

Unleashing **INDIA'S** Innovation

Toward Sustainable and Inclusive Growth



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THE WORLD BANK

Overview of presentation

1. India's context (WHY)

- Economic dualism
- Productivity dispersion  Broad-based innovation

2. Enabling environment for innovation (WHAT)

- Competition as key spur to innovation
- Skills and absorptive capacity

3. Policy options for inclusive innovation (HOW)

- Harnessing formal creation activities for the poor
- Promoting and diffusing grassroots innovations
- Helping enterprises better absorb knowledge

1. WHY unleash innovation: a broad definition of innovation

**CREATION &
COMMERCIALIZATION**

**Shifting out the global
frontier of knowledge**



**Product
Innovation**

**Process
Innovation**

**Organizational
Innovation**

**DIFFUSION &
ABSORPTION**

**Moving toward the
global frontier of
knowledge**



Sustainable and Inclusive Growth

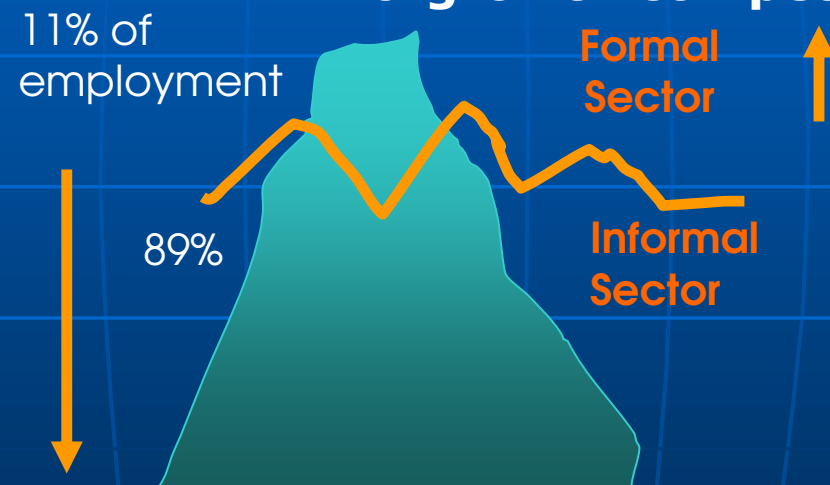
Unleashed innovation needs to focus on the reality of Dual India

Context

- Nuclear and space power
- Top innovation player

Challenge

- Pro-growth competitiveness agenda



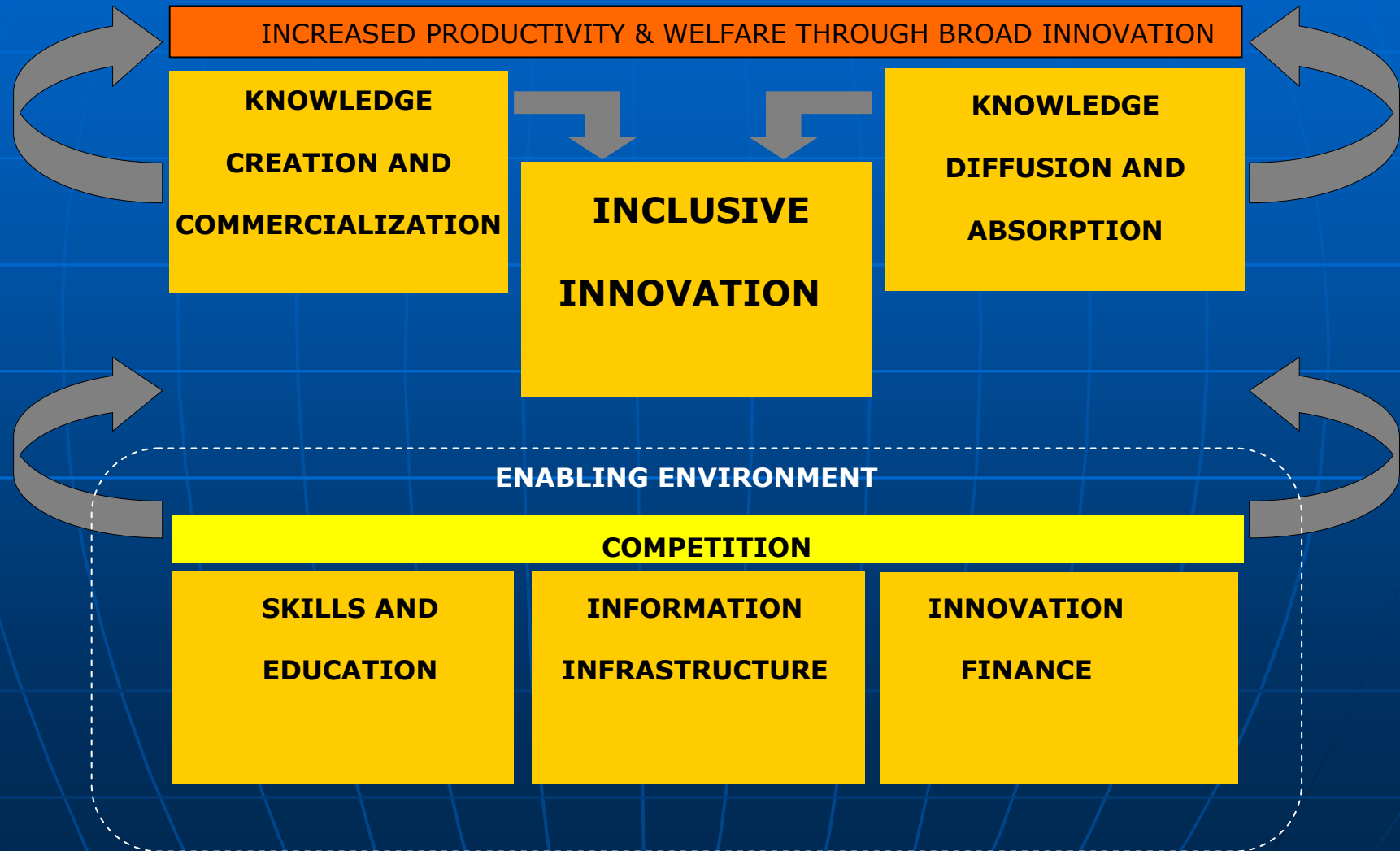
Context

- 1/4 of population below poverty
- 70% rural, 46% of women illiterate

Challenge

- Pro-poor inclusiveness agenda

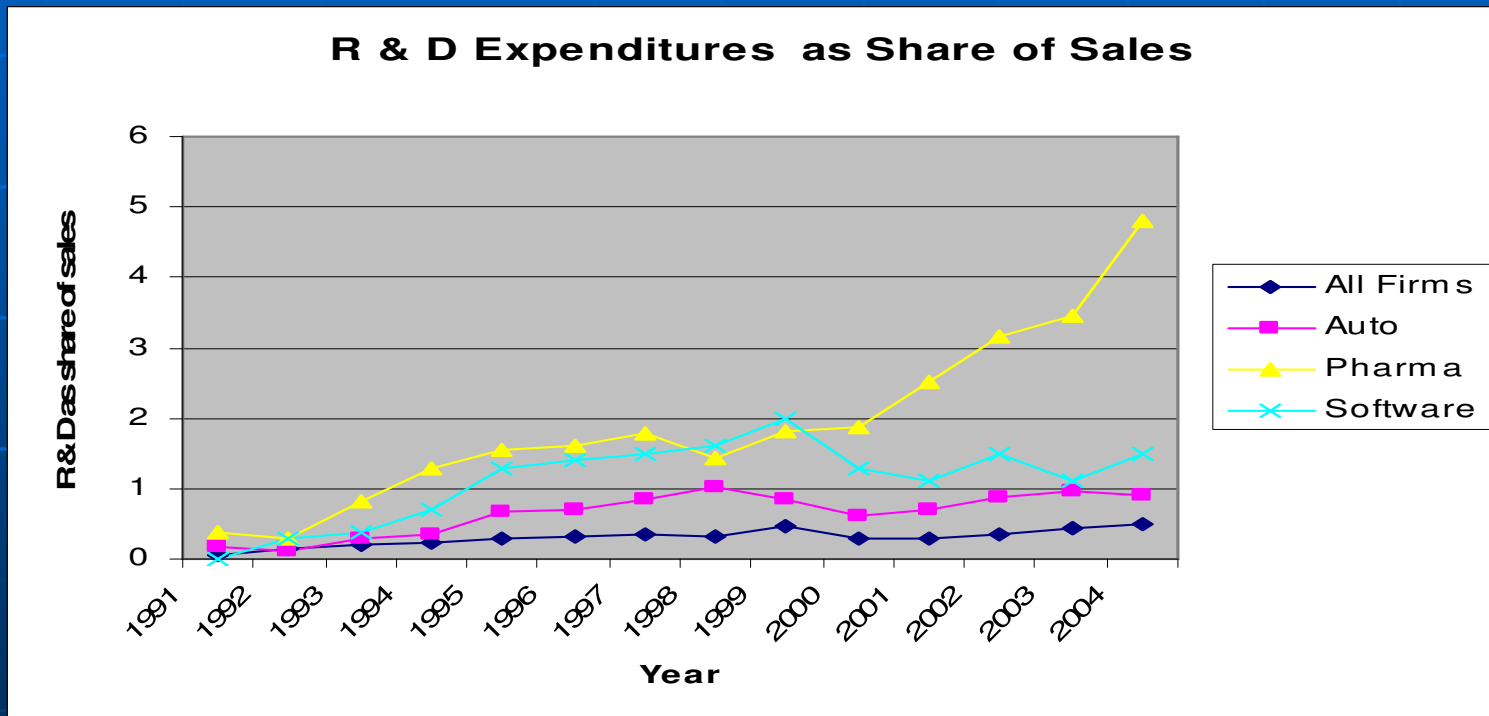
2. WHAT needs to be done: enabling inclusive innovation



Components of enabling environment	Policies	Institutions	Capabilities
Creation and commercialization of new knowledge	<ul style="list-style-type: none"> • Policies to promote more private R&D <ul style="list-style-type: none"> ○ <i>IPR regime</i> ○ <i>Matching grants</i> ○ <i>Tax subsidies</i> • Public spending on R&D <ul style="list-style-type: none"> ○ <i>National mission programs</i> ○ <i>Competitive grants</i> ○ <i>Peer reviews</i> • Pro-innovation public procurement • Support for pro-poor innovations 	<ul style="list-style-type: none"> • Public labs, universities • Private R&D labs • IPR institutions • Technology transfer offices • Science and technology parks • Technology incubators • Research and education networks • Specialized nongovernmental institutions • Grassroots networks • Early-stage technology development finance and venture capital 	<ul style="list-style-type: none"> • High-level human capital for R&D (scientists, engineers, technicians) • Techno-entrepreneurship
Diffusion and absorption of existing knowledge in new locations	<ul style="list-style-type: none"> • Openness to global knowledge flows <ul style="list-style-type: none"> ○ <i>Trade</i> ○ <i>FDI & JVs</i> ○ <i>Technology licensing policy</i> ○ <i>Internet access</i> • Foreign education and attracting the diaspora <ul style="list-style-type: none"> ○ <i>Cross-border flows</i> ○ <i>Betw. FDI subsid. and local firms</i> 	<ul style="list-style-type: none"> • Technical information services • Technology upgrading • Productivity organizations • Metrology, standards, testing, and quality control systems • National research and education networks • Networks at cluster level • Technology absorption finance for micro, small, and medium enterprises 	<ul style="list-style-type: none"> • Formal education and skills • Engineering consulting firms • Business support services
Broader investment climate	<ul style="list-style-type: none"> • Competition and trade • Regulatory policies, especially toward infrastructure • Entrepreneurship support • Good rule of law • Macroeconomic stability 	<ul style="list-style-type: none"> • Efficient financial system • Flexible labor market • Effective courts and judiciary • Market-responsive formal education institutions and lifelong learning system 	<ul style="list-style-type: none"> • Literacy • Secondary and higher education graduates • Managers • Entrepreneurs

Competition is critical for innovation

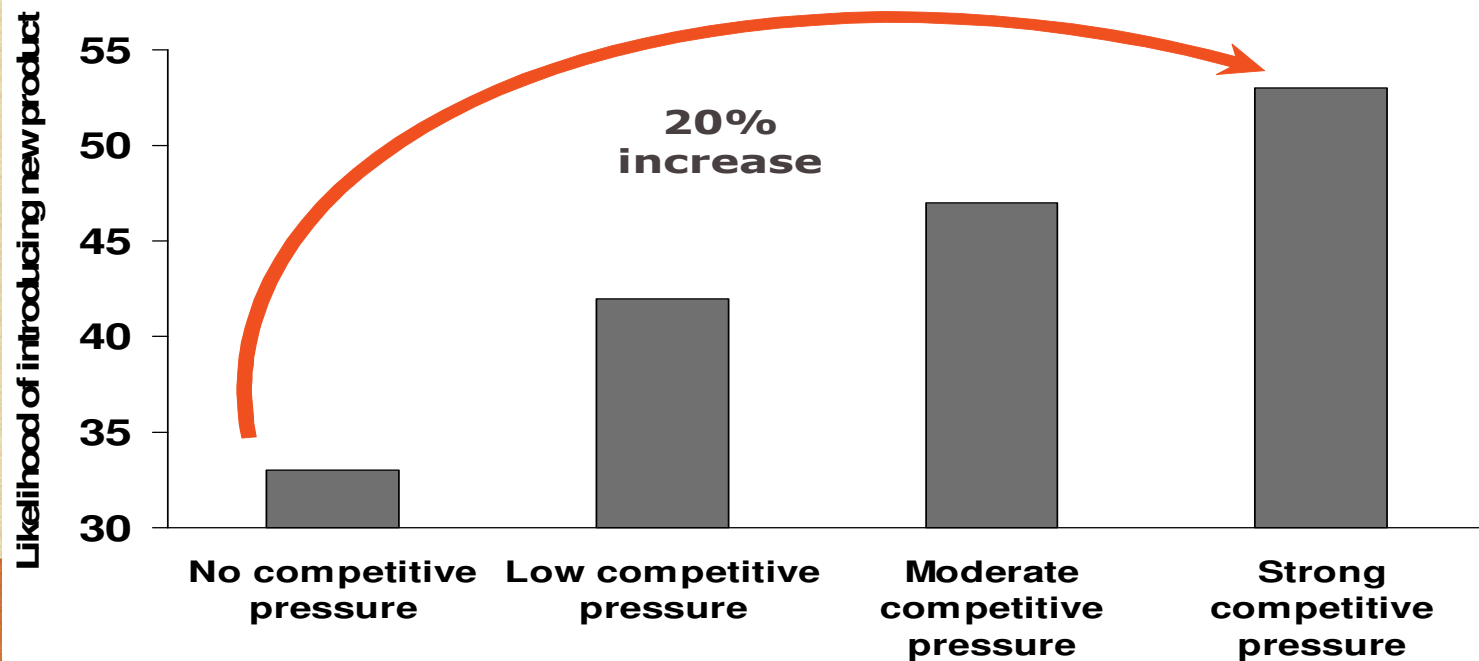
R&D Intensity of Indian Corporates, 1991-2004



- after early 90s liberalization, R&D spending increased more than 7-fold

Competition is critical for innovation: recent evidence from Russia (1)

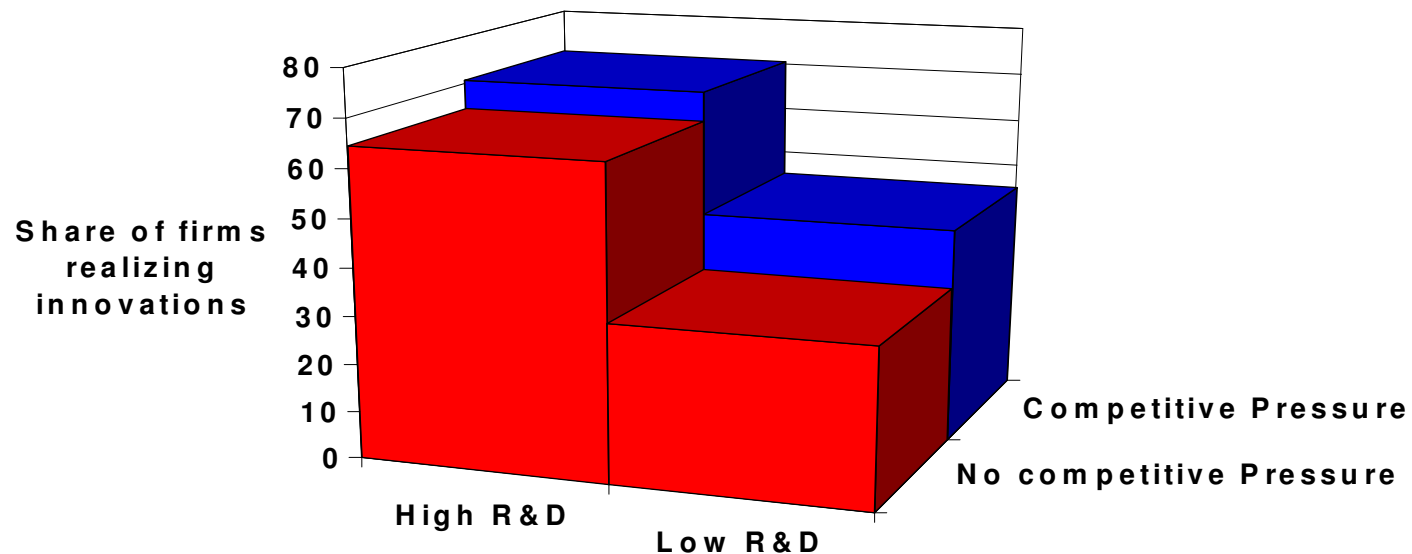
Increasing competitive pressure can boost innovation



See R.Desai and I.Goldberg, eds. *Can Russia Compete?* Brookings Institution, 2008

Competition is critical for innovation: recent evidence from Russia (2)

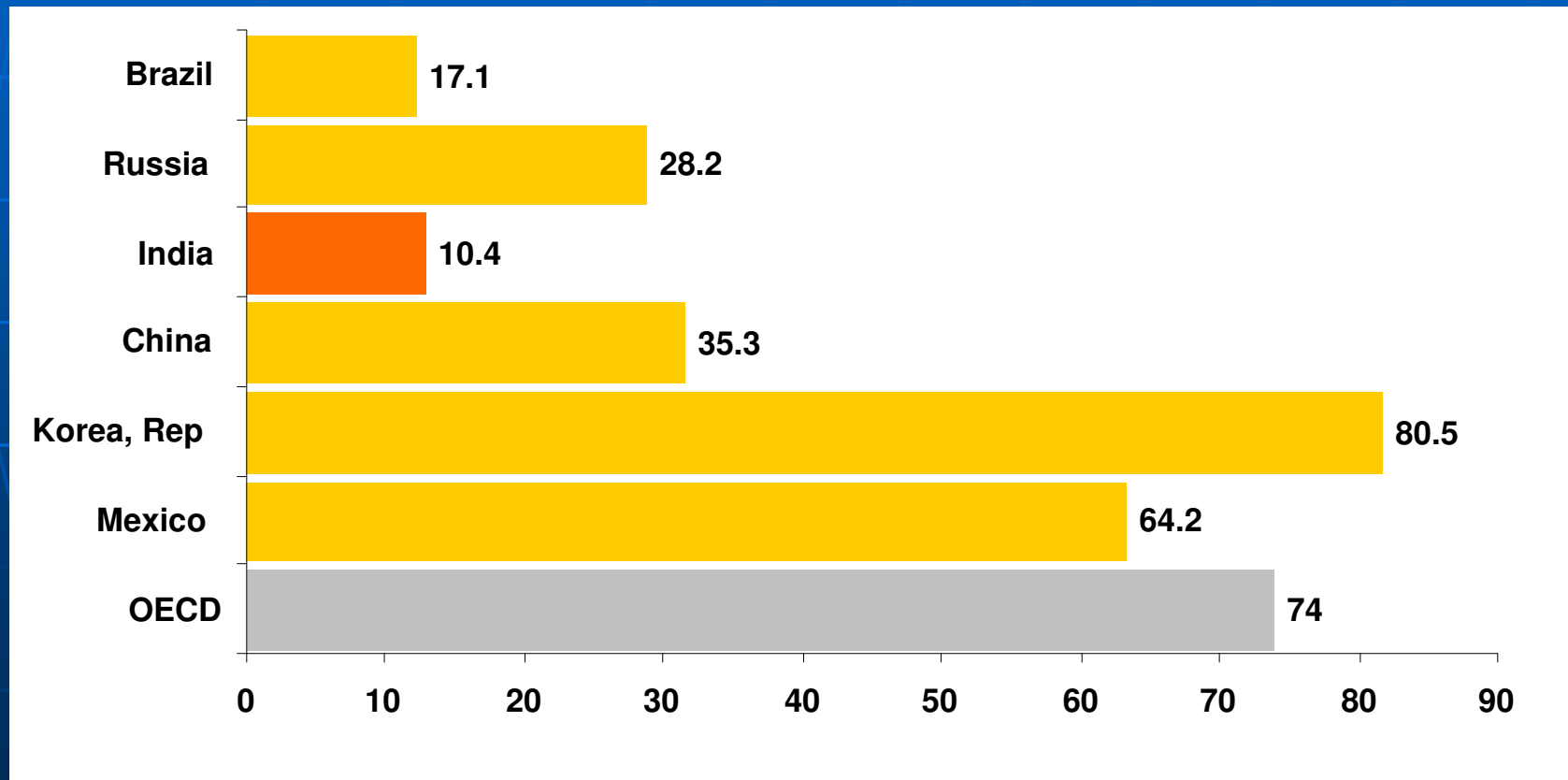
Firms that operate in less competitive environments also spend less on R&D and innovate less



See R.Desai and I.Goldberg, eds. *Can Russia Compete?* Brookings Institution, 2008

To spur experimentation & risk-taking, reform bankruptcy for easier re-entry

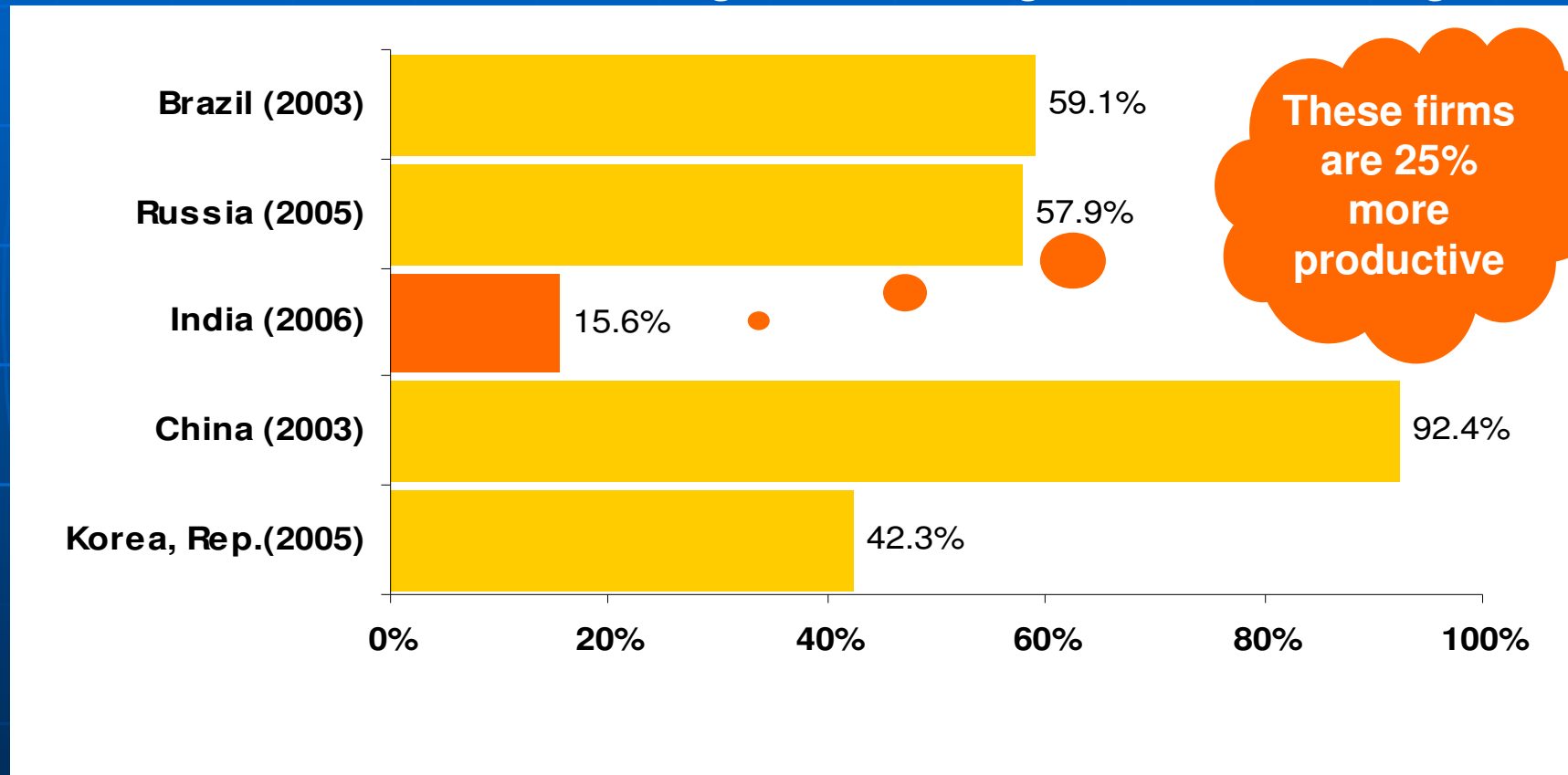
Recovery Rates when Closing a Business (cents on \$)



- increase competition & innovation by reforming bankruptcy process

To promote continuous learning, invest more for in-service training

% Formal Manufacturing Firms offering In-Service Training



- increase quality and quantity of education and training to increase skills

Many outstanding questions remain on most appropriate enabling environment

Inward FDI and IPRs by Level of Economic Development

Dependent Variable:	Inward FDI Stock (in real 2000 U.S. dollars)			
	All Countries	Developed Countries	Developing Countries	Least Developed Countries
Constant	-9.23*** (1.33)	-1.67 (4.25)	-8.73*** (2.37)	-32.7*** (7.14)
Patent Rights Index	2.01*** (0.19)	11.2*** (1.12)	1.65*** (0.19)	1.66** (0.76)
Real GDP per capita	0.96*** (0.06)	-0.27 (0.32)	0.99*** (0.099)	3.34*** (0.47)
Freedom to Trade Internationally	2.52*** (0.47)	2.14 (1.42)	1.78** (0.75)	1.88** (0.78)
Doing Business Rank	-0.027 (0.053)	-0.19 (0.098)	0.11 (0.13)	3.17*** (1.13)
IPR Survey	1.61*** (0.49)	6.88*** (1.91)	1.63*** (0.61)	-6.11** (2.64)
Legal Effectiveness	0.87*** (0.32)	-2.18*** (0.85)	0.70 (0.37)	0.84 (0.60)
Physical Property Rights	0.37 (0.58)	-6.19** (2.66)	0.94 (0.72)	4.43* (2.32)
Governance	-1.69*** (0.19)	-0.29 (0.60)	-1.51*** (0.31)	0.10 (0.85)
Number of Observations	261	67	163	31
Pseudo-R ₂	63.1%	69.6%	35.1%	57.3%

Note: Variables are in natural log units, except for Governance. Standard errors are in parentheses. ***, ** indicate statistical significance at the 1% & 5% levels. Estimation is by Feasible GLS.

Source: W. Park and D. Lippoldt (2008), "Technology Transfer and the Economic Implications of the Strengthening of IPRs in Developing Countries", OECD Trade Policy Working Papers No. 62.

3. HOW: Policy options to make innovation work better for the poor

(1) Formal creation activities

- Increase and redirect R&D for the poor (incentives to better meet the needs of the poor)

(2) Grassroots creation activities

- Promote, commercialize and diffuse (support networks & incentives for diffusion of new ideas)

(3) Absorption of knowledge by enterprises

- Build capacities (technology upgrading programs)

(1) Harness formal creation activities

Support early-stage tech development

(from ideas to proof of concept)

Strengthen & scale-up existing programs thru risk-sharing competitive **matching grant funding & PPPs**:

- Appropriate technologies: **individual** SMEs or collaborations for pro-growth or inclusive projects
 - build on SBIRI (Small Business Innovation Research Initiative)
- Frontier technologies: **consortia** of firms, R&D labs and universities
 - build on NMITLI (New Millennium Indian Technology Leadership Initiative) & OSDD (Open Source Drug Discovery consortium)

(2) Promote grassroots innovations

Deepen pipeline of “VC-ready” projects and provide access to early-stage funding

- Rural grassroots informal business ventures
- High-tech ventures from R&D labs, universities and others
- **Deal flow support services**: increase quality and volume of deal flow thru support to “Tech Assistance Companies”
 - services include technology/market assessment, business plan formulation, testing/validation, market linkage development, and legal advice on IP strategy
- **Risk capital finance**: SPV to manage 2 kinds of funds-of-funds for demonstration impact
 - FOF Tech: investments in higher-tech ventures
 - FOF BOP: riskier investments in ventures to benefit the poor

(3) Help firms better absorb knowledge

Introduce “**strategic**” pilots (scalability & diffusion)

- based on search networks (to unblock identified successive constraints to development)
- allowing beneficiaries to re-assemble existing programs to meet local needs
- supported by bottom-up contests for matching grants

■ **Support enterprise-led cluster initiatives**

- Spur and strengthen technology upgrading initiatives (with enterprise association or other local institution as Implementing Agency)

■ **Improve access to global knowledge**

- Build up capabilities of diaspora networks

Coordination challenges

Pragmatic coordination

- Dialogue and consensus building
- Priorities: sequencing/ ease of implementation
- Actions by government, private sector, civil society

Data-driven, outcome-focused policy choices

- Evidence-based assessment of what works and doesn't
- Ex-ante: Include elements of randomized field trials in "new" programs
- Ex-post: Conduct regular, independent evaluations with international benchmarking