Innovation and Competitiveness: Implications for Policy and Saudi Arabia

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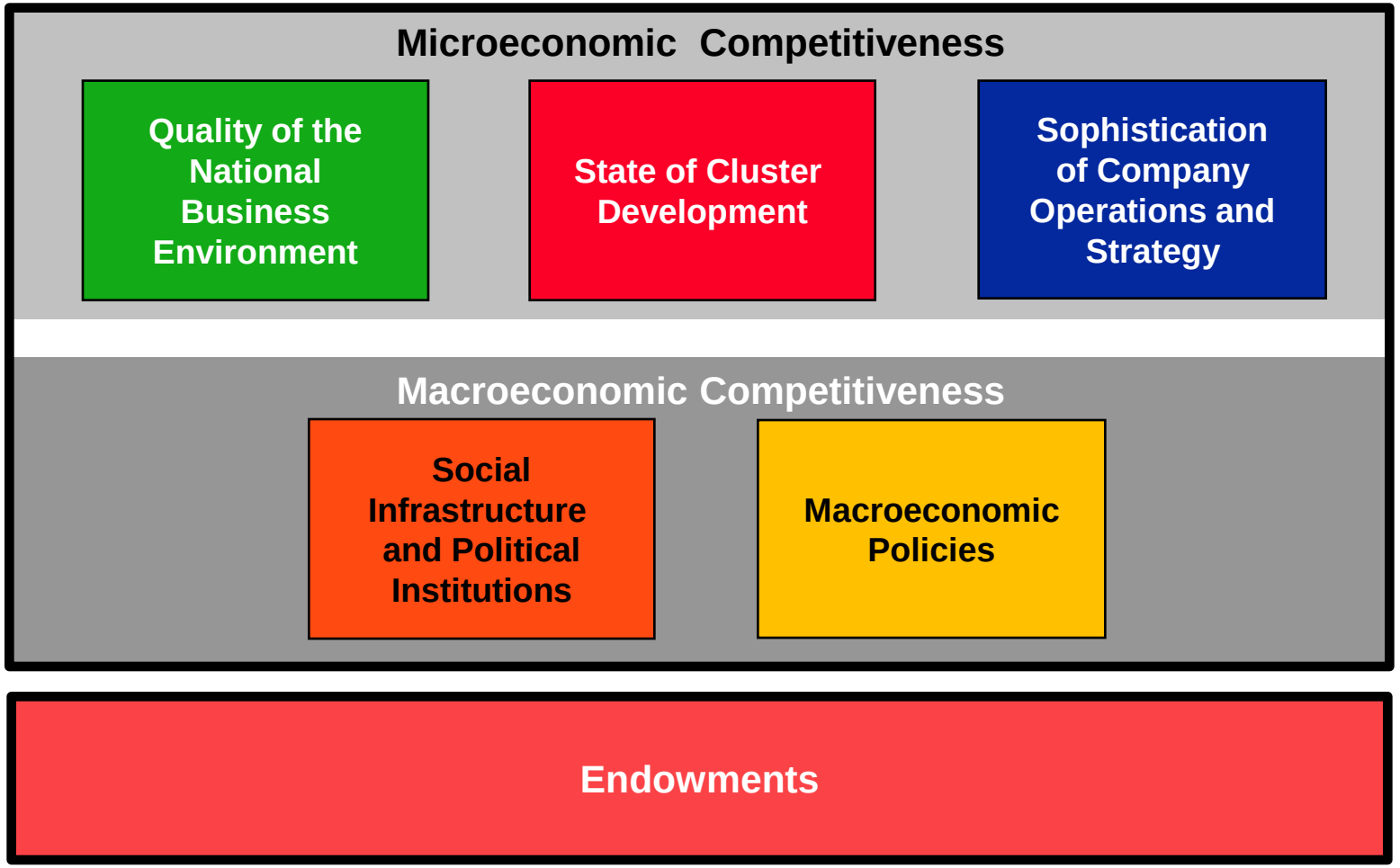
What is Competitiveness?

- Competitiveness depends on the **productivity** with which a nation uses its human, capital, and physical resources.
  - Productivity **sets the sustainable standard of living** (wages, returns on capital, returns on natural resources)
  - It is not **what** industries a nation competes in that matters for prosperity, but **how productively** it competes in those industries
  - Productivity in a national economy arises from a **combination of domestic and foreign firms**
  - The productivity of **"local" or domestic industries** is fundamental to competitiveness, not just that of export industries

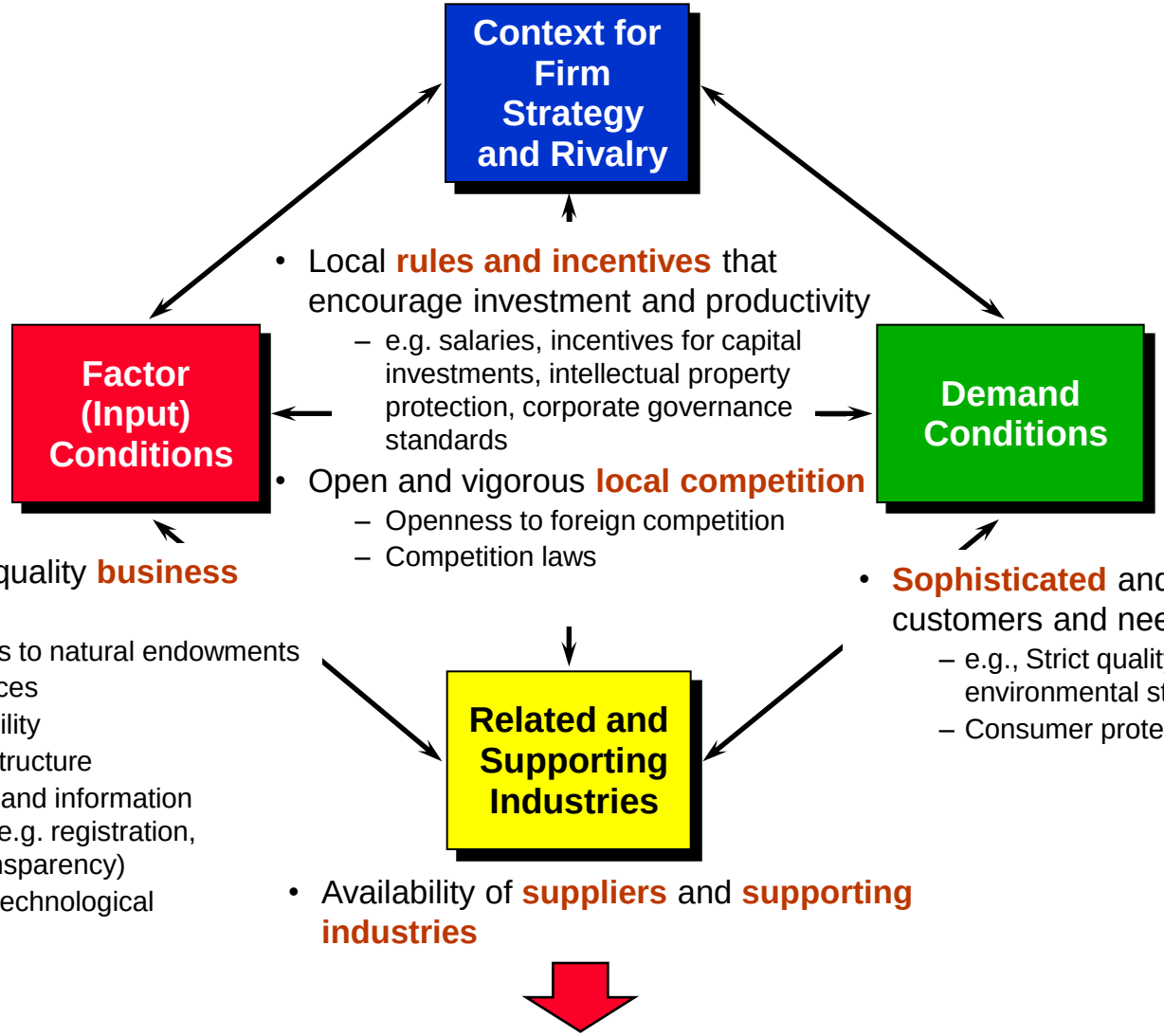
- Only **competitive** businesses can create jobs, rising income, and wealth
- Nations compete to offer the **most productive environment for business**
- The public and private sectors play **different but interrelated roles** in creating a productive economy

Determinants of Competitiveness



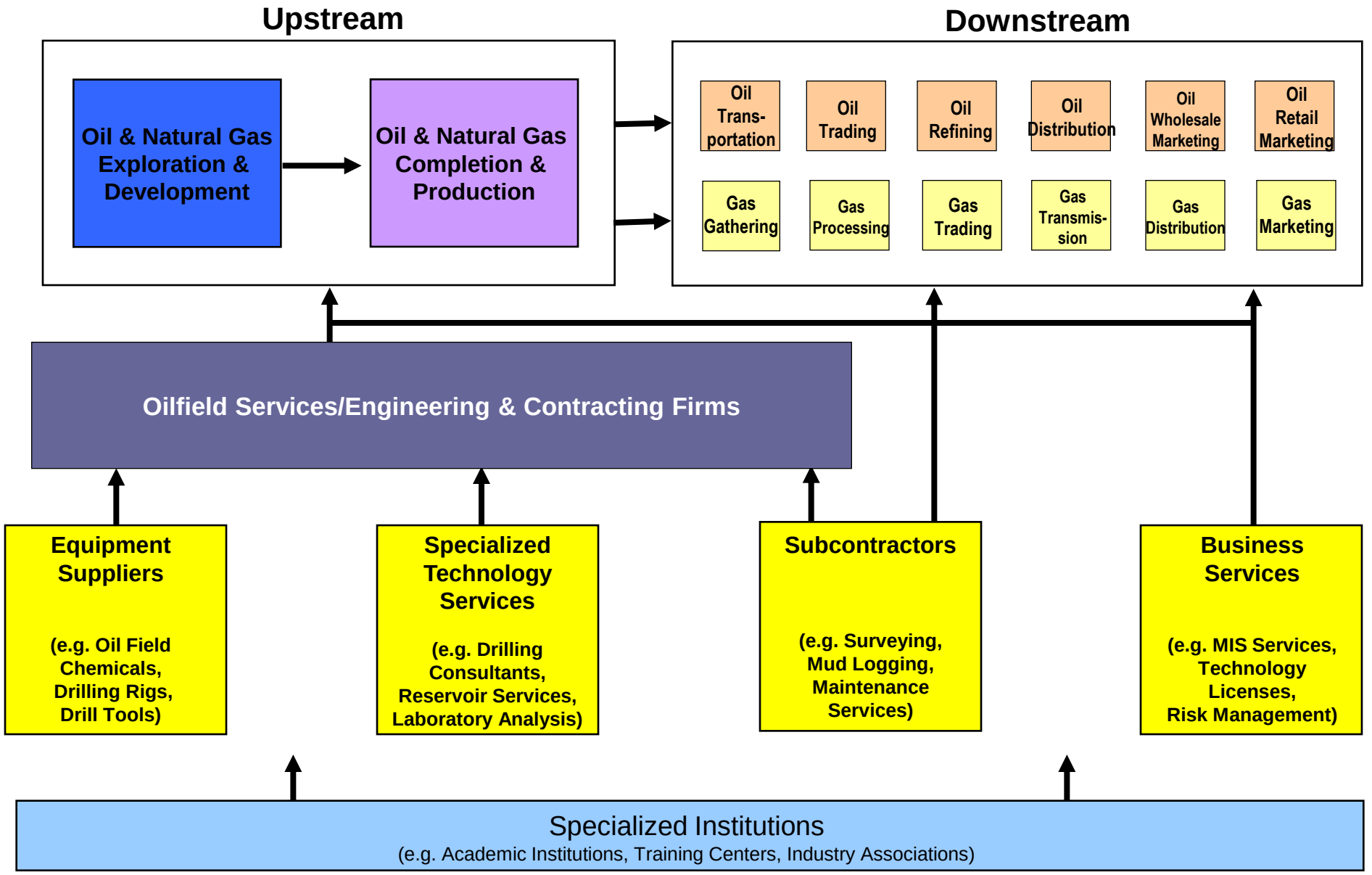
- Endowments create a **foundation** for prosperity, but true prosperity is created by **productivity** in the use of endowments
- Macroeconomic competitiveness sets the **potential** for high productivity, but is **not sufficient**
- Productivity ultimately depends on improving the **microeconomic capability** of the economy and the **sophistication of local competition**

Quality of the National Business Environment

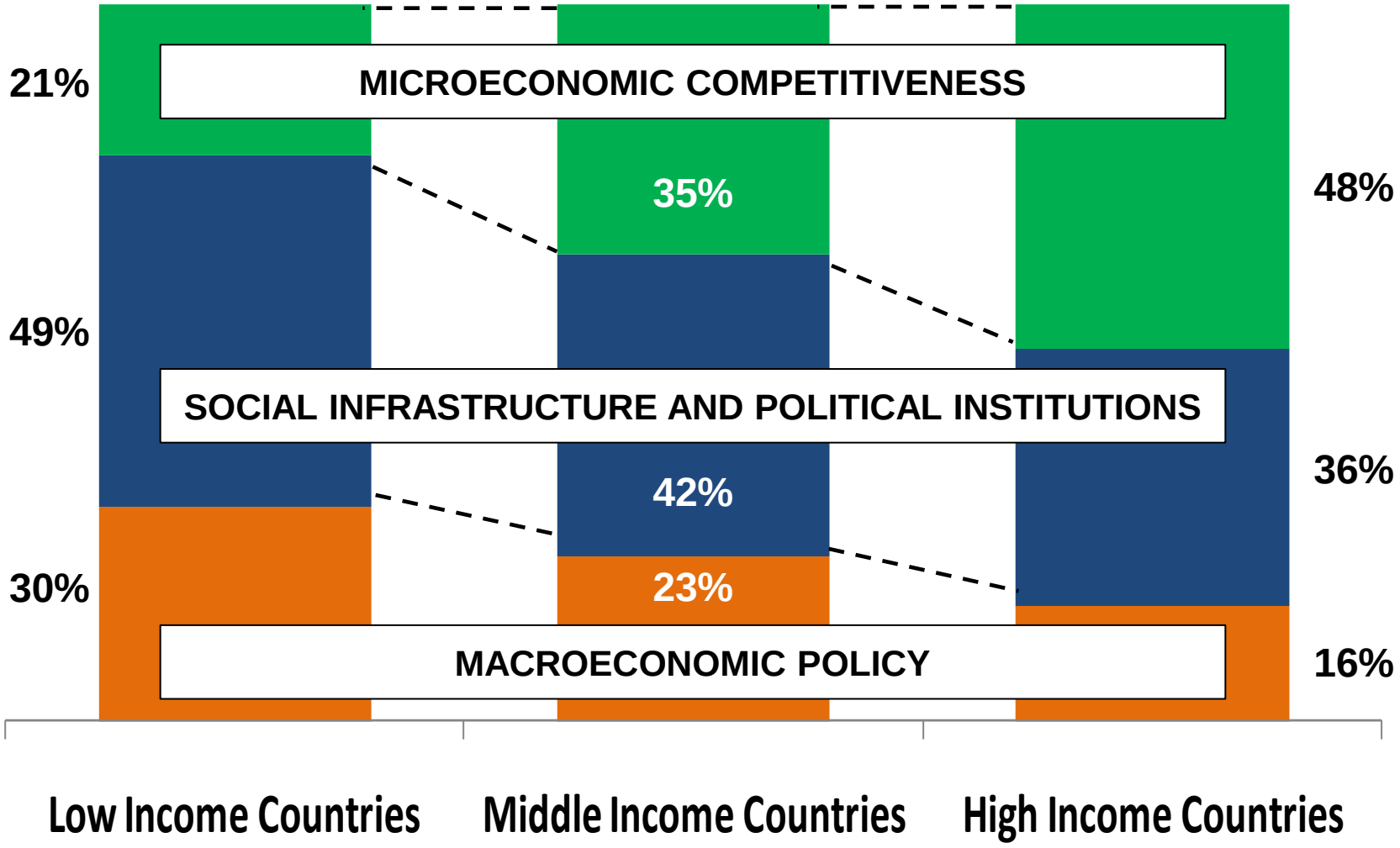


- **Many things matter** for competitiveness
- Successful economic development is a process of **successive upgrading**, in which the business environment improves to enable increasingly sophisticated ways of competing

The Houston Oil and Gas Cluster



Determinants of Competitiveness
Relative Impact by Stage of Development



Notes: - Weights in a linear model across all economies: Micro: 0.31, SIPI: 0.41, Macro Policy: 0.28
- Middle-stage weights are an average of Low- and High-stage weights.

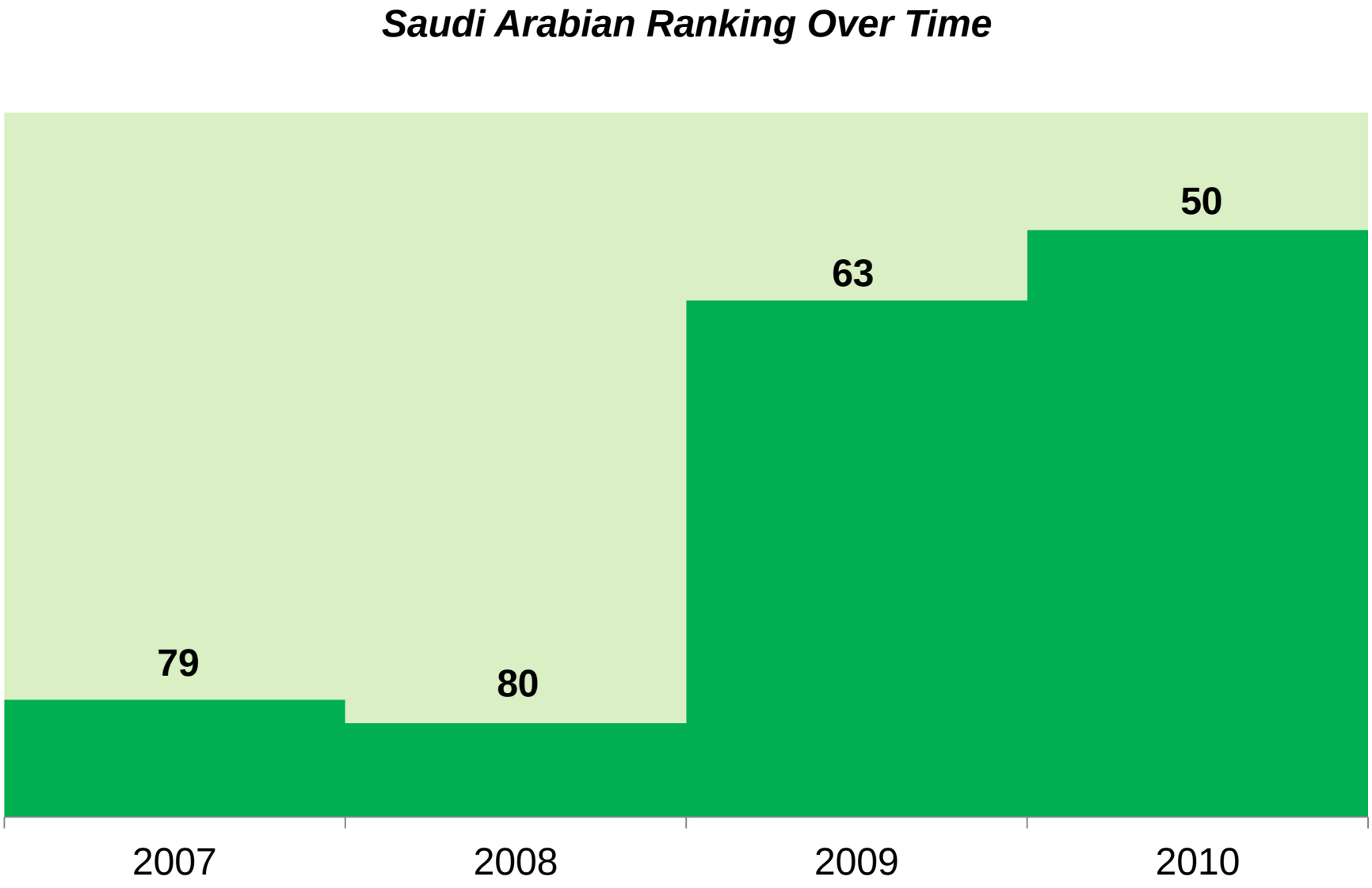
Competitiveness Upgrading in Saudi Arabia, 2007 - 2010

Macroeconomic Competitiveness

Selected Survey Indicators	*Improvement in Rank*
Decentralization of economic policymaking	+65
Business costs of corruption	+64
Quality of primary education	+42
Business costs of crime and violence	+42
Effectiveness of law-making bodies	+38
Freedom of the press	+34
Irregular payments by firms	+33
Judicial independence	+31
Transparency of government policymaking	+27
Reliability of police services	+23
Property rights	+23

Source: WEF Global Executive Opinion Survey, fixed sample of 128 countries

Transparency International Corruption Perception Index



Source: Transparency International Corruption Perception Index

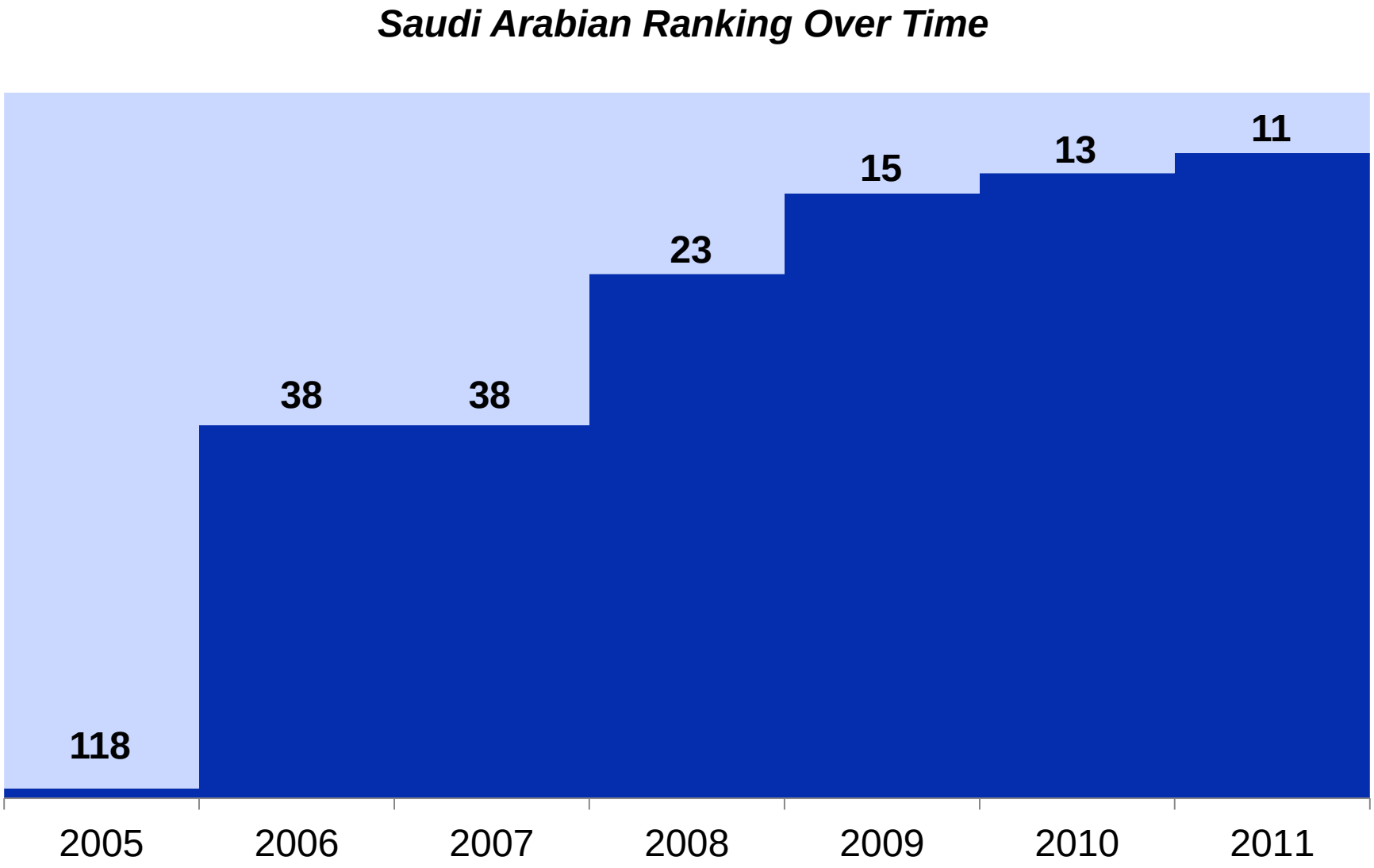
Competitiveness Upgrading in Saudi Arabia, 2007 - 2010

Microeconomic Competitiveness

Selected Survey Indicators	*Improvement in Rank*
Procedures required to start a business	+89
Business impact of rules on FDI	+88
Regulation of securities exchanges	+78
Time required to start a business	+75
Restrictions on capital flows	+71
Stringency of environmental regulations	+67
Prevalence of trade barriers	+62
Protection of minority shareholders' interests	+61
Prevalence of foreign ownership	+59
Efficacy of corporate boards	+58
Low market disruption from state-owned enterprises	+57

Source: WEF Global Executive Opinion Survey, fixed sample of 128 countries

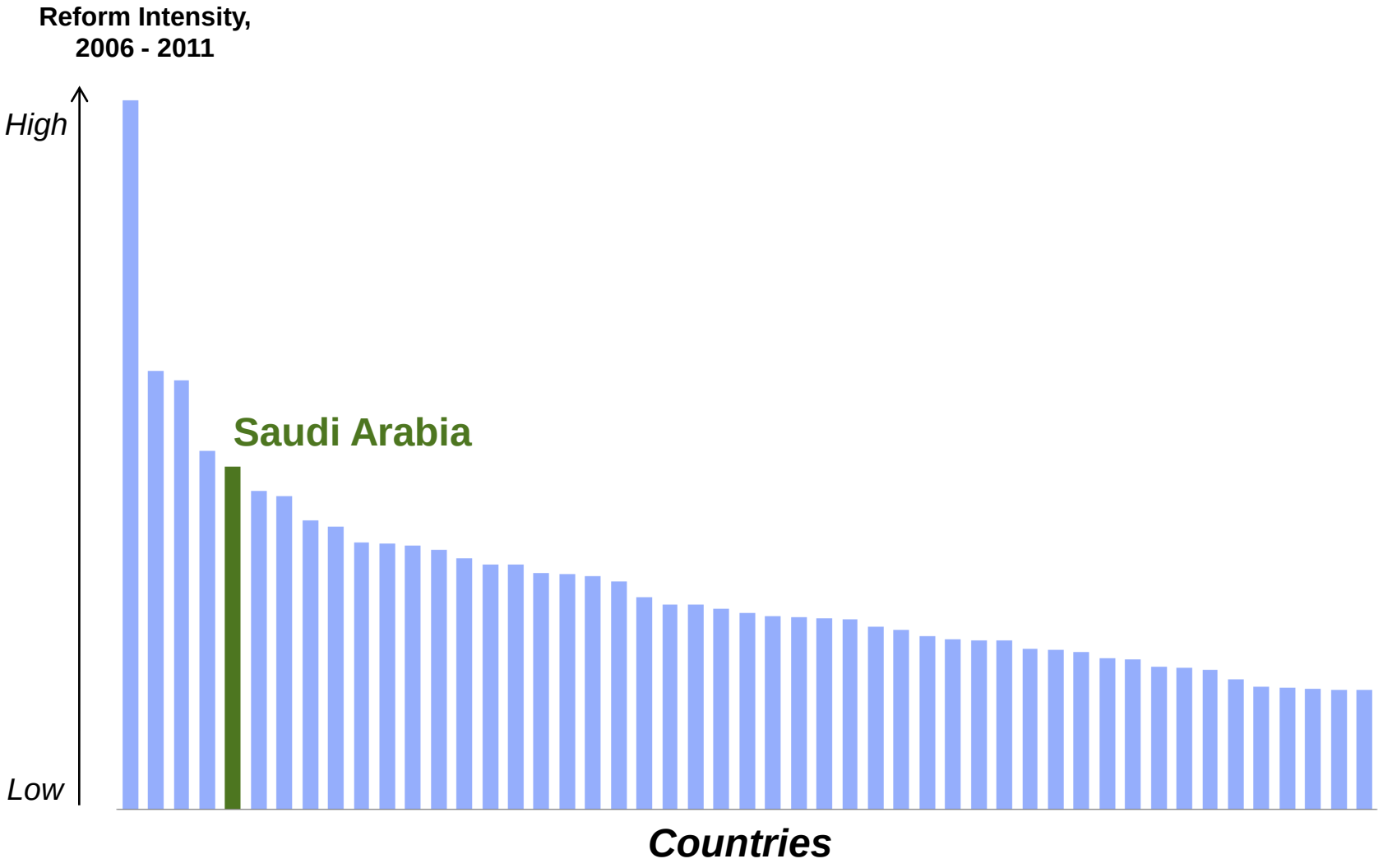
World Bank Doing Business Indicators



Source: World Bank, SAGIA

Progress on Business Regulation

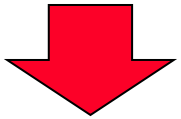
Leading Countries, 2006 - 2011



Source: World Bank Reform Intensity Index, World Bank

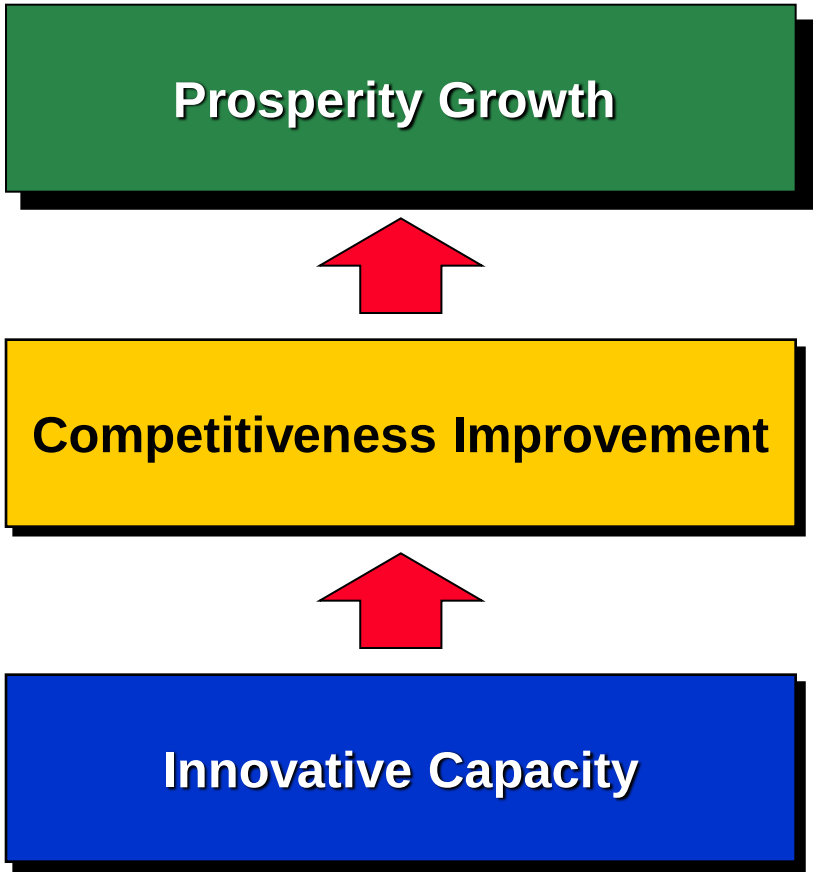
Saudi Arabia's Progress on Competitiveness

- Competitiveness has become **central to Saudi Arabia's economic policy agenda**
- Programs like "10 by 10" have set **measurable goals** to motivate rapid progress
- Substantial reforms have been implement in areas like **business regulation, education, and financial markets**.
- Large **investments** have been made to improve infrastructure, create economic cities, develop the petro-chemical cluster, and launch ambitious academic institutions like KAUST



- Significant competitiveness challenges **remain**
- But Saudi Arabia's position in international assessments of competitiveness has **improved markedly**

Improving Competitiveness: The Innovation Imperative



Productivity Growth

Moving to an Innovation-Driven Economy

Low Cost Labor and Natural Endowments

Productivity in Producing Products and Services

Unique Products and Processes

Source: Porter, Michael E., T*he Competitive Advantage of Nations*, Macmillan Press, 1990

Technological Progress and Economic Development

DEVELOPING ECONOMIES

ADVANCED ECONOMIES

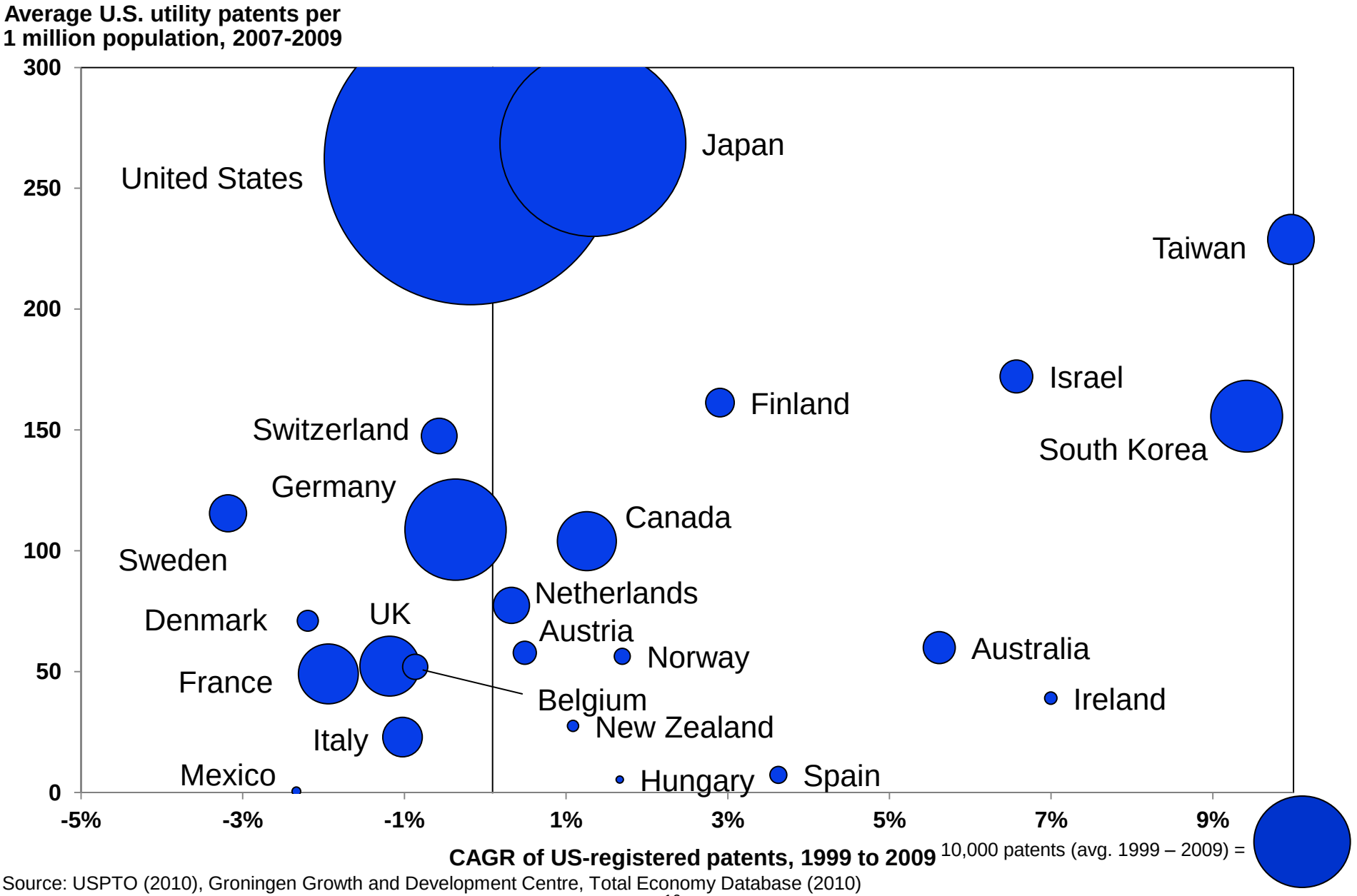
- Skill improvement
- Technology transfer institutions

- College education
- Applied research organizations

- Advanced university education, especially in science, technology, and management
- Scientific research institutions

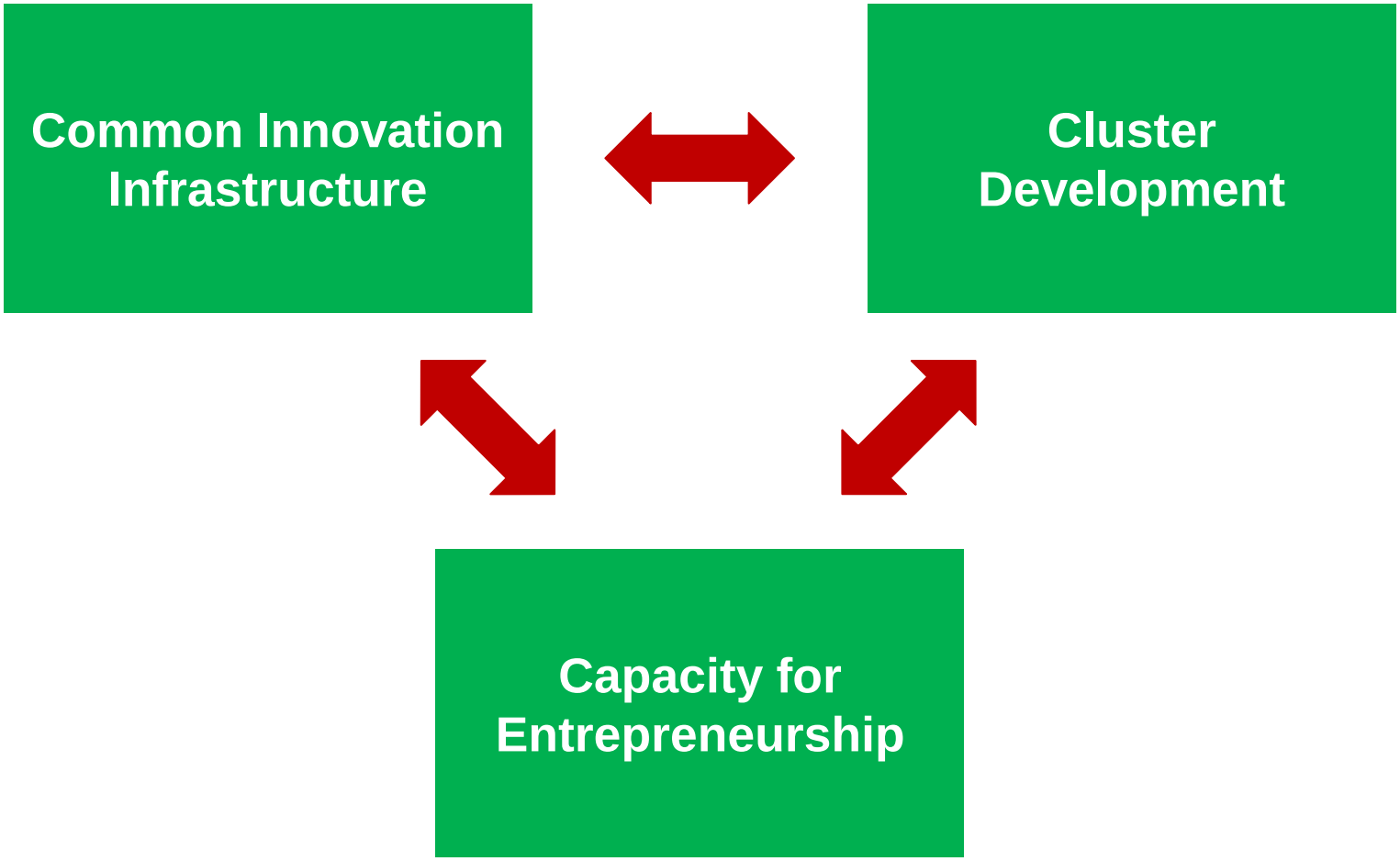
Innovative Output

Selected OECD Countries, 1999 to 2009



Source: USPTO (2010), Groningen Growth and Development Centre, Total Economy Database (2010)

Key Drivers of an Innovation-Driven Economy



- The innovative capacity of an economy depends on the **strength of each area** and on the **linkages** among them

Source: Furman.Porter/Stern

Common Innovation Infrastructure

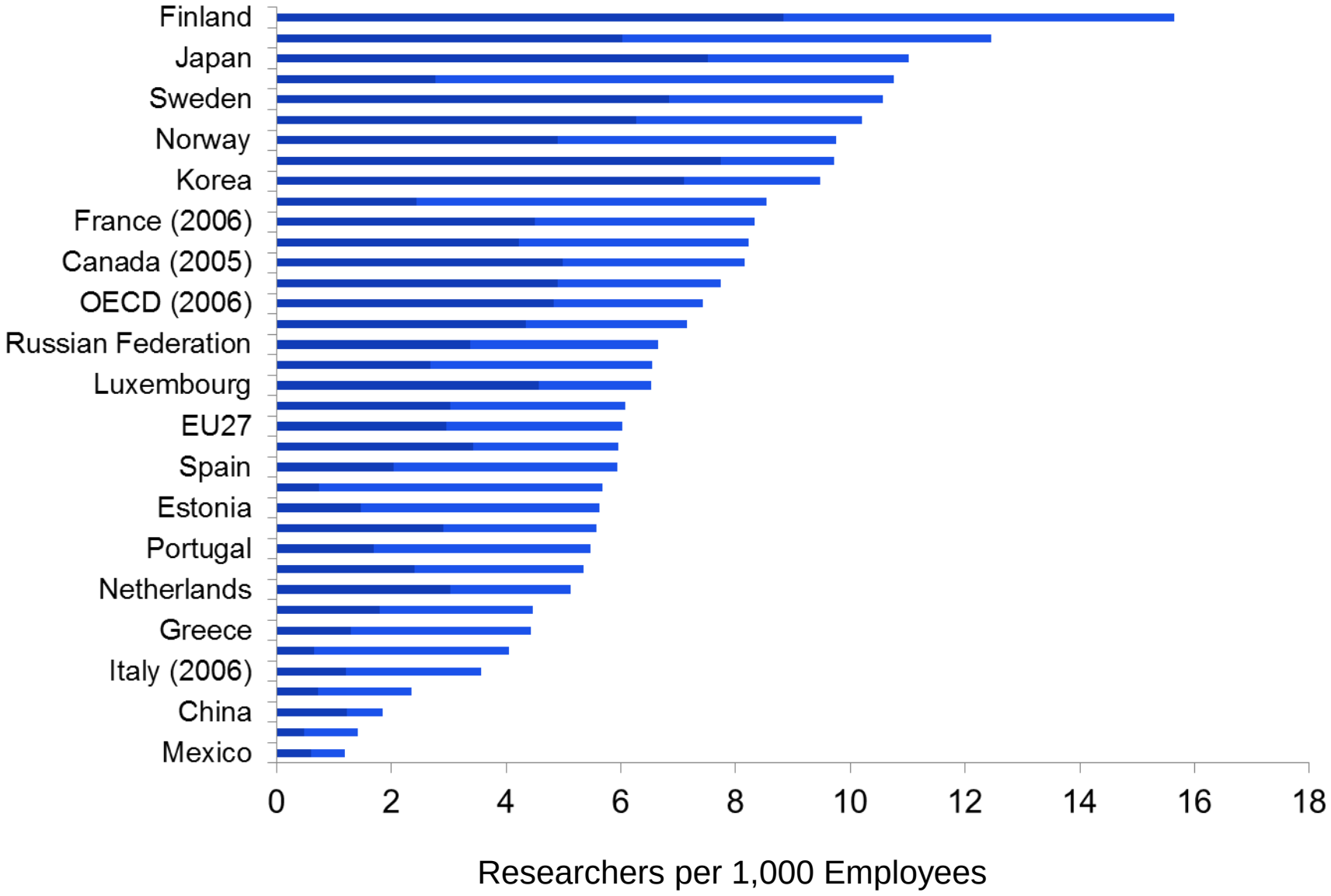
Innovation Resources

- Science and engineering workforce
- Access to universities and postgraduate education
- Funding for basic science and technology
- Sophisticated Information Technology infrastructure

Innovation Policy

- Intellectual property protection
- R&D incentives
- Government procurement of advanced products
- Openness to international trade and investment

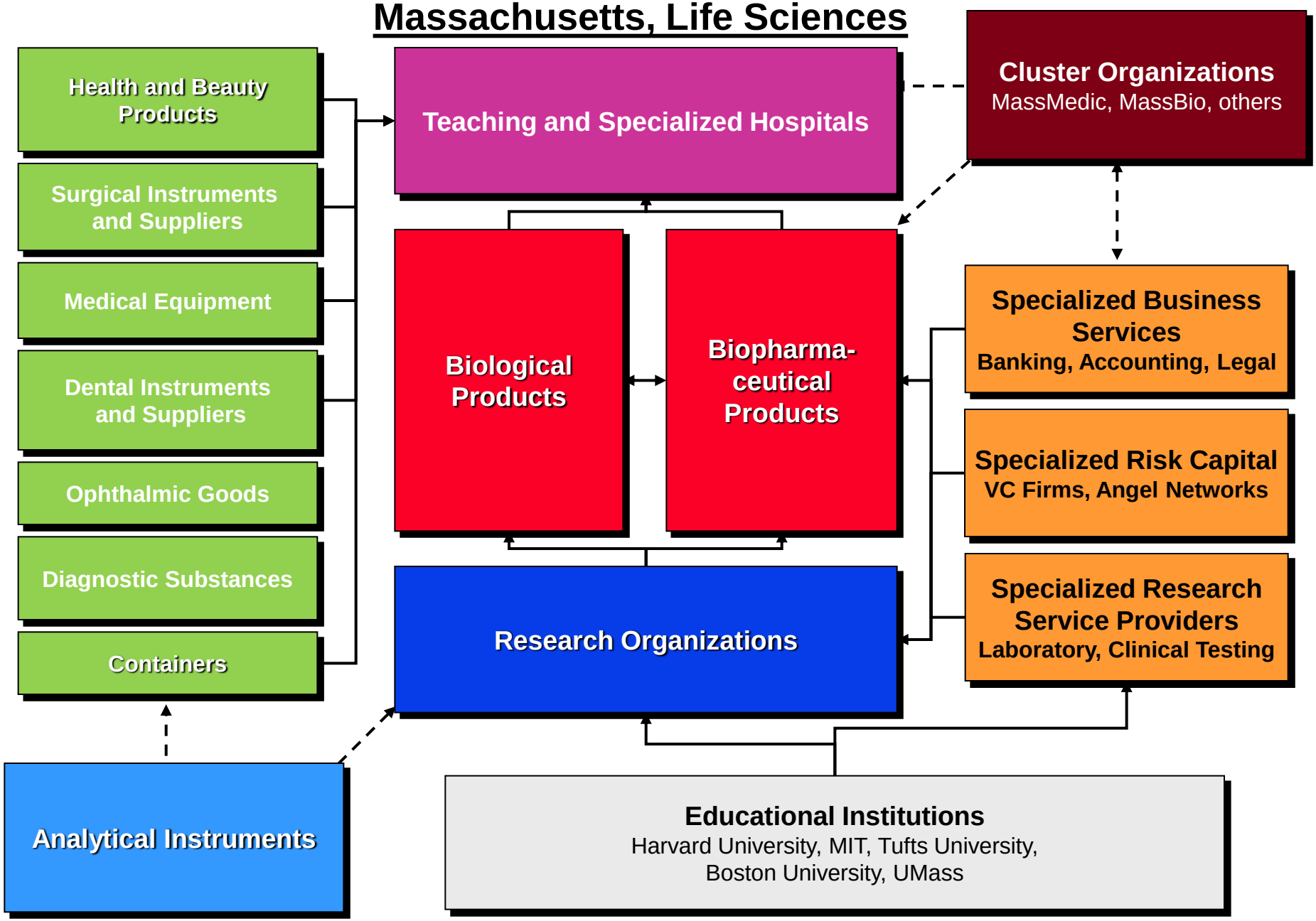
Science and Engineering Workforce



Source: OECD

Clusters and Innovation

Massachusetts, Life Sciences



Clusters and Innovation

- Clusters **increase productivity** and **operational efficiency**
- Clusters stimulate and enable **innovations**
- Clusters facilitate **commercialization** and **new business formation**

- Clusters reflect the fundamental importance to productivity and innovation of **linkages and spill-overs** across firms and associated institutions

Institutions for Collaboration

Selected Massachusetts Organizations, Life Sciences

Life Sciences Industry Associations

- Massachusetts Biotechnology Council
- Massachusetts Medical Device Industry Council
- Massachusetts Hospital Association

University Initiatives

- Harvard Biomedical Community
- MIT Enterprise Forum
- Biotech Club at Harvard Medical School
- Technology Transfer offices

General Industry Associations

- Associated Industries of Massachusetts
- Greater Boston Chamber of Commerce
- High Tech Council of Massachusetts

Informal networks

- Company alumni groups
- Venture capital community
- University alumni groups

Economic Development Initiatives

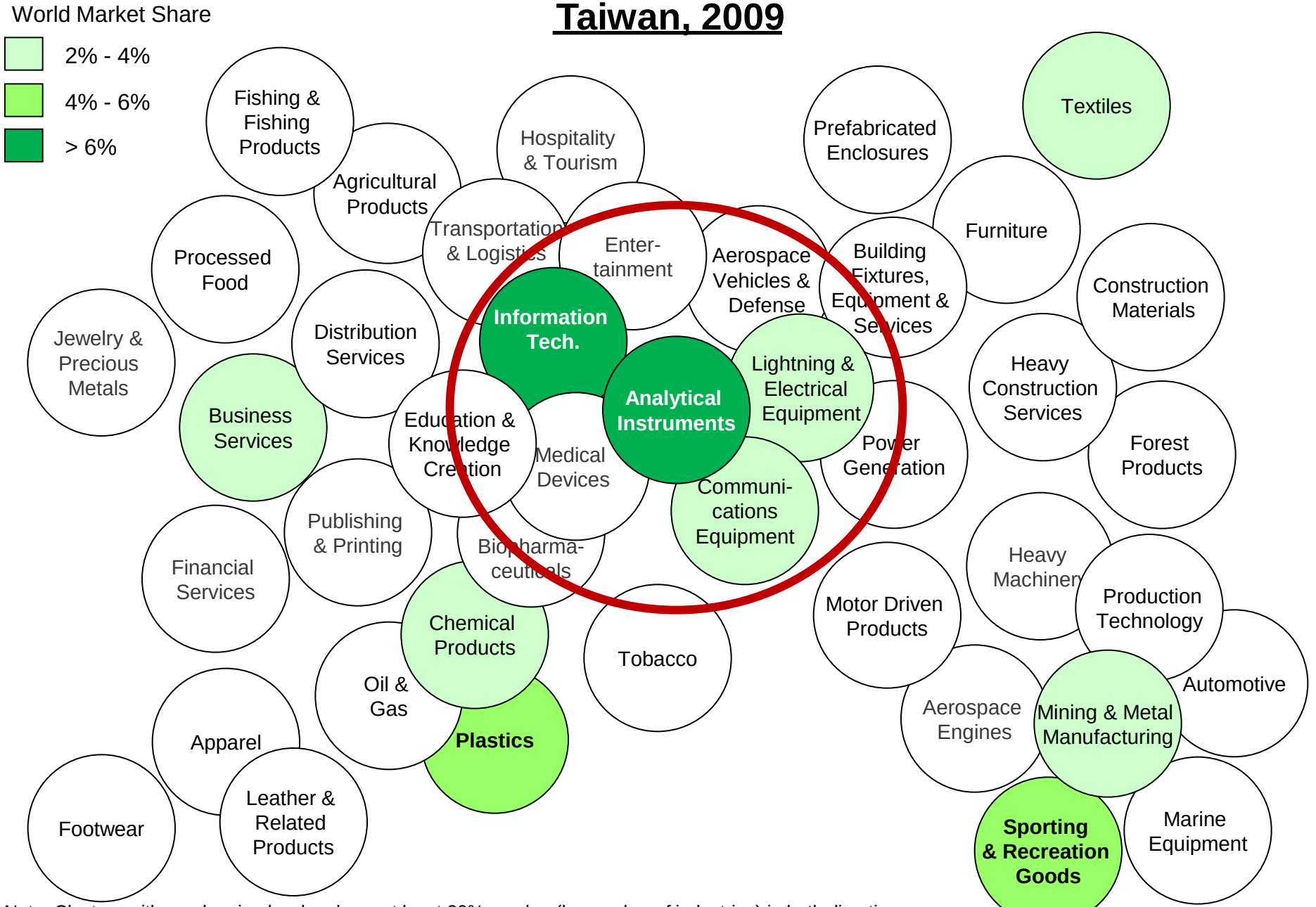
- Massachusetts Technology Collaborative
- Mass Biomedical Initiatives
- Mass Development
- Massachusetts Alliance for Economic Development

Joint Research Initiatives

- New England Healthcare Institute
- Whitehead Institute For Biomedical Research
- Center for Integration of Medicine and Innovative Technology (CIMIT)

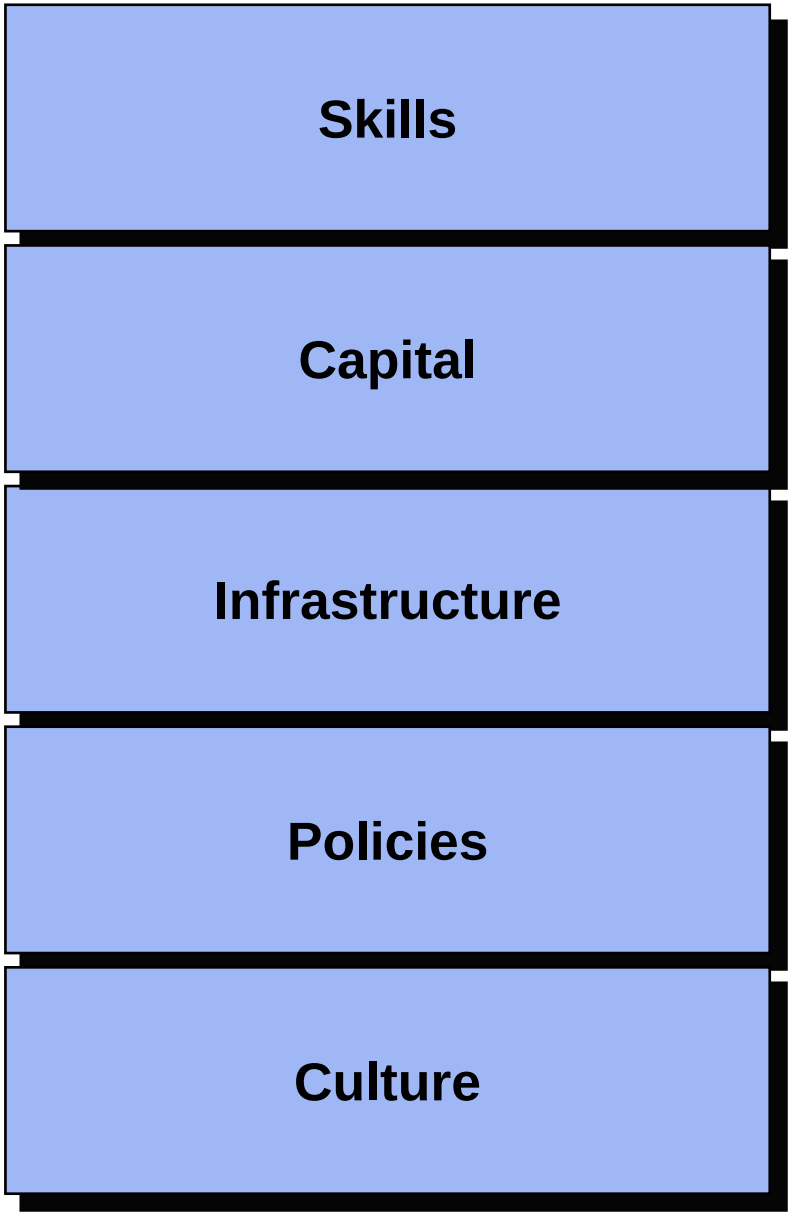
Share of World Exports by Cluster

Taiwan, 2009



Note: Clusters with overlapping borders have at least 20% overlap (by number of industries) in both directions.

Capacity for Entrepreneurship



- Entrepreneurship training
- Mentorship programs
- Entrepreneur networks

- Risk capital providers
- Angel funding
- Tax policies encouraging risk capital

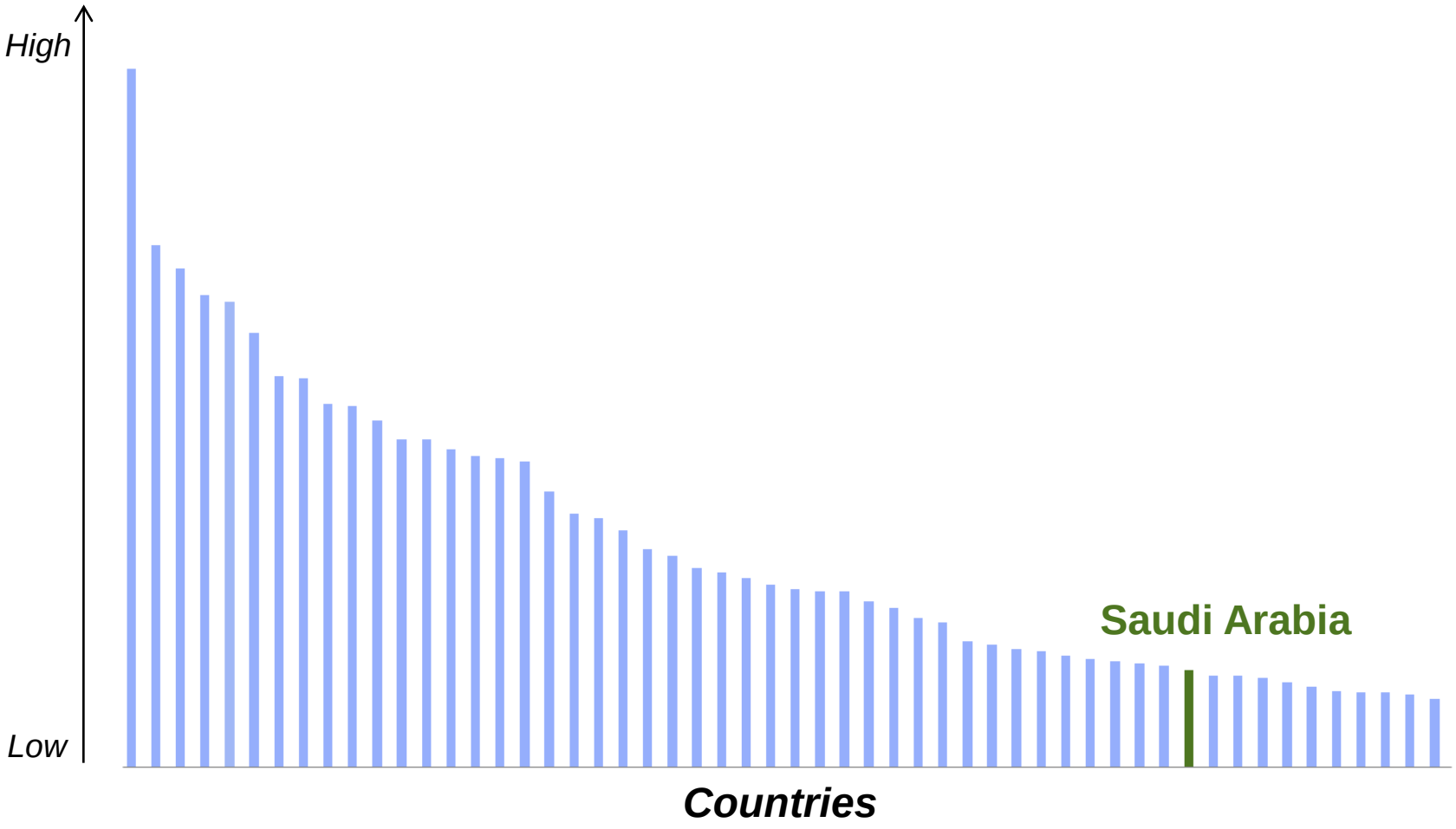
- Access to facilities, incubators
- Services for start ups (legal, accounting, HR)

- Ease of incorporation
- Ease of doing business
- Bankruptcy laws

- Public recognition of entrepreneurs
- Risks of failure

Total Early-Stage Entrepreneurial Activity

G.E.M. Index, 2009



Source: Global Entrepreneurship Monitor (2010)

Progress Towards an Innovation-Driven Economy

Saudi Arabia and other Emerging Economies

Country	Total U.S. Patents 1980 - 1989	Total U.S. Patents 1990 - 1999	Total U.S. Patents 2000 - 2009	CAGR (1980 - 2009)
GCC				
Saudi Arabia	38	96	184	6%
Kuwait	14	23	79	6%
United Arab Emirates	7	11	48	7%
Latin America				
Argentina	184	292	444	3%
Brazil	269	613	1,032	5%
Chile	31	76	147	5%
Costa Rica	15	27	46	6%
Mexico	393	446	738	1%
Asia				
China	134	571	6,019	14%
India	108	442	3,987	13%
Indonesia	15	44	56	5%
Malaysia	19	132	935	14%
Thailand	18	72	229	9%

Note: CAGR based on period averages.
Source: U.S. Patents, USPatent and Trademark Office

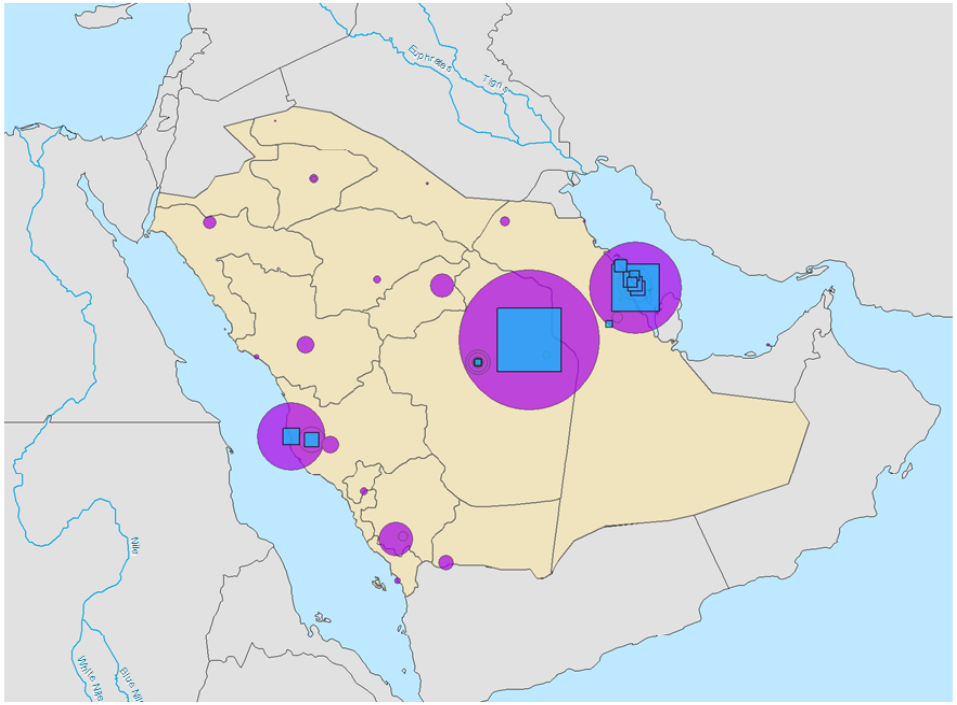
Innovation in Saudi Arabia
Leading Patent Originators

Organization	2005	2006	2007	2008	2009	Total
Saudi Arabian Oil Company	12	5	10	20	8	55
Saudi Basic Industries Corporation	3	7	3	3	1	17
King Fahd University Of Petroleum And Minerals, Research Institute	1	0	1	2	8	12
Other organizations	1	1	4	3	4	13
Individually Owned Patents	1	6	2	2	1	12
Total Saudi Utility Patents	*18*	*19*	*20*	*30*	*22*	*109*

Note: Includes only organizations receiving more than 5 patents in this period
Source: USPTO (2010)

Distribution of Saudi Arabian Innovation Output

Science Research Indicators:
Kingdom of Saudi Arabia (2000-2006)



Legend		
Key	Indicator	Range
●	Publications	1 - 5434
■	USPTO Utility Patent Grants	1 - 88

Data Sources: *ISI Web of Science* (Publications), *Delphion* (Patents)

Source: Monitor Company

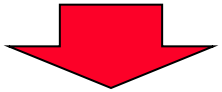
Selected Innovation Policy Initiatives
Saudi Arabia

Universities and Science Parks

- King Abdullah University of Science and Technology (KAUST)
- King Abdulaziz City for Science and Technology (KACST)
- King Fahd University of Petroleum and Minerals (KFUPM)
- KAUST Research Park and Innovation Cluster
- Dhahran Techno-Valley
- Riyadh Techno Valley

Policies

- National Science, Technology & Innovation Plan (NSTIP)
- STC Venture Capital Fund
- Economic Offset Program
- The Centennial Fund
- SMEs Funding Guarantee Program
- Scientific Creativity Awards / Intel Int'l Science and Engineering Fair
- Mawhiba Young Leader Program



- Numerous government initiatives to support innovation

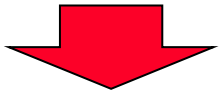
Source: Monitor Company

Innovation in Saudi Arabia: Progress

- Significant efforts to improve **common innovation infrastructure**
- High dependence on expatriate skills and challenges in developing **local human resource capacity**
- Programs focused on leading global partners and high involvement of government, with the need to foster greater **grassroots efforts** involving a wide array of Saudi companies
- **Cluster development remains concentrated in** oil and industries and petrochemicals
- **Entrepreneurship** has only recently become a priority
- Innovation programs are in need of **greater coordination**

An Innovation Agenda for Saudi Arabia
The Next Steps

- Supplement leading edge research efforts with programs targeted at **mainstream Saudi companies**
  - Technology Transfer
- Improve **linkages** between academic institutions and companies
- Organize innovation policy more tightly around **clusters**
  - This will improve coordination across the large number of individual policy efforts to support innovation
- Launch comprehensive program to improve capacity for **entrepreneurship**



- Define a **distinctive role** for Saudi Arabia in the global innovation system

Competitiveness and Innovation

- Competitiveness upgrading is a **critical priority** for every country – even more so after the recent crisis
- As economies progress, further gains in competitiveness increasingly require **innovation**
- Innovation occurs, where a strong **innovation infrastructure**, **dynamic clusters**, and an **entrepreneurial culture** are tightly connected
- Saudi-Arabia has over the last few years been **leading reformer**, significantly improving its competitiveness fundamentals
- To revive the **innovative traditions** of the Arab world, Saudi Arabia needs to deepen and diversify its cluster portfolio and create a more environmental climate