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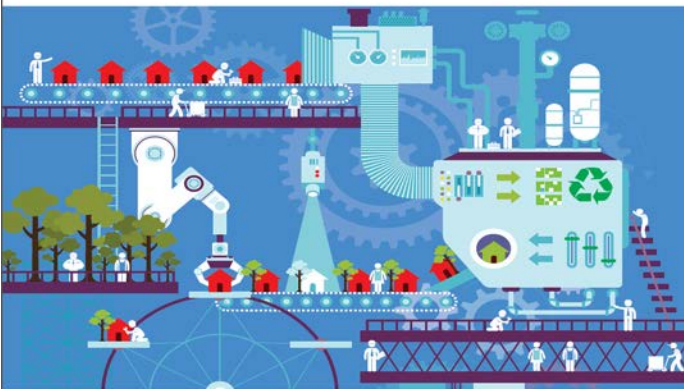


# Industrial Development Report 2016

## *“The Role of Technology and Innovation in Inclusive and Sustainable Industrial Development”*

Industrial Development Report 2016

The Role of Technology and Innovation in  
Inclusive and Sustainable Industrial Development



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# Overview

- Conditions for sustained growth
- Conditions for inclusiveness
- Conditions for environmental sustainability
- Policy principles to steer conditions



# Conditions to boost technology and sustained growth

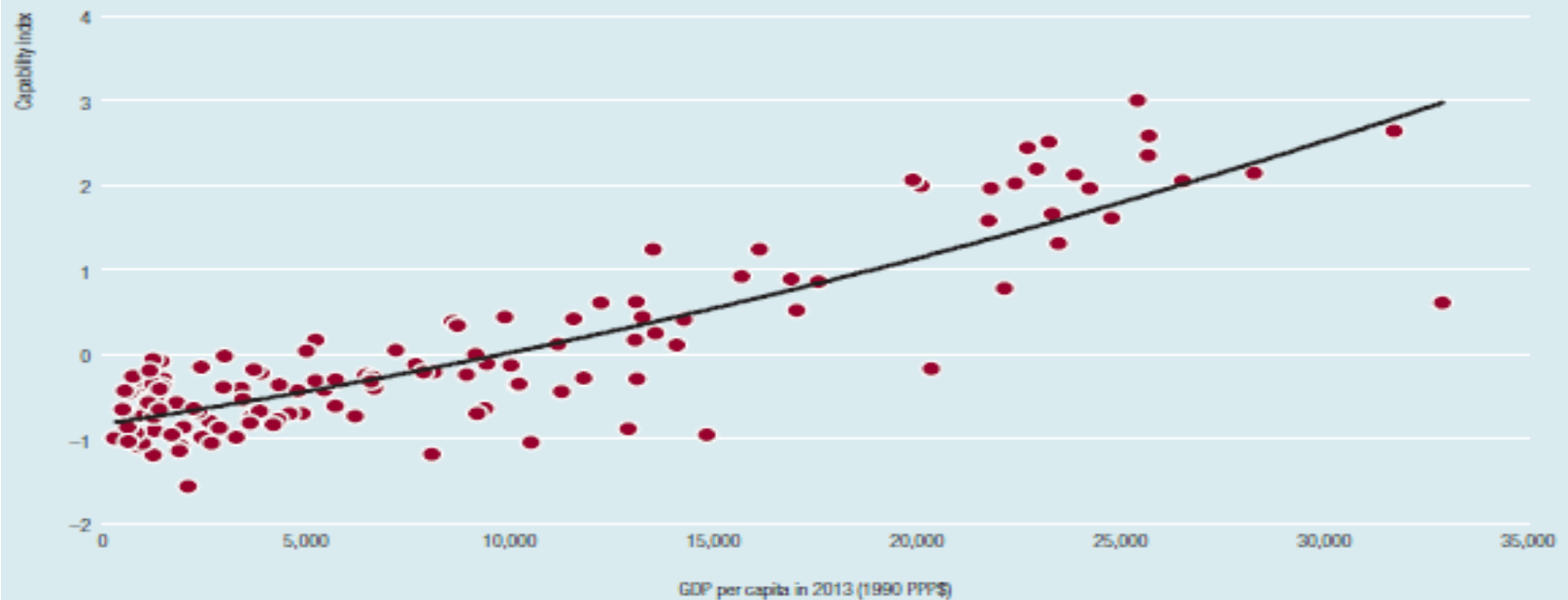
- Identifying and nurturing growth enhancing sectors and activities
- Investing in human capital
- Improving the functioning of innovation systems
- Upgrading in domestic clusters
- Participating and upgrading in global value chains
- Optimizing contributions from foreign direct investments

# Investing in human capital

- Technological capabilities are mainly related to the level of education of population.
- Basic literacy is not enough but the full range of education.
- Technology specific skills are needed to absorb new technologies.
- Improved education curriculum.
- Vocational training.
- R&D expenditure

# Improving functioning of innovation systems (I)

Figure 2.6  
Index of innovation system and institutional capabilities versus GDP per capita, 2013



Note: GDP is gross domestic product; PPP is purchasing power parity.  
Source: Kaltenberg and Verspagen (2015).



# Improving functioning of innovation systems (II)

- Learning and innovation involve complex interactions between the firms and their environment which includes the institutional and organizational framework, infrastructure and institutions for knowledge creation.
- This should be reflected concretely into:
  - technical information services
  - extension services
  - quality control institutions
  - technological commercialization infrastructure.

# Participating and upgrading in global value chains

- Special Economic Zones (SEZs).
- Accessing GVCs
  - thinning in
  - thinning out
- Approaches to upgrading
  - vertical value chains
  - additive value chains
  - increasingly technologically sophisticated activities



# Conditions for technology to boost inclusiveness

- Type of innovation
- Factor and skills endowment
- International conditions
- Social policies

# Type of innovation

- Products innovation generates employment, process innovation reduces jobs.
- Employment reducing effects of process innovations are often mitigated by market forces themselves (e.g. markets and jobs from new sectors and new machines, lower consumer prices, more investments etc.)
- Use of “appropriate technologies” coherent with the resources endowments of countries.

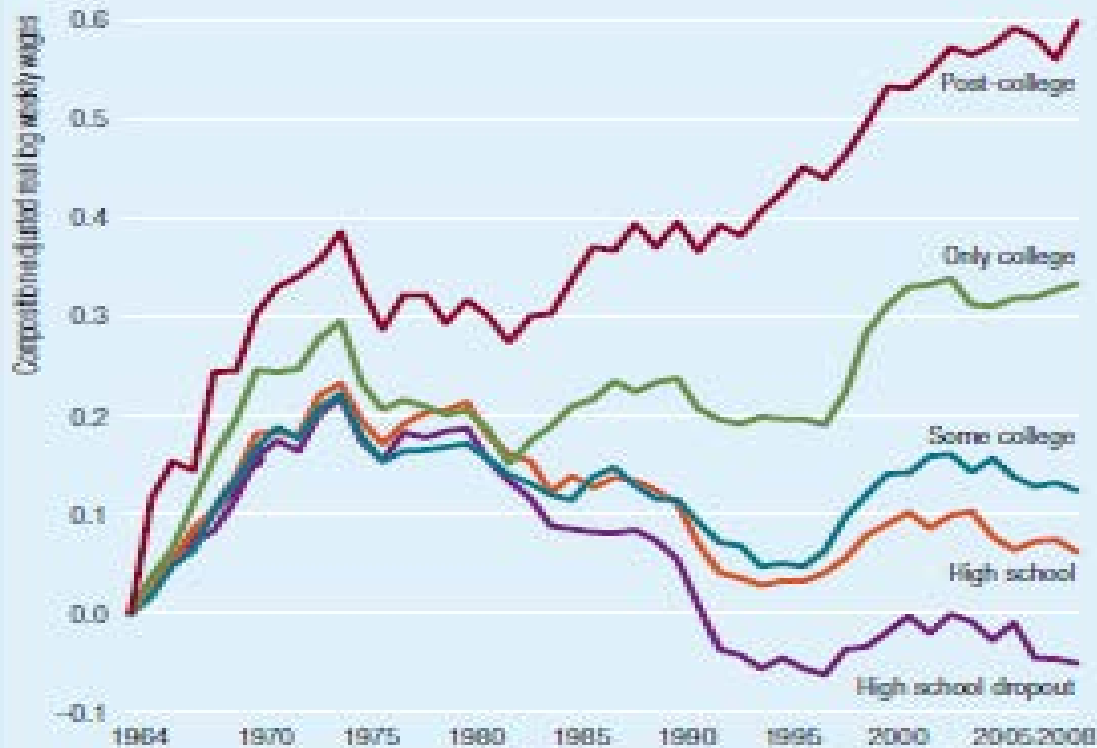


# Factors and skills endowment (I)

- Developing and aligning skills with the needs of industry, including on the job training and predictable career ladders;
- Valorize entrepreneurship vocation of talented young people in low and middle income countries
- Entrepreneurial support should consider the level of industrialization

# Factor and skill endowment (II)

**Figure 4.6**  
**Change in income for various skill groups,**  
**United States, 1964–2008**



Source: Acemoglu and Autor (2011).

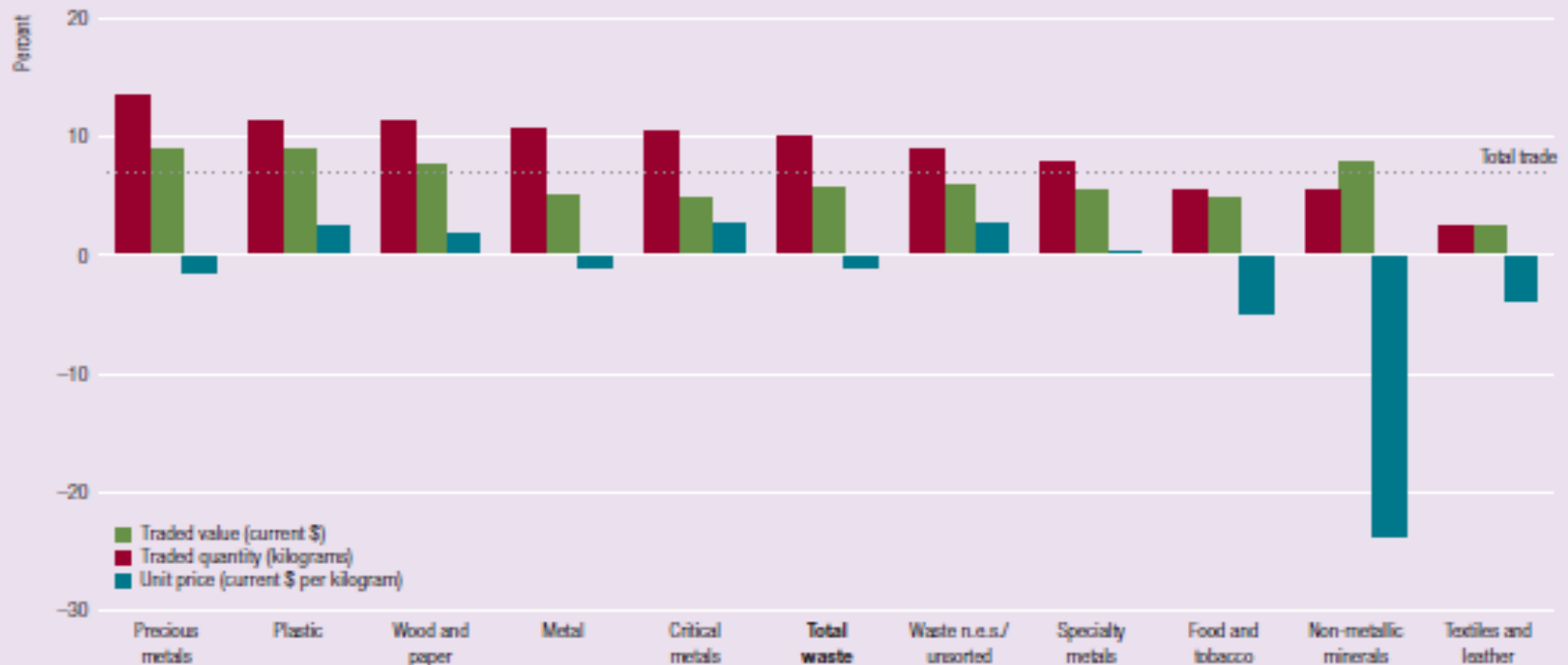


# Conditions for technology to boost environmental sustainability

- Market pull factors
- Shifting to new and high tech sectors
- Regulation and international agreements
- Global value chains

## Some environmental sectors such as waste are already booming

Figure 5.14  
Cumulative average growth rate of waste trade, 1993–2012



Note: n.e.s. is not elsewhere specified.

Source: UNIDO elaboration based on United Nations Comtrade database (UNSD 2015a).

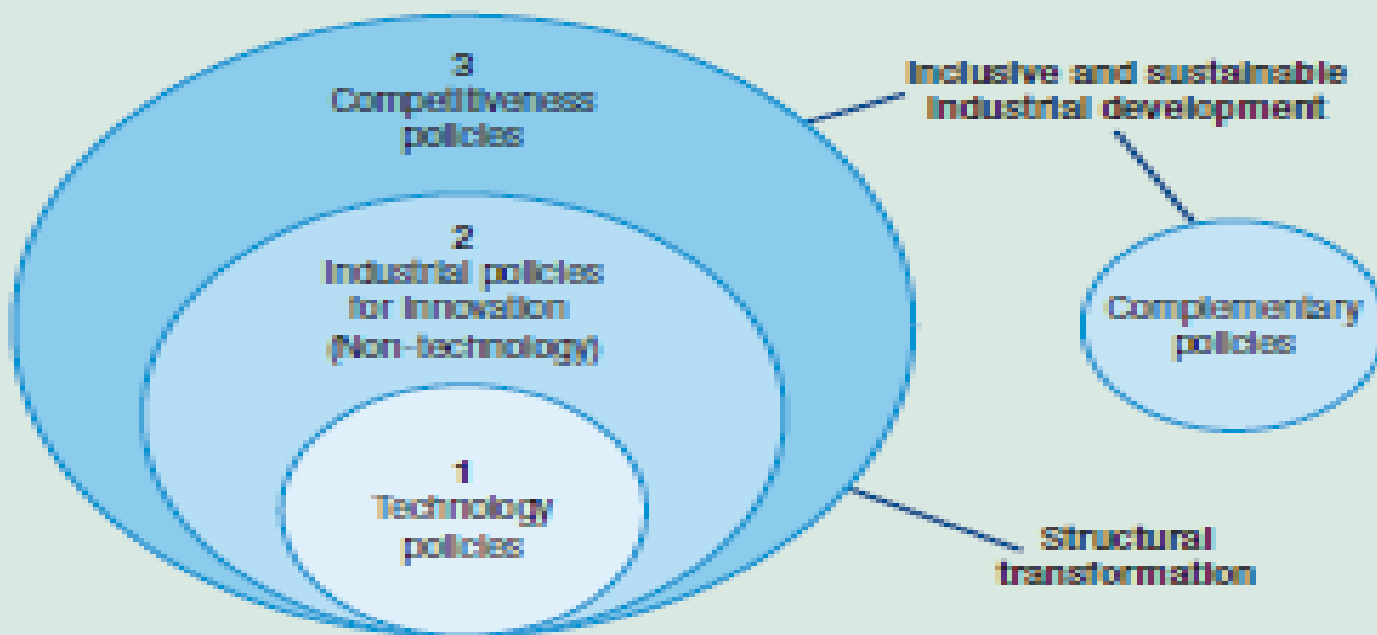
## A global deal for climate change should contain...

- A generalized commitment of world countries to reduce emissions with clear emissions caps.
- Mechanisms to price environmental externalities
- Clear monitoring and evaluation systems
- Punishment mechanisms in case of “free riding” behaviors
- Mechanisms to facilitate technology transfers (e.g. clean development mechanisms)

# Policy principles to promote ISI technology

Figure 6.1

## Policies targeting inclusive and sustainable industrial development



Source: UNIDO elaboration.



# A coordinated set of interventions

Table 6.1

**Taxonomy for innovation policy (including technology and non-technological industrial policies)**

Policy domain	Market-based	Public goods/direct provision
Technology market	R&D subsidies, grants	Technology transfer support, technology extension programme, public-private research consortia, public research institutes
Product market	Tax exemptions for innovation investments, attraction of foreign direct investment, R&D tax incentives, import tariffs, duty drawbacks, tax credits, investment/foreign direct investment incentives	Use of public procurement for innovation, protection of intellectual property rights, procurement policy, export market information/trade fairs, linkage programmes, foreign direct investment country marketing, one-stop shops, investment promotion agencies
Labour market	Wage tax credits/ subsidies, training grants	Training institutes, skills council
Capital market	Subsidized credit for innovative firms, directed credit, interest rate subsidies	Loan guarantees, skills council
Land market	Subsidized rental	Promotion of technology and production clusters, creation of technology parks, establishment of special economic zones, export processing zones, factory shells, infrastructure, legislative change, incubator programmes

Source: Adapted from Weiss (2015) and Warwick (2013).

## Different policies at different stages of development

**Table 6.2**  
**Innovation for different stages of development for developing and emerging countries**

Country category	Objective of innovation	Type/source of innovation	Main agents involved
Early stage	Improve productivity and process technology	Incremental innovation based on adoption of foreign innovations and technologies; Innovation needs to respond to specific "local" conditions for outcomes	Universities and research institutes, private businesses, especially those with exposure to foreign markets
	Favour the generation of inclusive innovation to improve welfare and access to business opportunities	Incremental innovation based on combination of foreign technology and/or local, traditional knowledge	Nongovernmental organizations, GOs, small firms, public and private associations engaged in disseminating knowledge via networks
Middle stage	Build up innovation capacities to reach the world technological frontier	Incremental and radical innovation capacity to compete with leading world innovators	Private firms, universities and research institutes, public institutions
	Build-up niche competencies	Incremental innovations based on applying foreign innovations and technologies strategically to support industrial development	Public institutions to address coordination challenges, private sector initiative including foreign companies
Middle and late stage	Climb the value ladder in global value chains	Incremental and radical innovation capacity to differentiate contributions	Private sectors with support from public agents, intermediaries, diasporas, large firms
	Keep competitiveness in frontier industries	Innovation is identical to that in developed countries exposed to the global market	Private sector in interaction with public research institutions, universities and large firms

Source: Adapted from OECD (2012c).



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**MANY THANKS**