

# Turbocharging Mexico's Innovation Economy

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Mexico Innovation Week  
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# About ITIF

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- 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

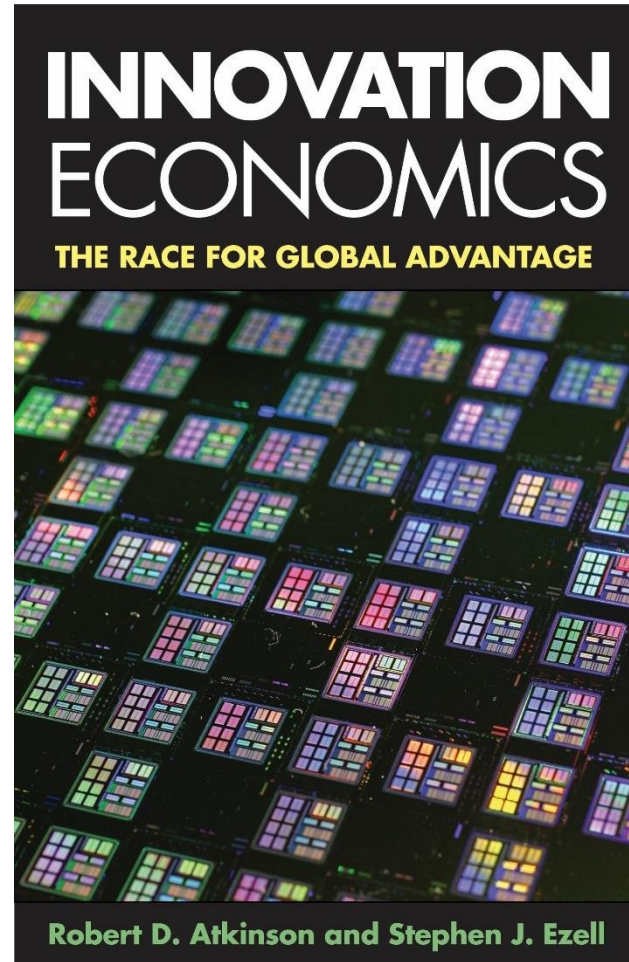
# Today's Presentation

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- 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

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Rob  
Atkinson



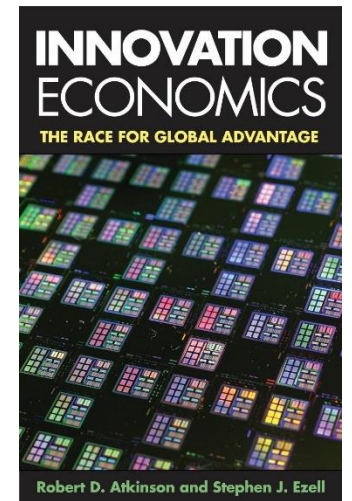
Stephen  
Ezell

Yale University Press  
September 2012

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

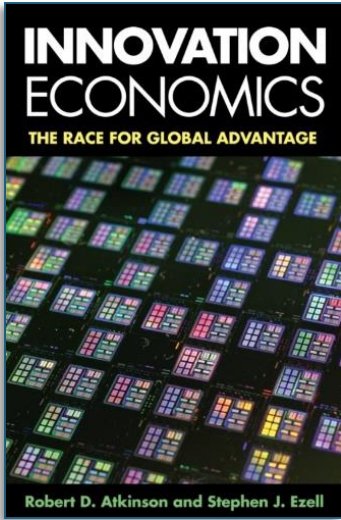
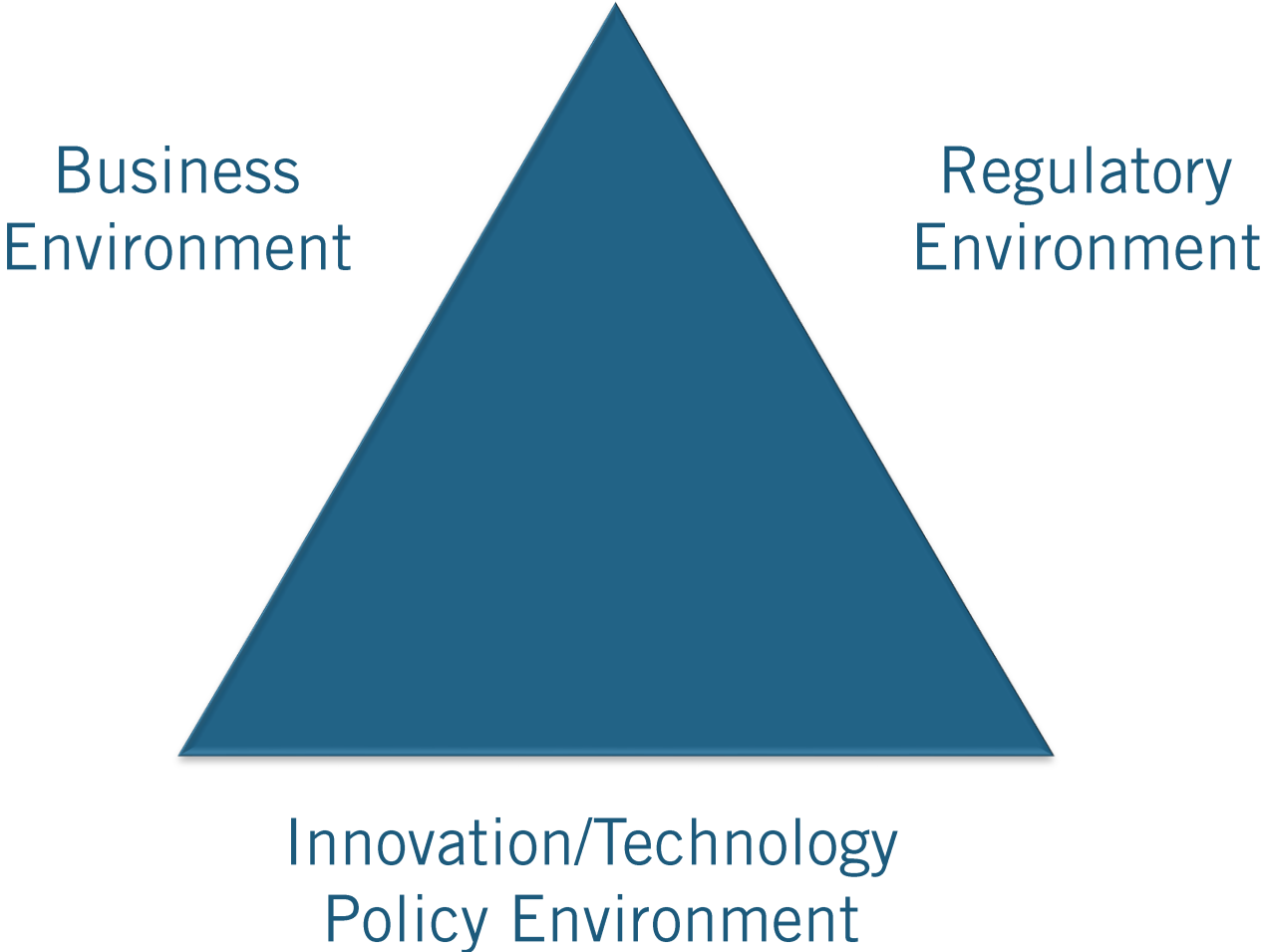
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1. Inspiration
2. Intention
3. Insight
4. Institutions
5. Investment
6. Incentives
7. Intellectual Property
8. International



# Get the “Innovation Triangle” Right

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# Business Environment ▲

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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 ▲

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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

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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

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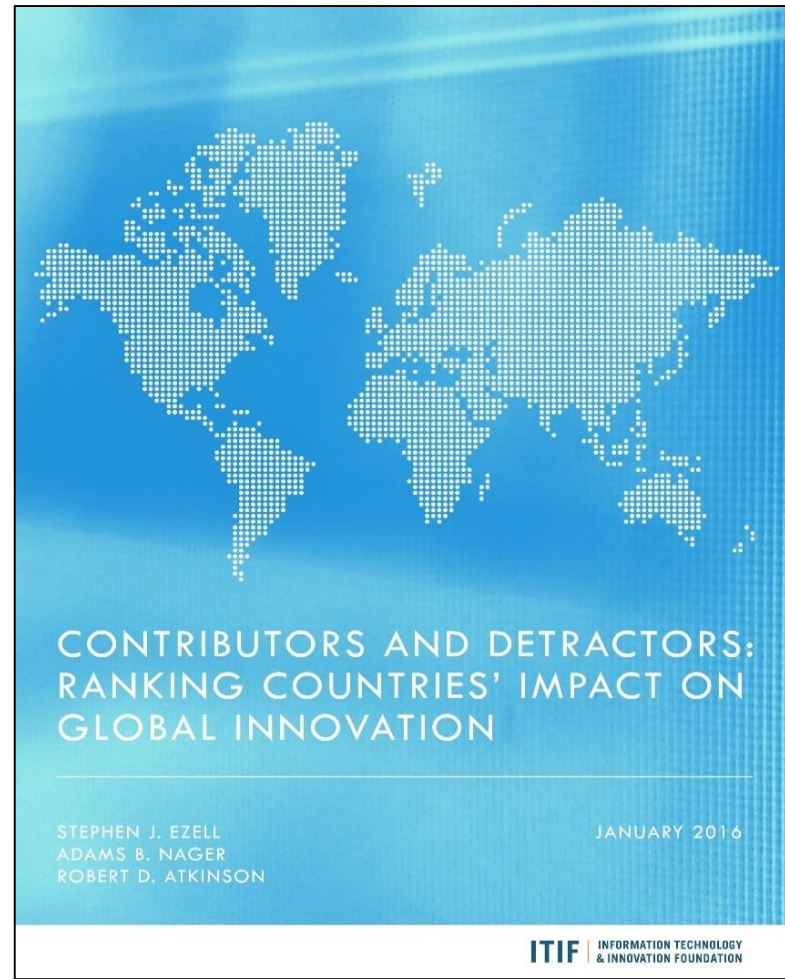
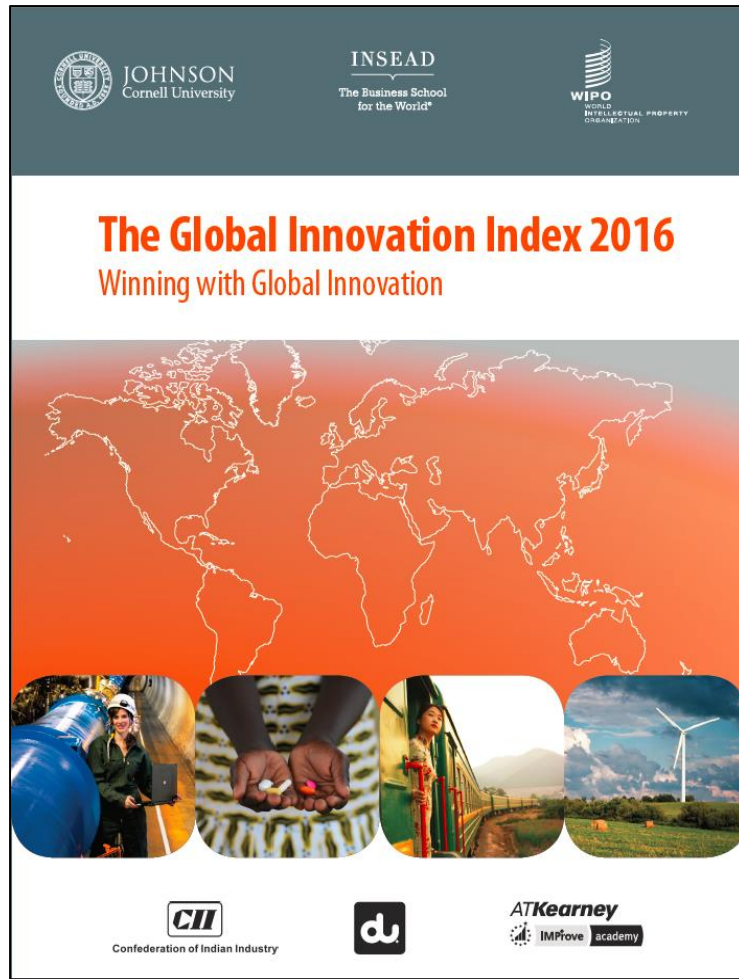
1. They compete by inventing *next-generation* products and services.
2. They embody and depend on intellectual property.
3. They are characterized by very high initial fixed costs (e.g., R&D/design), but low marginal costs...which
4. Means they need access to large global markets.

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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

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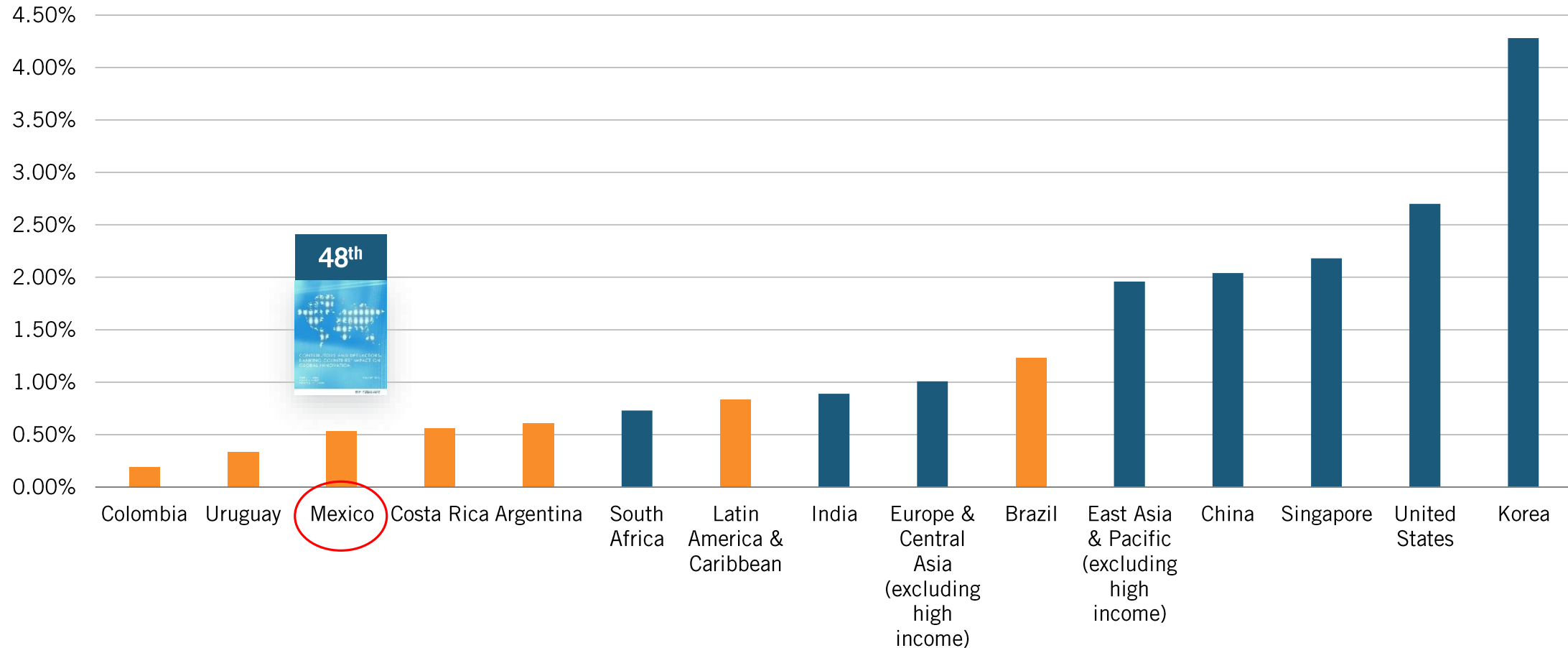


1. Increase investment in research and development.
2. Leverage tax policy to stimulate R&D and innovative activity.
3. Increase investment in education.
4. Continue to bolster and support entrepreneurship.
5. Strengthen IP rights.
6. Continue to embrace trade and FDI liberalization.



# Increase Mexico's National R&D Intensity

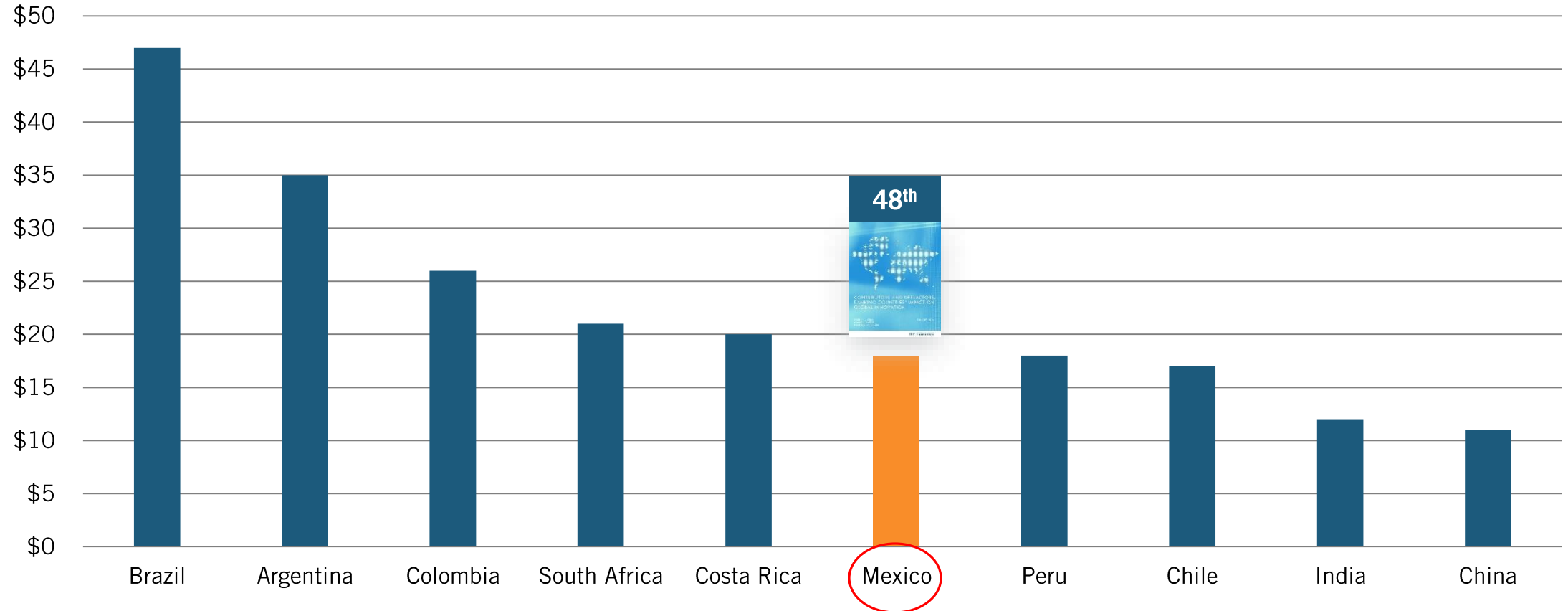
R&D Investment as a Share of GDP



# Increase Government Funding of University Research



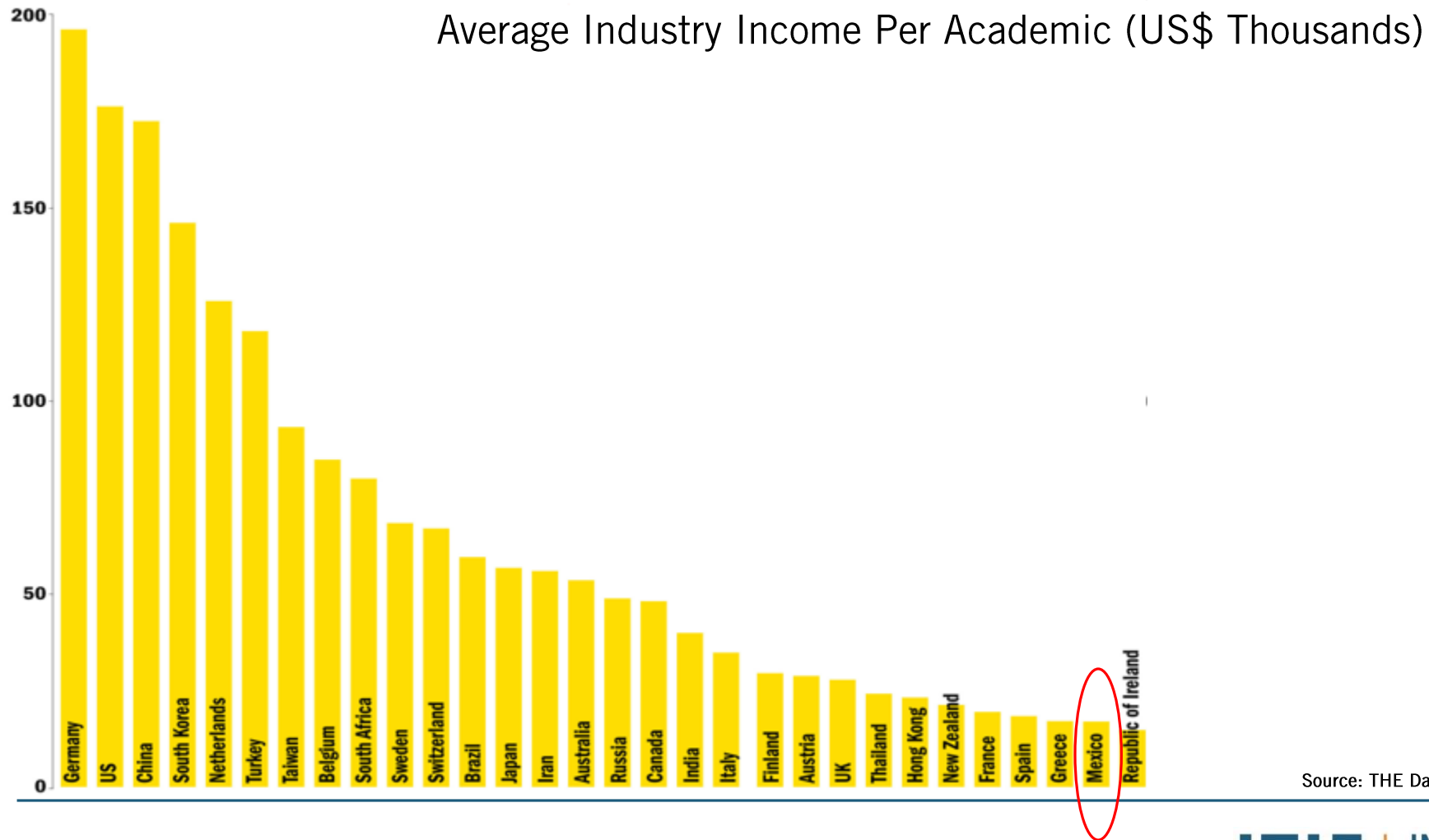
Government Funding of University Research (per capita)



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



# Increase Industry-Funded University Research



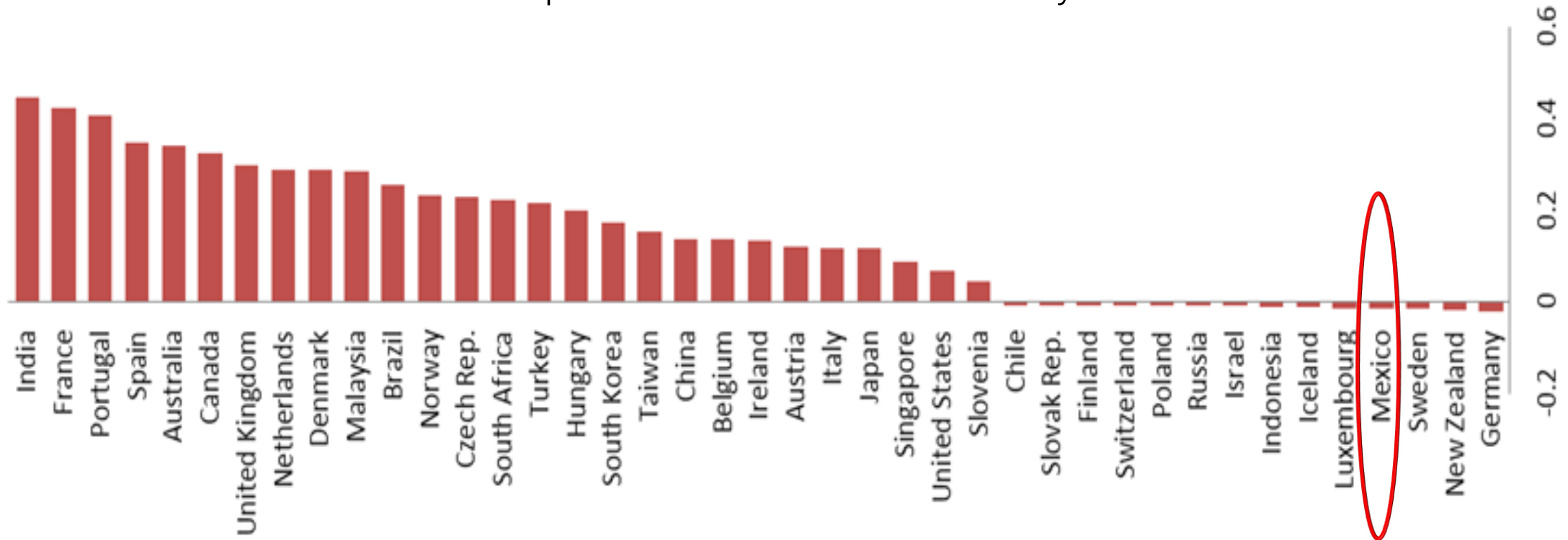
Source: THE DataPoints © THE data@timeshighereducation.com.



# Effective Tax Policies Can Help Spur Mexican R&D



Comparative R&D Tax Credit Generosity



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

# Effective Tax Policies Can Help Spur Mexican R&D

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

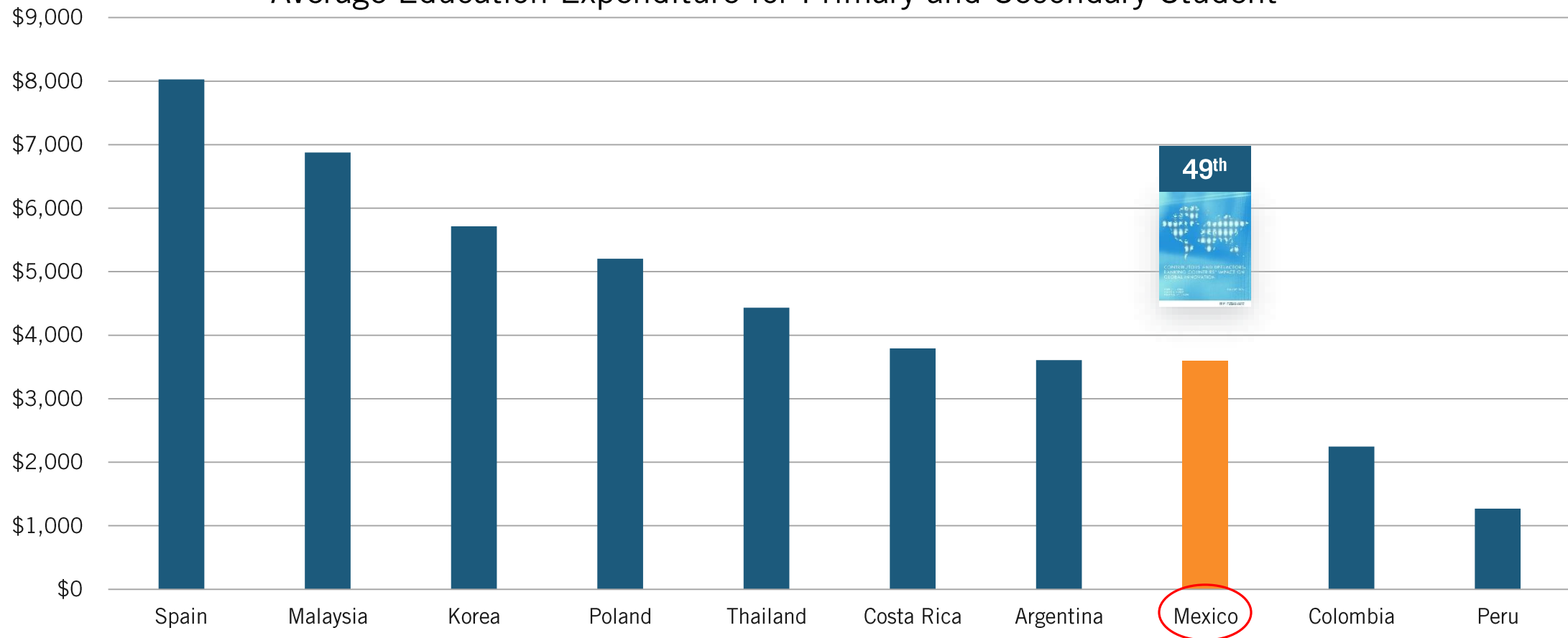
Sources: ITIF, *Creating a Collaborative R&D Tax Credit*, ITIF, *Patent Boxes: Innovation in Tax Policy and Tax Policy for Innovation*

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# Invest More in Human Capital/Education



Average Education Expenditure for Primary and Secondary Student

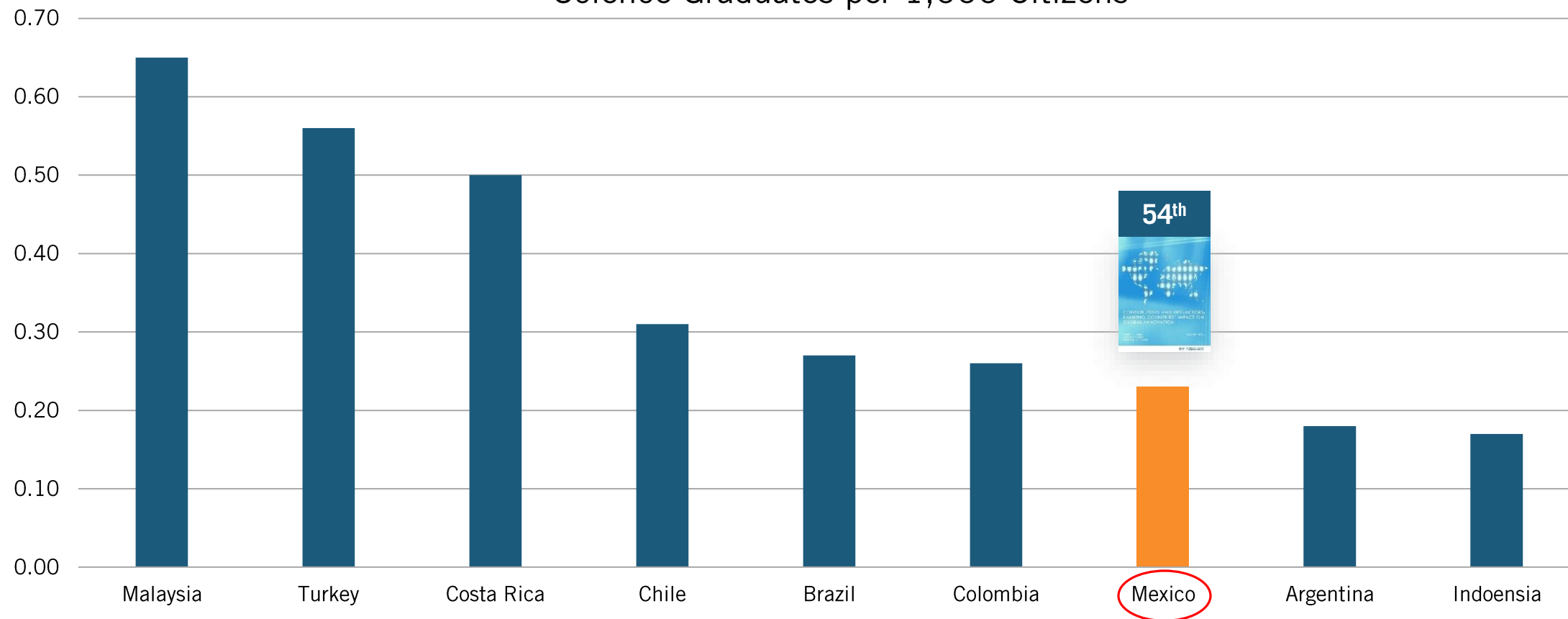


Source: ITIF, *Contributors and Detractors: Ranking Countries' Impact on Global Innovation*, 2016



# Increase the Number of Science Graduates

Science Graduates per 1,000 Citizens



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

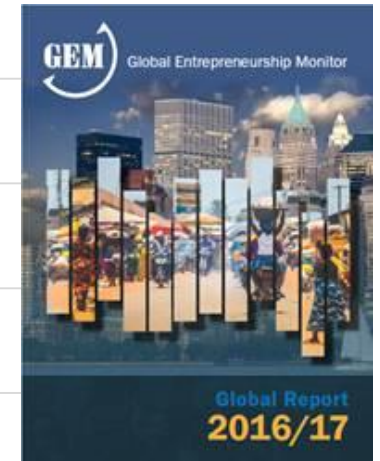
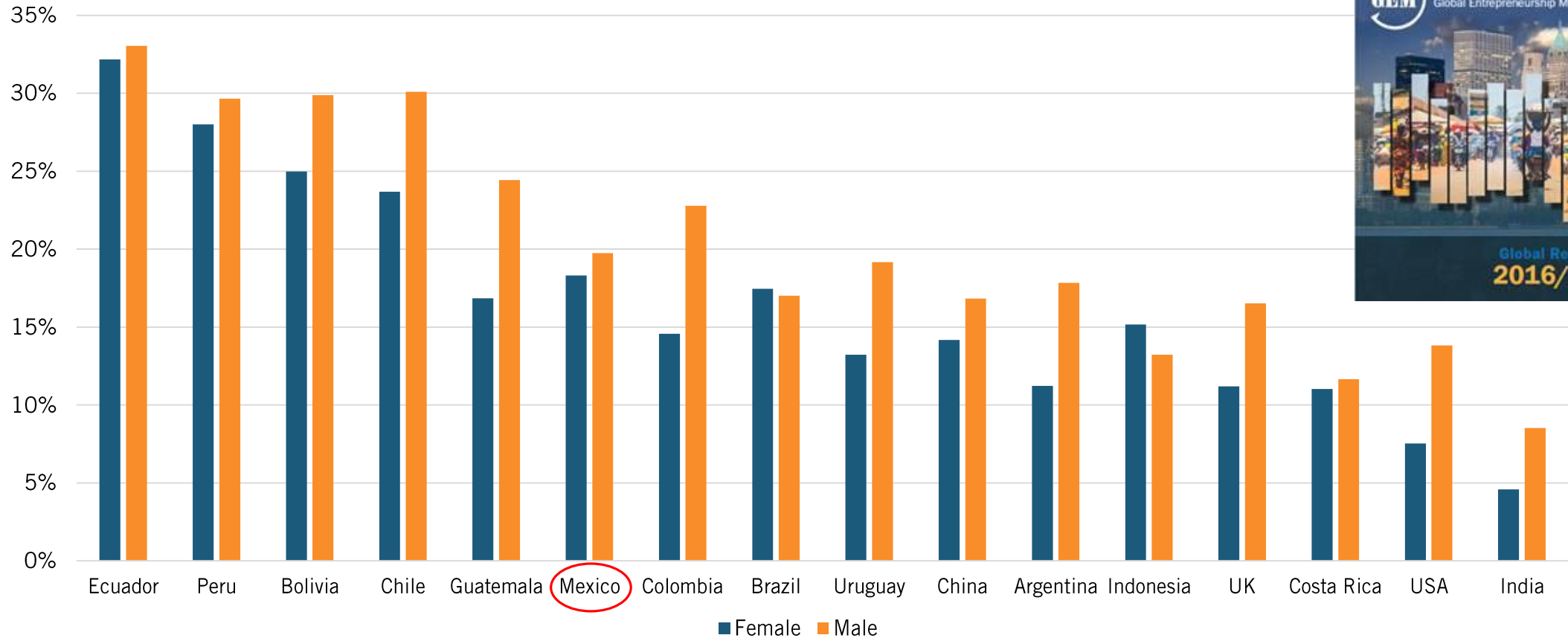
# How Mexico Is Supporting Entrepreneurship

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- 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

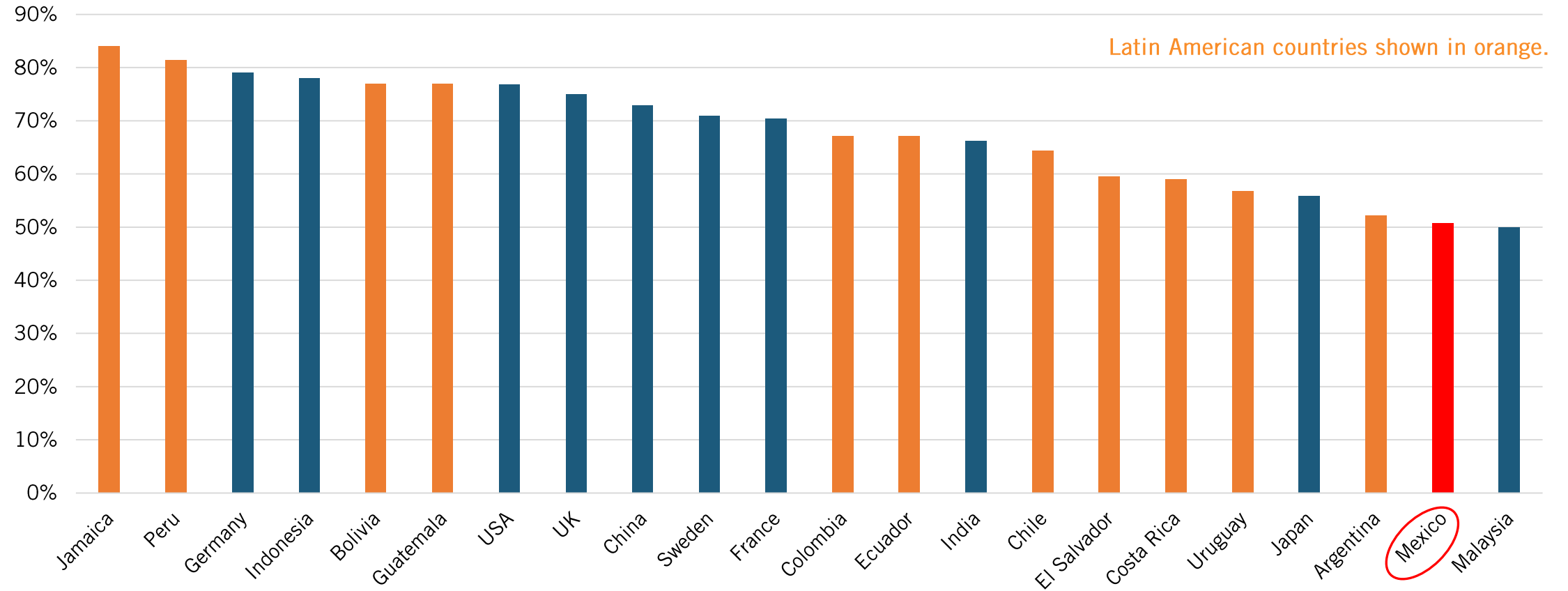
Total Early-Stage Entrepreneurial Activity, Select Countries



Source: 2015/2016 Global Entrepreneurship Monitor Report

# Encourage Entrepreneurship and Risk Taking

“Successful Entrepreneurship Enjoys A High Societal Status”

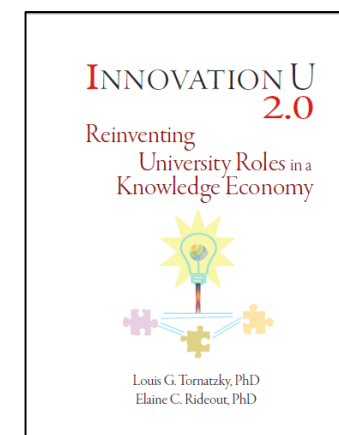


Source: 2015/2016 Global Entrepreneurship Monitor Report

# Reform University Policies to Spur Innovation and Entrepreneurship

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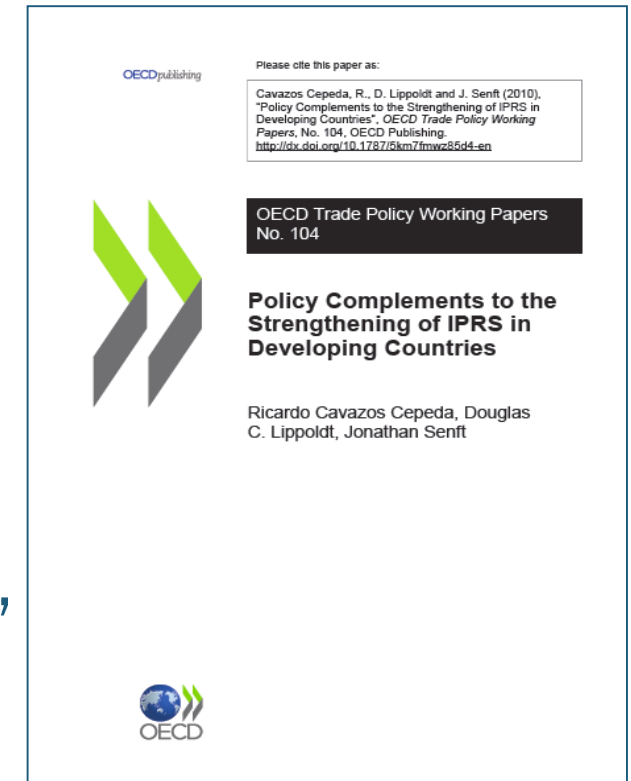
- ✓ Give academic researchers ownership rights of IP deriving from government-funded research (e.g., “Bayh-Dole”).
- ✓ Give students rights to the IP they invent at universities.
- ✓ Increase *permeability*: Take faculty members’ commercial experiences into account in tenure decisions; allow faculty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





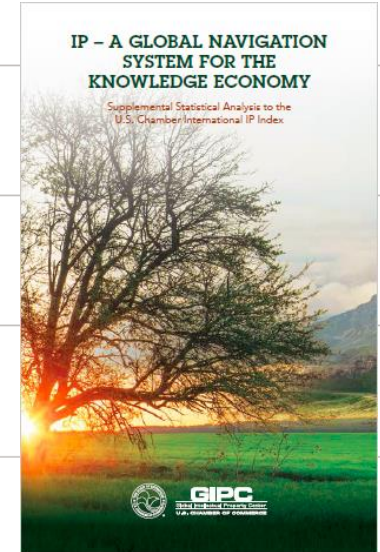
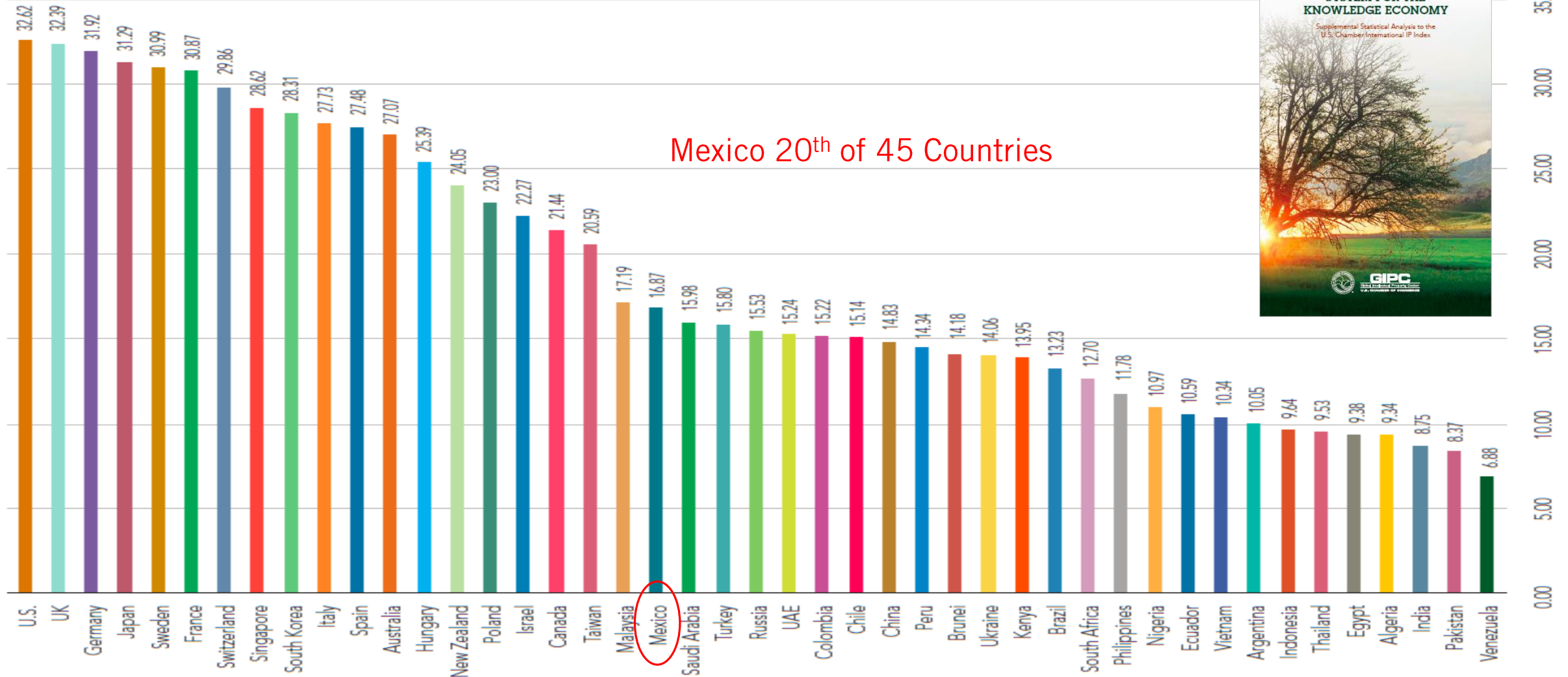
# IPRs Are Vital to Innovation, As They:

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.

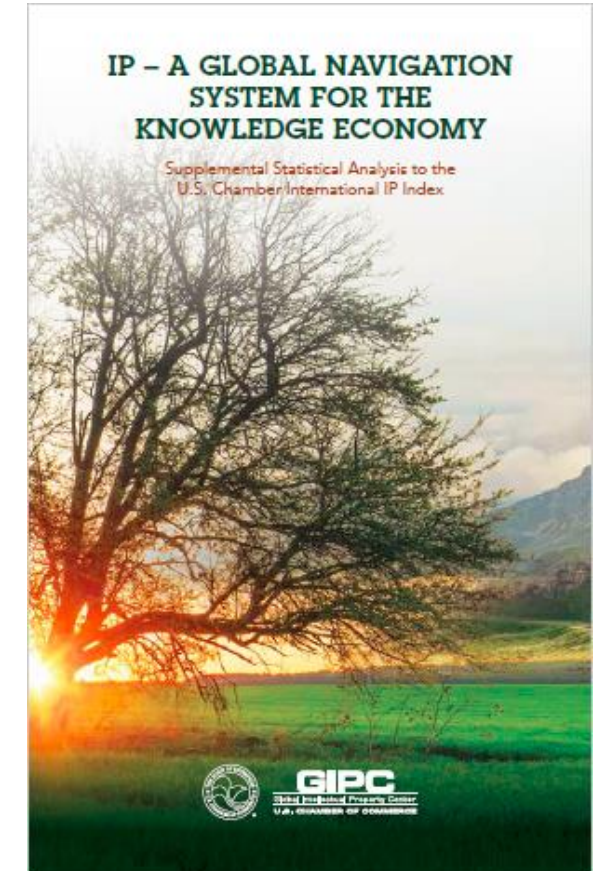


# Strengthen Intellectual Property Rights Protections

2017 GIPC International IP Index Rankings



# Leadership in Biotechnological Innovation Requires Robust IP Protection



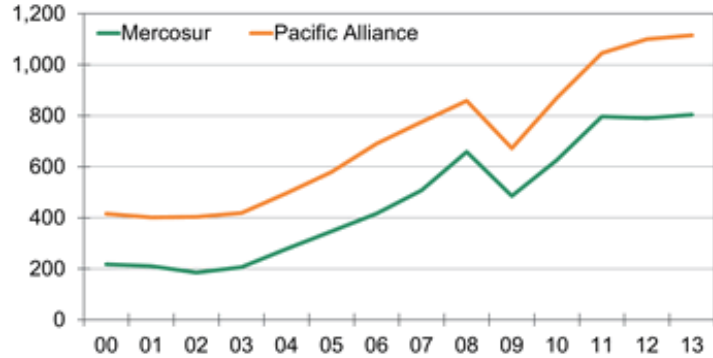
Source: Global Intellectual Property Center, *IP-A Global Navigation Center for the Knowledge Economy*

# Mexico Leading the Charge for Trade Liberalization



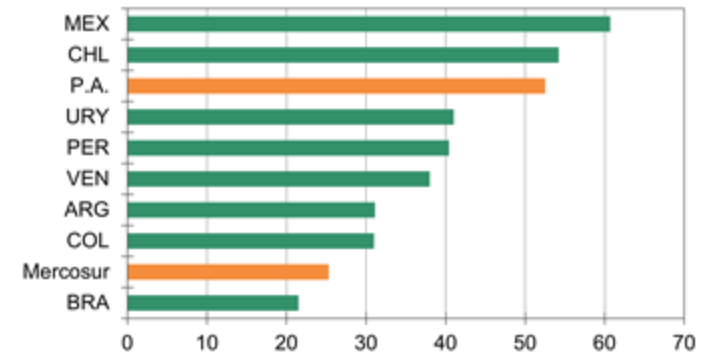
## Pacific Alliance Exports Top Mercosur's

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

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- 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

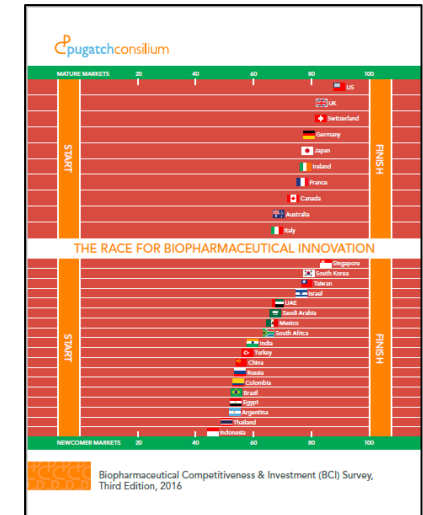
Mexico has the 2nd largest biopharmaceutical market in Latin America and the 11th largest in the world.

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

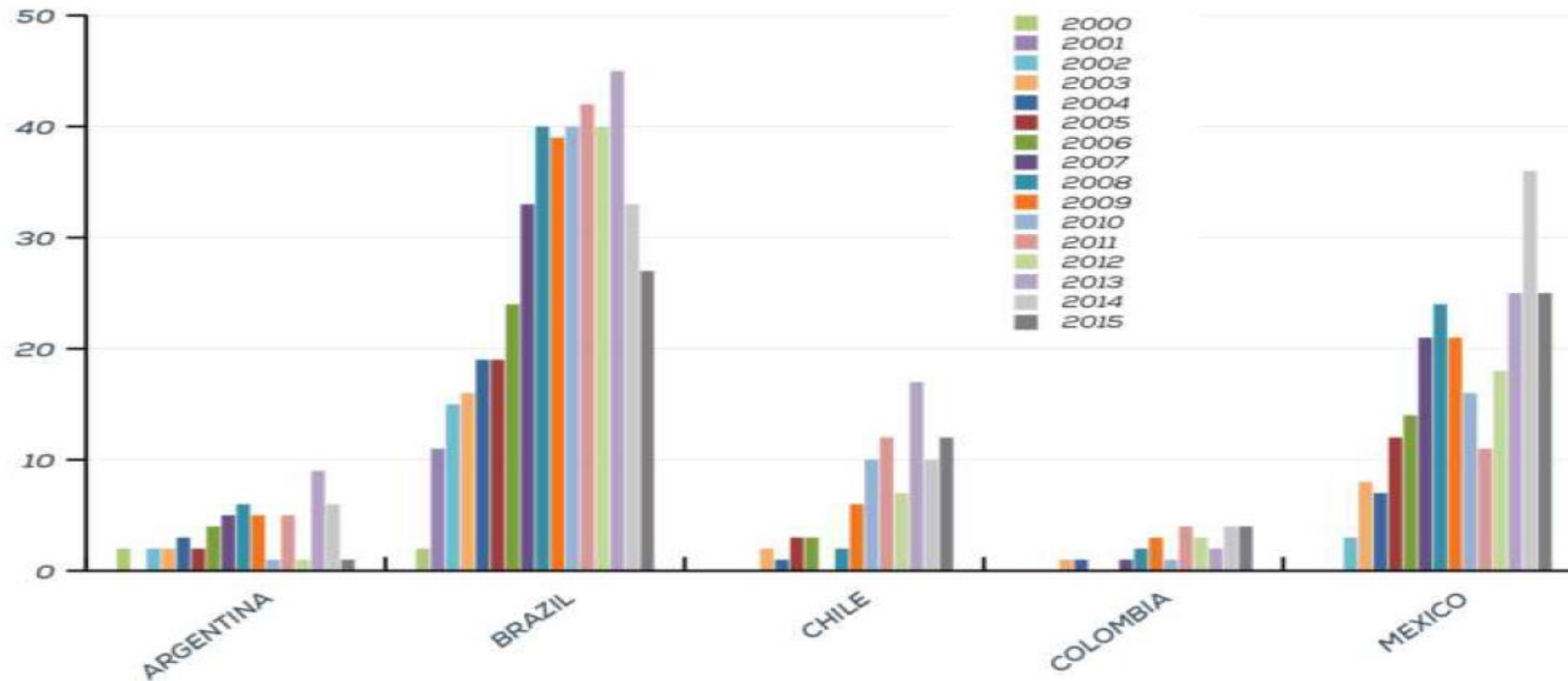


Source: *The Race for Biopharmaceutical Innovation: BCI Survey 2016*



# Increasingly Fertile Environment for Life-Sciences Innovation

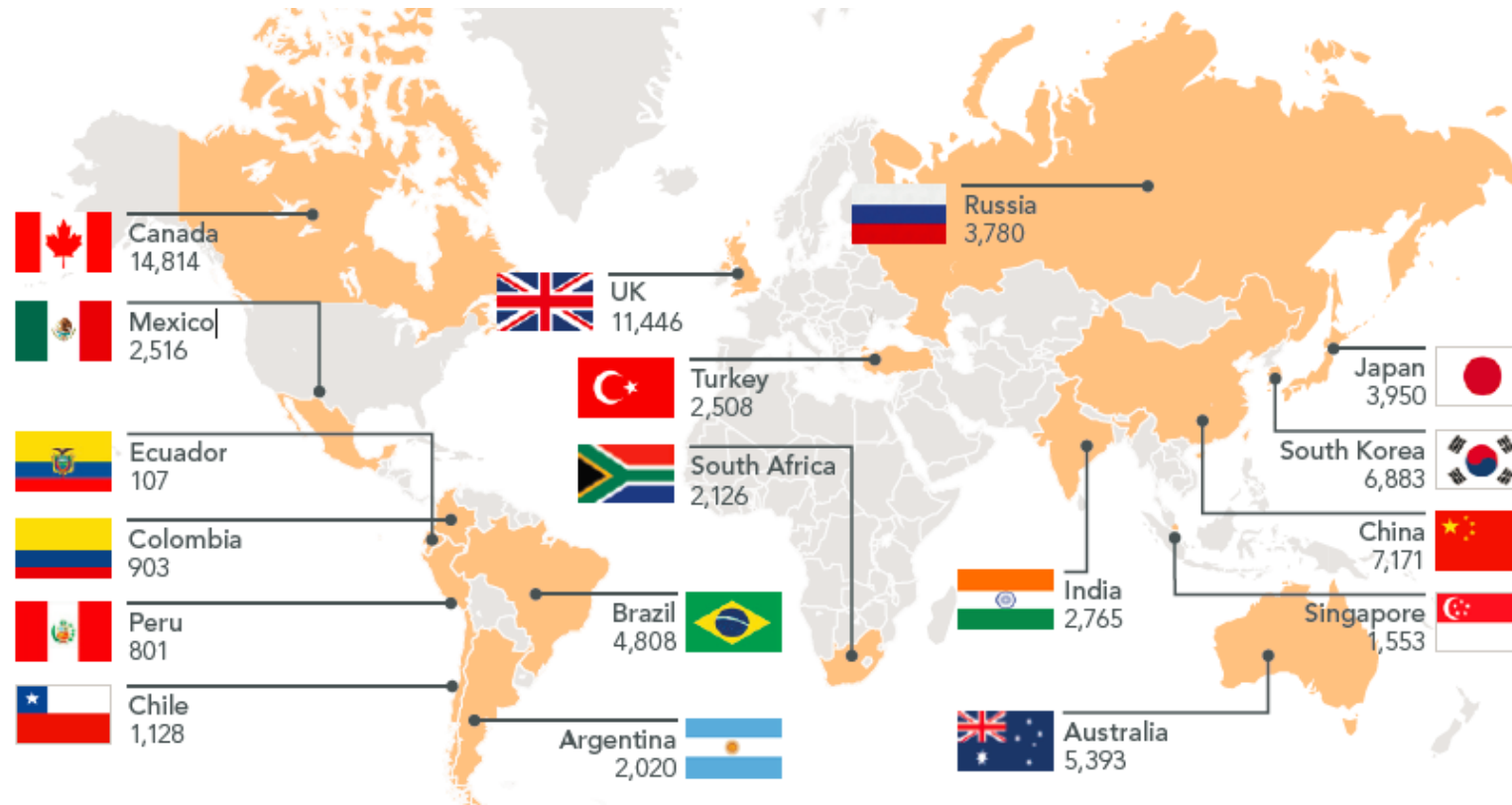
Pharmaceutical Patents Filed Through Patent Cooperation Treaty, 2000-2015



Source: WIPO; The Geneva Network

# Increasingly Fertile Environment for Life-Sciences Innovation

Absolute Number of Clinical Trials to Date, Global Comparison 2016



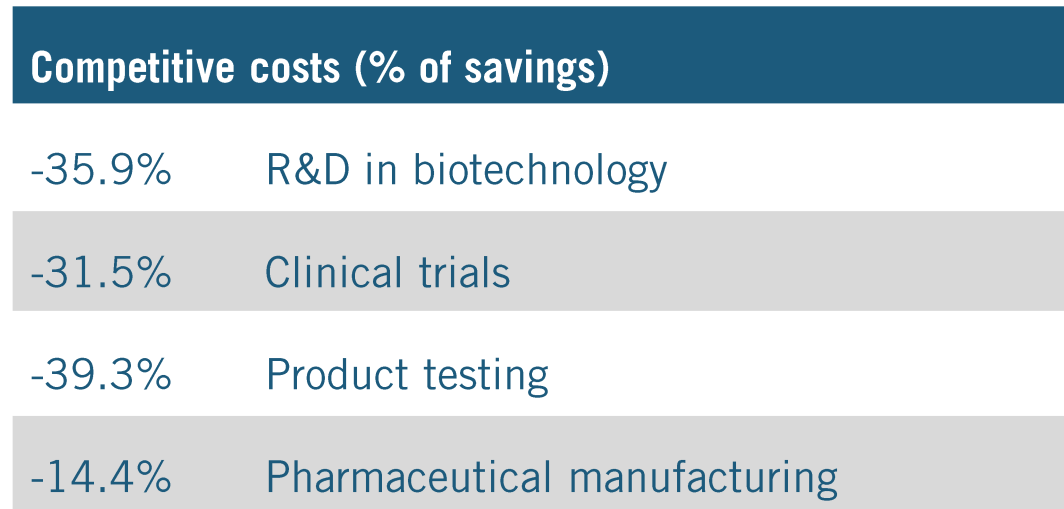
Source: Clinicaltrials.gov, 2016 (Note: data is based on number of clinical trials registered in the database in January 2016)

Source: Pugatch Consilium, *Developing the Biotechnology Sector*

# Life-Sciences Innovation Strengths in Mexico

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

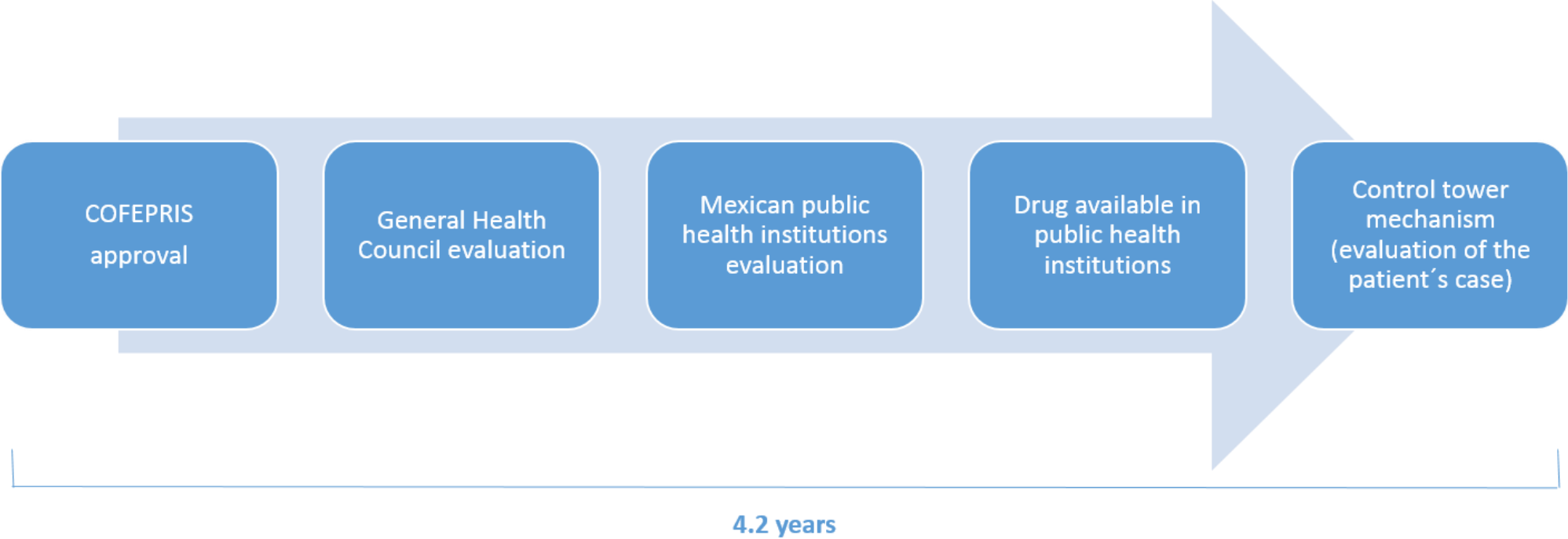


- Increasingly skilled human capital base for biomedical research.
- Diverse ecology a platform for biomedical innovation.

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.**



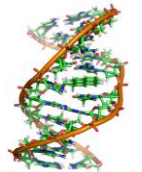
- **Only 10% of drugs are approved and made available in public healthcare institutions.**

Source: The Geneva Network

# Life-Sciences Innovation Opportunities for Mexico

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- 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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