



UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION



SUSTAINABLE DEVELOPMENT GOAL 9
INDUSTRY, INNOVATION AND INFRASTRUCTURE

Design and Implementation of Innovation Policies: An Industrial Policy Perspective

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SUSTAINABLE DEVELOPMENT GOAL 9

Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation



ISID: Support industrialization considering three types of possible outcomes (Lima Declaration, 2013):

Inclusiveness

Economic

Sustainability





Walking the talk:

- 1. Innovation and innovation policy from a developmental perspective**
- 2. Renewed impulse for the convergence of innovation policy and industrial policy**
- 3. Policy making as a learning process**
- 4. Policy instruments: an heterogeneous mix**
- 5. Historical evidence**
- 6. Looking ahead**



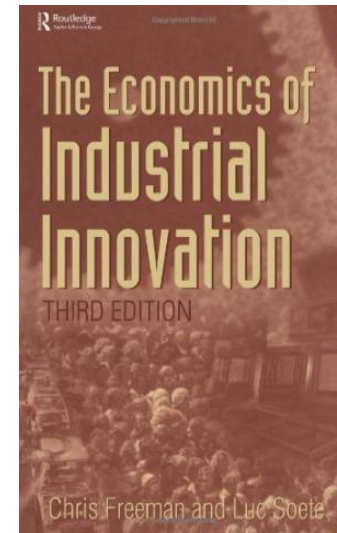


1. Innovation and innovation policy from a developmental perspective



Innovation is not an end in itself

“Innovation is of importance not only for increasing the wealth of nations in the narrow sense of increased prosperity, but also in the more fundamental sense of enabling people to do things which have never been done before. It enables the whole quality of life to be changed for better or for worse. It can mean not merely more of the same goods but a pattern of goods and services which has not previously existed, except in the imagination.” (Freeman and Soete, 1997:2)



Innovation goes beyond R&D

“It goes far beyond the confines of research labs to users, suppliers and consumers everywhere – in government, business and non-profit organisations, across borders, across sectors, and across institutions.” (OECD-Eurostat 2005)

Innovation policy is not just about promoting innovation

Citizen engagement is vital to ensure that science and technology **respond** to the challenges of international development ...



The Slow Race
Making technology work for the poor

Melissa Leach
Ian Scoones

“Innovation should focus not only on the technology, but also on the social, cultural and institutional relationships that will enable the technology to work.” (Leach and Scoones, 2006:29)



Slow race to citizen solutions



Race to the universal fix



Race to the top in the global economy



2. Renewed impulse for the convergence of innovation policy and industrial policy





- Industrial policy language still difficult to digest in certain circles, while the notion of innovation policy seems to provide space for public intervention
- Interest in leveraging/shaping domestic STI capabilities as drivers of industrial leadership, trade competitiveness and employment creation



Technological

Developmental

Logistics systems

Human systems

Smart Factory

Digital systems

Manufacturing systems

Future of manufacturing

Catch up

Industrial leadership

Falling behind?

Policy strategies

Learning and experimentation

Multiple interactions / coordination

Converging policy realms

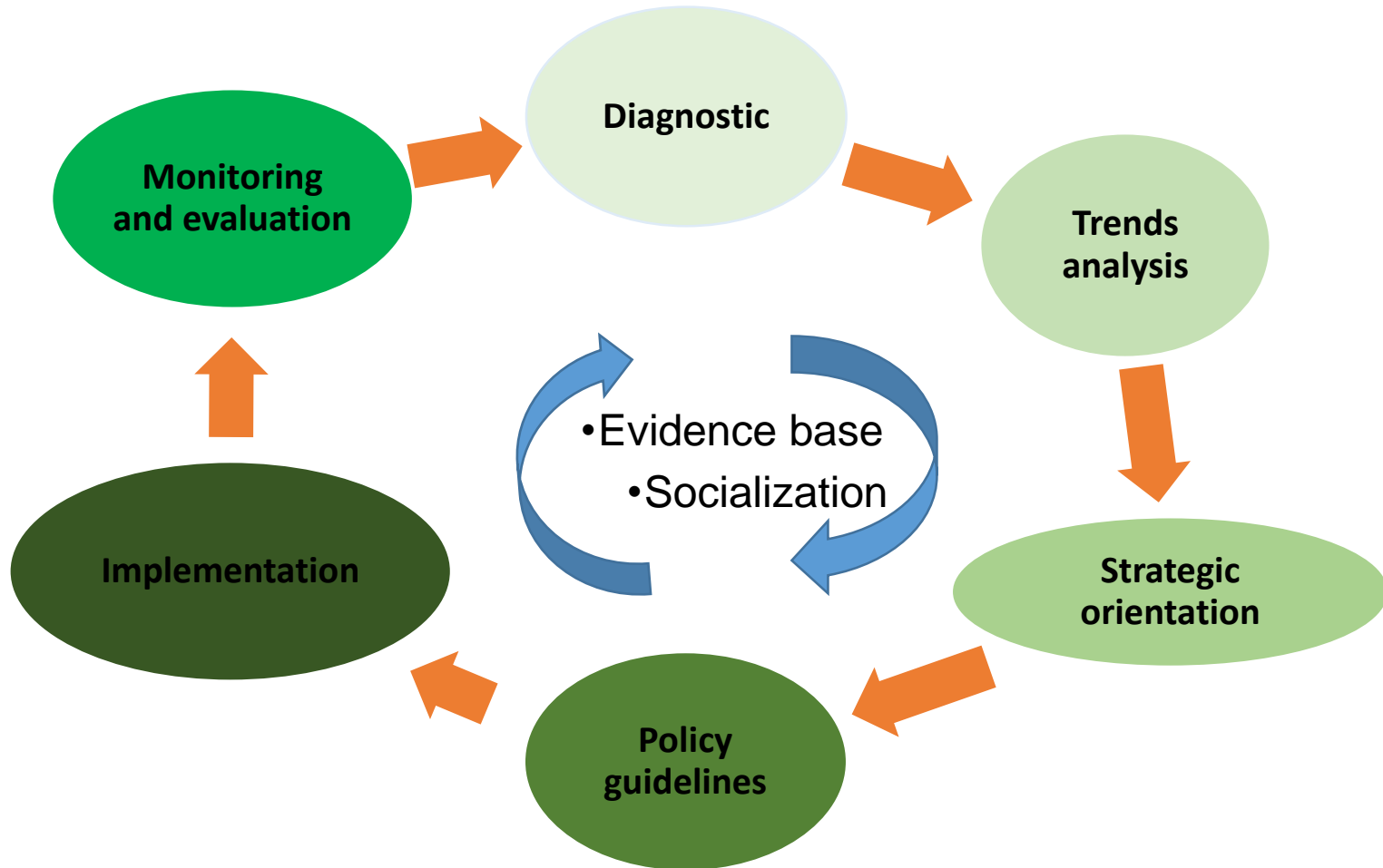
Distributed power

Context specific

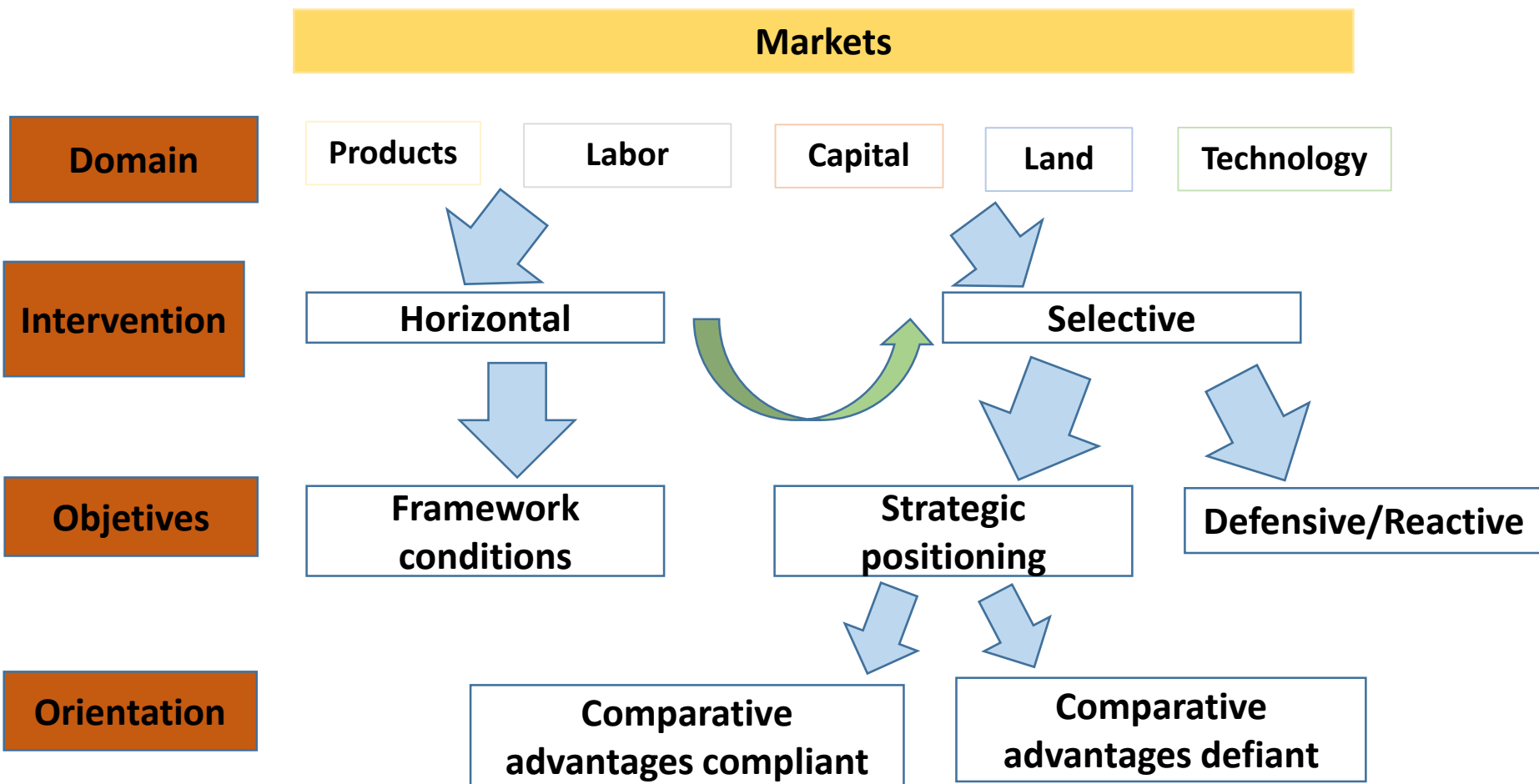


3. Policy making as a learning cycle



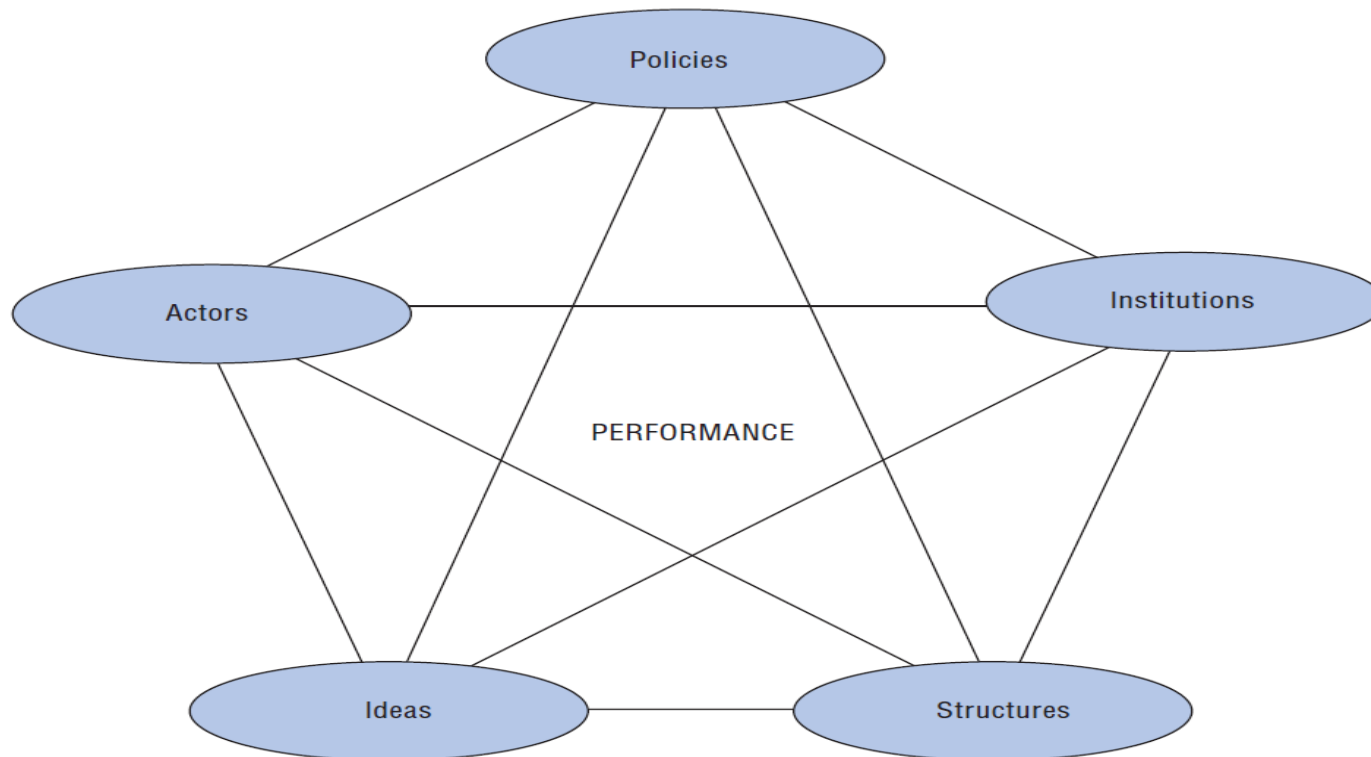


Policy Decision Tree: The choice for strategic orientations



Source: Adapted from Warick (2013:29)

Systemic failures: Interdependency of actors and factors that determine innovation and manufacturing performance



Source: OECD (2010:254)

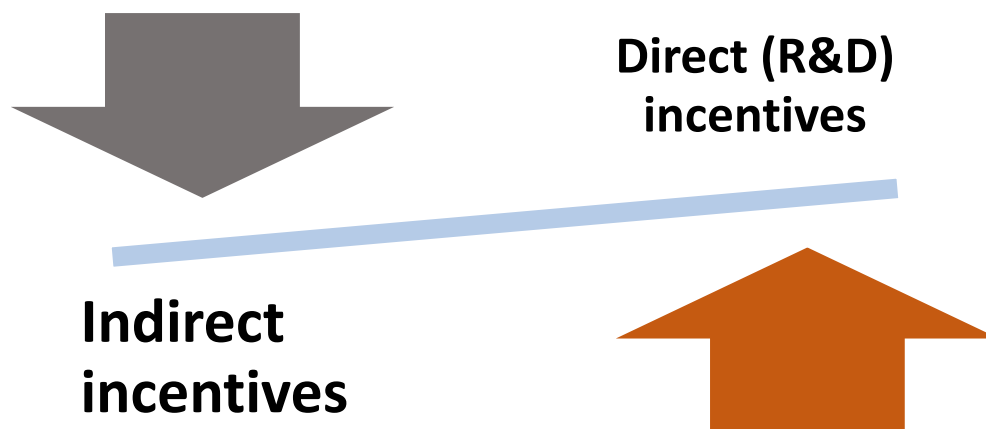


4. Policy instruments: an heterogeneous mix



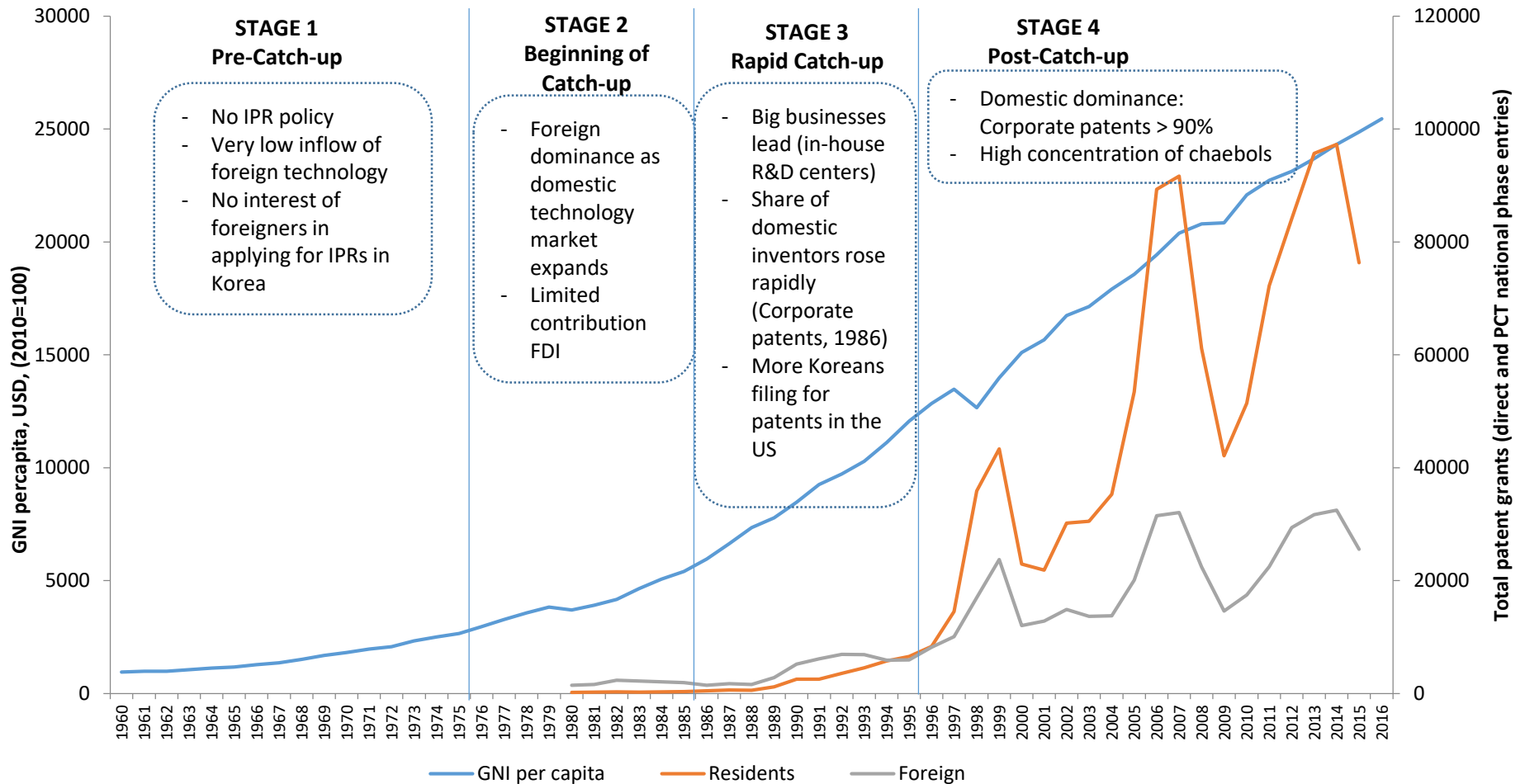
Policy instruments:

- Form a complex and heterogeneous portfolio that adjusts to the dynamics of innovation systems (optimality?)
- May work best in combination with other instruments (complementarity vs substitution)
- Can interact with market mechanisms potentiating or blocking one another (systemic nature)



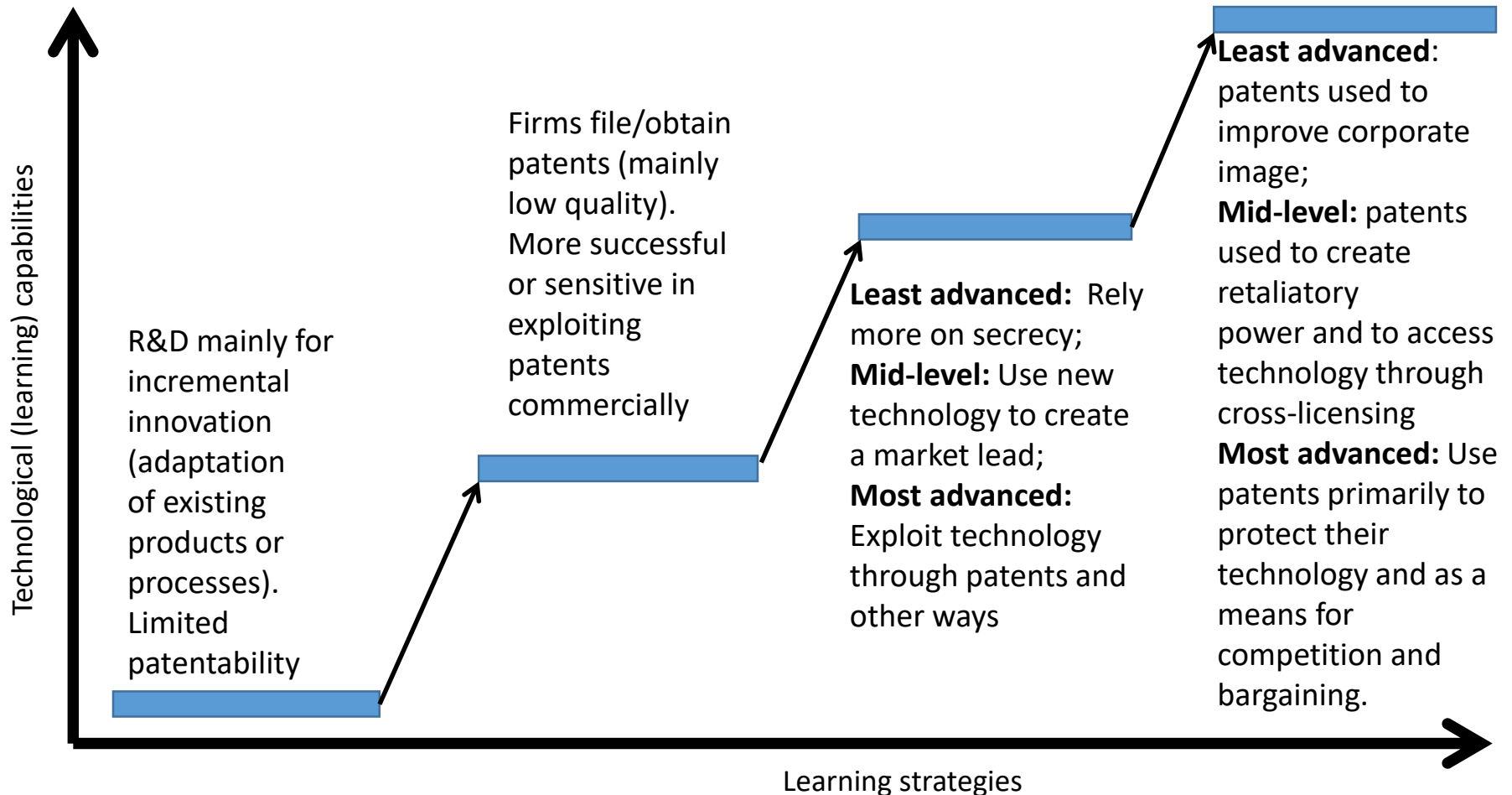
Izsák et al., (2013:15), Borrás and Edquist, (2013)

Intellectual Property Rights and industrialization in Rep. of Korea



Source: Based on Lee (2016). Data from WIPO and WB: World Development Indicators.

Sequencing latecomer's capability building and use of IPRs

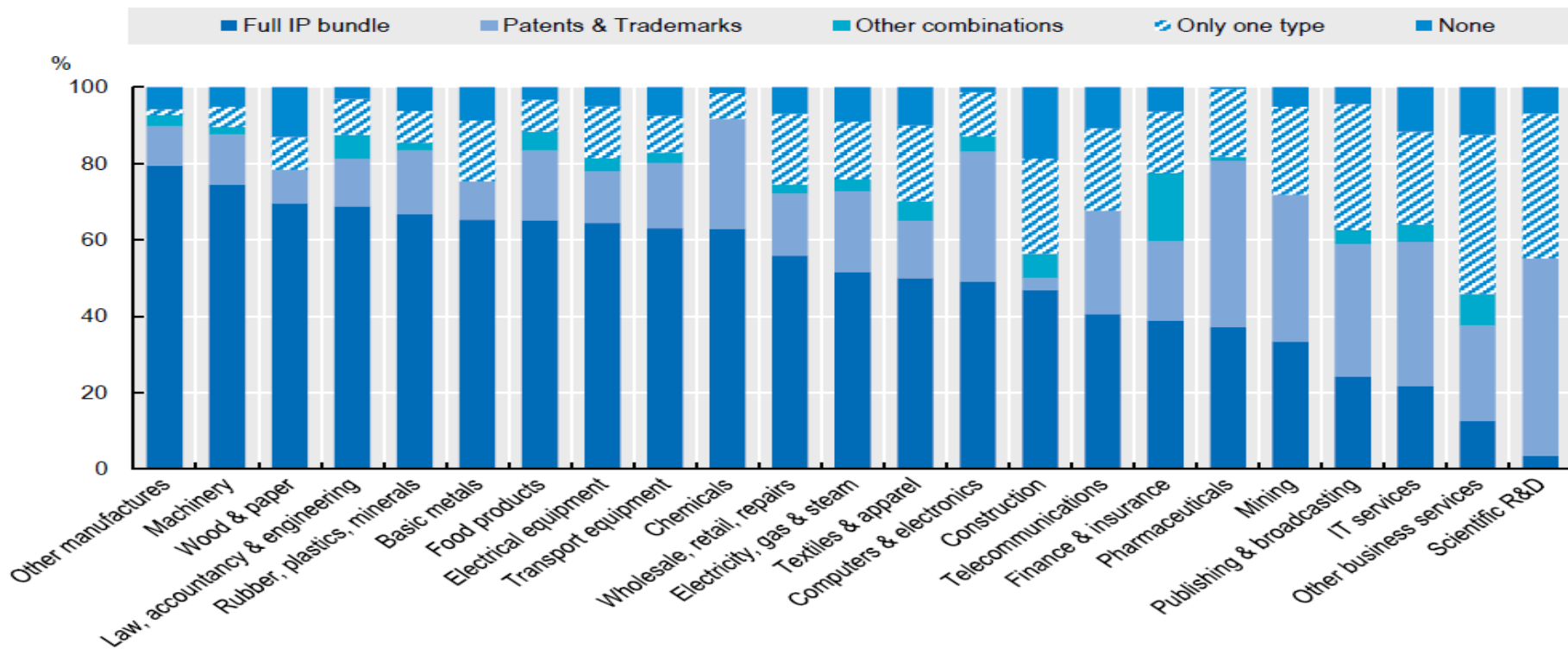


Source: Adapted from (Lee, 2016)

R&D and IPR are used distinctly and can have differentiated impacts across industries

Figure 4.9 - Top R&D investors with patents, trademarks and designs, by industry, ISIC rev. 4, 2012-14

Shares of companies with patents and/or trademarks and/or designs



Note: Data relate to industries with at least 20 company headquarters in the top 2,000 corporate R&D sample. Patent data refer to IP5 patent families filed in 2012-14; data for trademarks and designs refer to applications to the EUIPO, the JPO and the USPTO made in 2012-14.

Source: JRC-OECD, COR&DIP© database v.1., 2017.



5. Historical evidence





Brazil: Creation of an aerospace sector system of innovation

- Finding a market niche (commuter aircraft capable of serving airports with poor infrastructure);
- Channelling finance and design efforts to successfully develop a new product for this niche;
- Establishing a company to ensure commercial valorisation of innovations (Embraer, 1969);
- Creating new linkages to provide capital (government launch support, government commissioning and acquisition of the bulk of new planes, and a corporate tax incentive scheme channelling private capital to Embraer);
- Creating linkages to access technology (through exclusive co-production contracts, licensing agreements and support for R&D in aerospace and connected activities).

Source: Vértesy, (2011:141)

Malaysia's catching up in the palm oil industry

- Good governance: comprehensive, multi-level, multi-ministry, multi-year plans.
- Incorporate legislation, research, education policy, financing and investment, legal frameworks, taxation schemes, infrastructure, rural development and land distribution.
- Increased collaboration with funding bodies, NGOs and universities to foster research;
- Fiscal policies to support the development of the domestic market;
- Pro-active strategy to promote export orientation and as the industry consolidated, export diversification;
- Pro-active promotion of technological diversification
- Environmental controls to ensure sustainability in the long term.

Source: Craven, (2011), Rasia et al (2006) and Santiago (2015)

Policy instruments by type of market failure / policy problem in a system of innovation

Innovation system element	Instrument	Policy domain				
		Product	Labour	Capital	Land	Technology
<i>Enhancing skills for innovation</i>	Human Resources for R&D		◆ ●			◆ ●
	Innovation-related skills		◆			◆ ●
	Specialized, industry focused training centers / education programs		◆			◆ ●
	Labor mobility including immigration		◆			◆
<i>Investment in research and technologies</i>	(Competitive) funding for research			◆ ●		◆ ●
	Direct business R&D			◆		◆
	R&D infrastructure				◆	◆ ●
	Centers of Excellence				◆ ●	◆ ●
	Tax incentives			◆	◆	◆ ●

Notes: ◆ Aerospace; ● Palm Oil.

Source: Santiago (2015)

Innovation system element	Instrument	Policy domain				
		Product	Labour	Capital	Land	Technology
<i>Enhance innovation competencies of firms</i>	Direct business innovation		◆ ●			◆ ●
	Open access to public research findings					●
	Start-ups	◆				◆
	Networks / platforms				◆	◆
	Innovation support services		◆ ●			◆ ●
	Co-production agreements	◆	◆			◆
	Technology licensing		◆			◆
<i>Strengthen systemic linkages</i>	Collaborative R&D					◆ ●
	Clusters				◆	◆
	Interaction academia-business, including labor mobility		◆ ●			◆ ●
	Collaboration agreements (general or specific for the industry)					◆
	Technology Transfer	◆	◆ ●			◆ ●
	Spin-Offs					◆
	Joint ventures	◆		◆		◆
	S&T/Business Parks				◆	◆

IS element	Instrument	Policy domain				
		Product	Labour	Capital	Land	Tech
<i>Framework conditions</i>	State-owned firms	◆ ●			●	◆
	Specialized agencies to promote the industry	●		◆ ●		◆ ●
	Specialized agencies norms and standards	◆ ●	◆ ●			◆ ●
	General infrastructure		◆ ●	◆ ●	◆ ●	◆ ●
	General upskilling labor force		◆ ●			◆ ●
	Labor mobility (immigration)		●		●	
	Price controls (Domestic mkt)	●			●	
	(Managed) Privatization	◆				
	E-society				◆	◆
	IPR	◆				◆ ●
	Loans and guarantees	◆		◆ ●	●	◆ ●
	Public Procurement	◆		◆		◆
	Export-promotion agencies		◆ ●	◆ ●		
	Export taxes/credits to orient export composition	◆ ●		◆		
	Trade-related barriers	◆				
	Non-trade barriers	◆				
	Barter agreements	●		●		
	FTZ/EPZ		●		●	
	FDI controls	◆ ●		●	●	◆ ●
	Tax incentives for emerging local suppliers (capital investment, income, exports)	◆ ●		◆ ●		◆
Subsidies/Tax incentives for local production, capital investment, exports	◆				◆	
Promotion of vertical integration	●					
Commodity exchange markets	●		●	●		



6. Looking ahead



- Deepening trends towards knowledge-driven economy.
- Digital economy (Hall 2013)
 - R&D/GDP ratios stagnant in developed countries but growing in dynamic emerging markets: Investment intangibles > Investment in tangibles
 - Open innovation / closer interactions
 - Expansion in Intellectual Property-protected standards (Internet of Things, cloud, wireless communication, and others)
 - New questions around Intellectual Property issues involving consumer and other reproduction of protected products
- Revival of linkages between industrial policy, innovation policy and the overall conception of STI and their contribution to economic and social prosperity and environmental sustainability.



Thank you

