Understanding the Use of New Technology in Manufacturing

Conference on Use of Data in the Digital Economy
WTO, Geneva, October 3, 2017
“Trouble in the Making?”
How do advanced manufacturing technologies affect the prospects for developing countries to promote shared prosperity through manufacturing?
Figure O.2  Although Still Significant, High-Income Countries’ Global Share of Manufacturing Value Added Has Been Declining, as China Stands Out as an Expanding Producer

Share of global manufacturing value added in China, global regions, and high-income countries, 1994–2015

Source: World Development Indicators database.
Note: High-income countries (HICs) as defined in 1994 are those whose gross national income per capita was at least US$8,955.
Figure O.4  Labor Productivity Is Rising among the Dominant Manufacturing Countries—As Is the Productivity Gap with Smaller Producing Countries

Manufacturing labor productivity in China, global regions, and high-income countries, 1990–2010

Value added per worker, constant 2010 US$, thousands

<table>
<thead>
<tr>
<th>Region</th>
<th>1990</th>
<th>2000</th>
<th>2010</th>
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</thead>
<tbody>
<tr>
<td>China</td>
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<tr>
<td>East Asia and Pacific (excluding China)</td>
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<td>Europe and Central Asia</td>
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<td>Latin America and the Caribbean</td>
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<td>Middle East and North Africa</td>
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<td>South Asia</td>
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<td>Africa</td>
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<td>HICs</td>
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Legend: 1990, 2000, 2010
Figure O.10  China Increased Its Domestic Value Added in Gross Exports across All Manufacturing Sectors between 1995 and 2011

Change in domestic value added of manufacturing sectors in China, 1995–2011

Source: Calculations based on Trade in Value Added (TiVA) database of the Organisation for Economic Co-operation and Development and World Trade Organization.
Note: n.e.c. = not elsewhere classified.
Figure O.1  Manufacturing Subsectors, Grouped by Pro-Development Characteristics, 2013

- Capital-intensive regional processing
  - Wood and wood products
  - Fabricated metals products
  - Other nonmetallic mineral products
  - Food, beverage, and tobacco products
  - Basic metals
  - Rubber and plastic products
  - Paper and paper products; publishing and printing
  - Coke and refined petroleum products
  - Chemicals and chemical products

- Low-skill labor-intensive tradables
  - Textiles, wearing apparel, and leather products
  - Furniture; manufacturing, n.e.c
  - Transportation equipments
  - Machinery and equipment n.e.c

- Medium-skill global innovators
  - Electrical equipment
  - Computing, electronics and optical equipment
  - Pharmaceutical products

- High-skill global innovators
  - Other nonmetallic mineral products

- Commodity-based regional processing
  - Basic metals
  - Rubber and plastic products
  - Coca and refined petroleum products

- Export value-to-output ratio (%)
  - Subsectors exhibiting greatest R&D intensity
  - Subsectors where labor productivity deviated significantly from others
  - All other subsectors
Figure O.12  The Bar Is Rising for Some Manufacturing Subsectors More than Others Owing to the Relative Magnitude of Automation, Export Concentration, and Services Intensity, Conditional on the Extent to Which They Are Internationally Traded

Manufacturing subsectors, grouped by export concentration, degree of automation, services intensity, and tradedness, circa 2011–15

Number of robots per 1,000 employees

Herfindahl index

[Diagram showing the relationship between the number of robots per 1,000 employees and the Herfindahl index for various manufacturing subsectors.]
### Table O.1 New Technologies Shift the Policy Areas to Prioritize—With Sequencing Appropriate to a Country’s Current Position

*Policy priorities to strengthen manufacturing-led development, by country’s level of competitiveness, capabilities, and connectedness*

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Priorities for countries currently “lower” on this dimension</th>
<th>Priorities for countries currently, or aiming soon to be, “higher” on this dimension</th>
</tr>
</thead>
<tbody>
<tr>
<td>Competitiveness</td>
<td>Strengthen the business environment</td>
<td>Facilitate firm entry and exit, and the reallocation of capital and workers; improve bankruptcy procedures and universal coverage of social protection to facilitate worker mobility and to lower costs of disruption</td>
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<td>Promote flexible labor markets</td>
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<td>Liberalize backbone services critical to supporting manufacturing</td>
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<td><em>Develop mobile finance to facilitate use of embodied and embedded services</em></td>
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<td>Capabilities</td>
<td>Prioritize literacy, numeracy, basic ICT, and socioeconomic skills, but also invest in the development of advanced skills for people with access to higher education</td>
<td><em>(Set competition policy framework for network platforms; adjust regulations for new business forms)</em></td>
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<td></td>
<td>Improve basic management skills and processes</td>
<td><em>(Facilitate contracting, to enable greater use of sharing economy on production side)</em></td>
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<td>Develop certification of quality standards</td>
<td><em>(Develop programs to strengthen more-advanced skills, creativity)</em></td>
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<td>Connectedness</td>
<td>Reduce restrictions on trade in goods, particularly inputs (lower tariffs and NTBs, support trade facilitation)</td>
<td><em>(Emphasize the use of data and data processes within production)</em></td>
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<td>Strengthen basic logistics</td>
<td><em>(Support the development of a data ecosystem (access to ICT, policies on localization, network security, IPR))</em></td>
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<td></td>
<td><em>Support IoT logistics systems</em></td>
<td><em>(Develop regulatory frameworks to support cross-border data flow)</em></td>
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