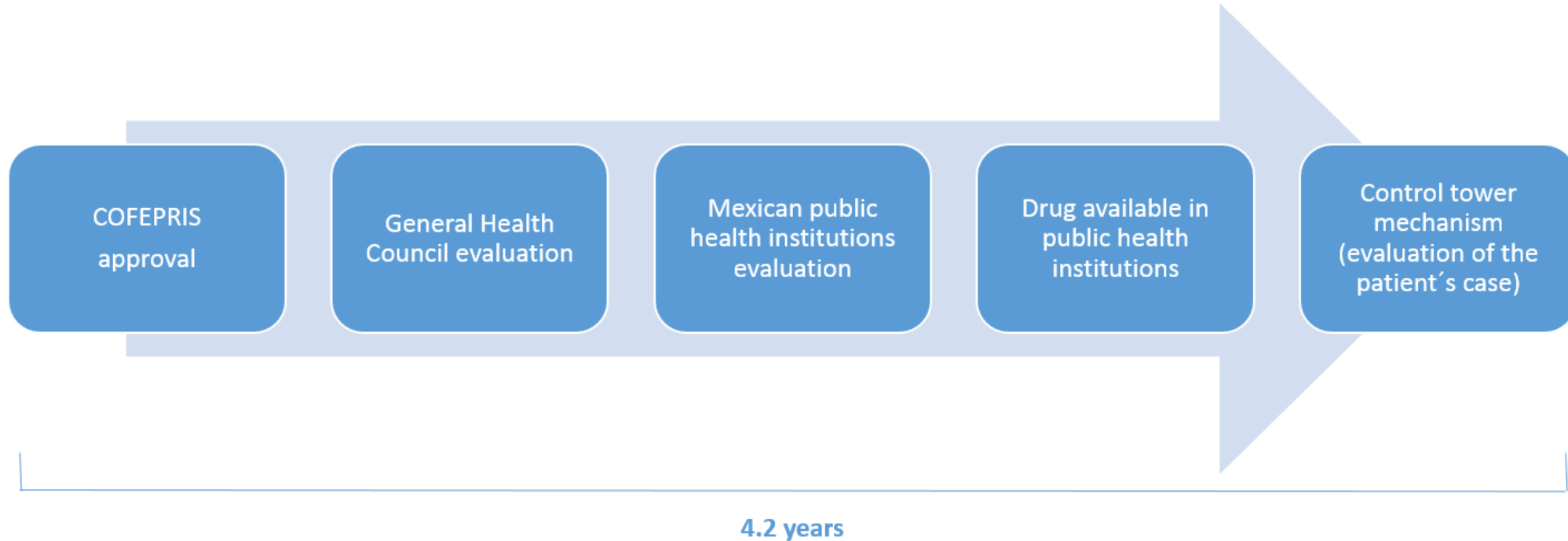


- Increasingly skilled human capital base for biomedical research.
- Diverse ecology a platform for biomedical innovation.

Source: The Geneva Network, ProMexico

Addressing Roadblocks to Regulatory Approval of Innovative Medicines

- Speeding patient access to innovative drugs vital for sector to realize its true innovation potential.

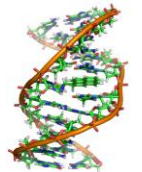


- Only 10% of drugs are approved and made available in public healthcare institutions.

Source: The Geneva Network

Life-Sciences Innovation Opportunities for Mexico

- Improve clinical trial guidelines (e.g. research team changes means trials restarts; clarify ownership rules for clinical trial data).
- Greater enforcement of biopharmaceutical IP; fight piracy/counterfeiting.
- Enhance R&D collaboration between biopharmaceutical industry, research institutions, and universities.
- Public procurement system fragmented; prioritizes cost over value.
- Recognize that biopharmaceutical value creation comes from the R&D, not from the manufacturing.
- Set a goal of becoming a “G20” life-sciences innovator.



Muchas Gracias!

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