Near-Shoring and Reshoring: Implications for Innovation Policy in the Post-COVID World

Mary Hallward-Driemeier and Gaurav Nayyar
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What Is At Stake?

• Patterns of global production around the world are shifting – what does this mean for future sources of growth?

• How are trends in technology and globalization changing the feasibility – and desirability – of manufacturing-led development as the model for development?

• If wages will be less important in defining competitiveness, how can developing countries make the most of new opportunities?
Why We Care About Manufacturing

• Some of the biggest development gains in history have been associated with the process of industrialization and GVCs have contributed to poverty reduction.

• Not all countries benefited equally from industrialization:
  • What matters is the “how” rather than the “what” of production.
  • GVCs allow countries to specialize in components rather than master a whole product.

• The manufacturing sector was different from other sectors because:
  • Being tradable, it offered economies of scale and innovation helped raise productivity over time.
  • It absorbed large numbers of unskilled workers at a productivity premium.
  • Labor productivity across countries tends to converge to the frontier over time.

• In three-quarters of countries, its share in GDP is declining. Is this a cause for alarm?
Drivers of GVCs are changing

- Increased automation / digitalization
- Increased intersectoral linkages
- Shifting role of China
- Increased nationalism
- Increased concern about climate change
- Growing concern about resilience

Many are long term trends, with COVID-19 accelerating or exacerbating them

DEBATE #1: Is reshoring or nearshoring going to be a big trend going forward?

DEBATE #2: Should attention be so focused on manufacturing?
Debate #1
Have robots grounded the flying geese?
New manufacturing process technologies: IoT, advanced robotics, and 3D printing are advancing.

### Operational stock of industrial robots in the manufacturing sector, selected countries and regions, 1995–2018

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### Use of manufacturing robots over the years

- **Furniture**
- **Motor vehicles, trailers and semi-trailers**
- **Office, Accounting and Computing machinery**
- **Electrical Machinery**
- **Machinery and equipment**
- **Fabricated Metal Products**
- **Basic Metals**
- **Non Metallic Products**
- **Rubber and Plastics**
- **Chemical and Chemical Products**
- **Pharmaceuticals, cosmetics**
- **Paper**
- **Wood and Furniture**
Artuc, Bastos and Rijkers (2019) show that a 10-percentage point increase in robot density in developed countries is associated with a 6.1 percentage point increase in their imports from less developed countries and a 11.8 percentage point increase in their exports to these countries.

Comparing growth in hearing aid trade – which is entirely 3D printed – with other similar products, Freund, Mulabdic and Ruta (2019) find that 3D printing increased trade by 58 percent over a decade. Early innovators in Europe, such as Denmark and Switzerland, remain the main export platforms.

Beyond hearing aids, the authors find that 35 products that are increasingly being 3D printed have also experienced faster trade growth relative to other similar goods.

Kinkel, Jager and Zanker (2015) using data on 3000 firms, find that firms using industrials robots in their manufacturing processes are less likely to offshore production activities outside Europe.

Artuc, Christiaensen, and Winkler (2019) show that an increase of one robot per thousand workers in the U.S.—about twice the increase observed between 2004–2014—lowers growth in exports per worker from Mexico to the U.S. by 6.7 percent.
Estimation

\[ \ln(1 + FDI)_{ist} = \alpha + \beta_1 \ln(1 + Robots_{ist}) + \beta_2 [\ln(1 + Robots_{ist})]^2 + \ln(1 + Exports_{ist}) + \gamma_{is} + \delta_{it} + \varepsilon_{ist} \]

- Estimate impact of automation on outbound FDI at the country-sector-year level
- Controlling for country-sector and country-year fixed effects
- Allow for non-linear impacts of automation
- And control for exports, other ICT intensity
# Results

1. Direct effect is positive and significant

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<td>Ln (1 + Robots per 1000 employees)</td>
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## Results

1. Direct effect is positive and significant  
2. The non-linear effect is negative

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Results

1. Direct effect is positive and significant
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3. But – only for middle income countries

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<td>840</td>
<td>2,196</td>
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4. Using instrument – to control for feedback from FDI on incentives to automate – makes results stronger.
5. Robust to excluding China or having China being a sending country
6. Robust to excluding any given sector
• Exploiting differences across countries and industries, the intensity of robot use in high-income countries has a positive impact on FDI growth from high-income countries to low- and middle-income countries.

• Past a threshold, however, increased robotization in high-income countries has a negative impact on FDI growth.
  • Only 3 percent are past the threshold beyond which further automation results in negative FDI growth and is consistent with re-shoring.
  • For another 25 percent of the sample, the impact of robotization on the growth of FDI is positive, but at a rate that is declining.
  • For more than 2/3 of the sample, automation is associated with constant or growing FDI, especially in lower income countries.
All hype?

Technologically feasible
Economically viable?
Debate #2
Should the development community’s attention be so focused on manufacturing? What is the promise of services-led development?
Almost all of the decline in agriculture’s share of total employment in low- and middle-income countries since the 1990s was offset by services.

Services, not industry, are driving structural transformation in LMICs.
EAP countries have seen the rising share of services too

Source: World Bank WDI
Labor productivity growth in services has been strong in LMICs.

Labor productivity growth in services has matched that in industry across LMICs in many regions since the 1990s, typically exceeding that of high-income countries.

In many EAP countries, services productivity growth has not matched that of industry.

Source: Calculations based on World Development Indicators database.
There are new opportunities for scale

Scale applies differently to services: small firms can be as productive as larger ones

But services offer new opportunities for scaling up and growing revenues:

- **Digital technologies** reduce the need for face-to-face and allow for more remote delivery of services
- **Multi-establishment firms** such as chains, franchising, allowing to sell at multiple locations
- **Quality** of services is more heterogeneous but an important determinant of price and revenues

Labor productivity, relative to large firms = 100

Source: Calculations based on firm-level data from 20 countries analyzed for this book, supplemented with OECD/Eurostat data
Intangible capital drives innovation

Investments in software and data increased the most among firms in global innovator services.

Investments in marketing and organizational innovation are more widespread across many services subsectors than in manufacturing.

Spending on software and data per worker (thousand euro)

Share of firms investing in marketing / organizational innovation (%)

Source: Calculations based on OECD data
Services increasingly matter for manufacturing competitiveness and account for much of the value added in a product.
Services linked to other sectors tend to be more productive – expanding opportunities for spillovers

Share sold to other sectors (horizontal) and total factor productivity (vertical)

Source: Calculations based on OECD data and the World Input-Output Database
Post COVID-19 Opportunities: Make the right comparison

• Not services now vs manufacturing led growing of the 1980s and 90s
  • China produced 5% of global manufacturing in early 1990s, now it is 25%
  • China’s wages are rising, but production is also moving inland.
  • Automation is reducing labor intensity of several sectors
  • Competition among locations in assembly has lowered margins

• Services today are expanding with digitalization and intersectoral linkages
  • Digital technologies enables more services to be stored and traded and to enjoy much greater scale economies
  • Innovation is increasingly happening in services and leveraging labor
  • Intersectoral linkages allow for benefits to be spread more widely
  • Benefits of services can be achieved regardless of level of industrialization

• China, nationalism, climate change, resilience: more reasons for some diversification of production
Policy Agenda

Trade, Technology, Training and Targeting (4Ts) to leverage the potential of the services sector for economic transformation
### Policy responses (4Ts) to make most of forward-looking trends

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<td>Potential for automation and data analytics to leverage labor</td>
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<td>From increased intangible capital, more incentives to innovate and invest</td>
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#### Trends

- **Technology trends**
  - Due to ICT, reduced need for physical proximity
  - Potential for automation and data analytics to leverage labor
  - From increased intangible capital, more incentives to innovate and invest

- **Linkages**
  - Expansion of linkages with other sectors, including other services

#### Policy implications to realize benefits of these trends

- **Trade** – to lower barriers to services trade and competition to expand access to markets
- **Technology** – to improve access to ICT and technology adoption; complementary policies to ensure competition and inclusion
- **Training** – to raise digital and complementary interpersonal skills; management practices
- **Targeting** – to address market failures in enabling services to capture wider spillovers
Trade: Making what is tradable more traded
Most restrictions are domestic regulations not those at the border

More LMICs Restrict Services Trade than HICs, 2016

STRI, retail services, by country, 2008 and 2016

Source: World Bank Services Trade Restrictiveness Index (STRI) database
Regulations behind the border need updating for digital technologies too

Shape regulations to address new challenges digital technologies bring:

- Continue to adapt competition policy for the digital age and new forms of market domination – avoid self-preferencing; thresholds & criteria for M&A; speed of enforcement; relevant remedies; who bears burden of proof; review of algorithms
- Sharing of commercial or B2B data could be new source of innovation, if compliant with competition rules, e.g. to avoid collusion or price setting
- Address costs of compliance for data privacy for smaller firms – make data portability and interoperability standardized and transparent
- Data privacy could limit some innovation – or ‘privacy by design’ become a new source of comparative advantage
- Policies on data localization and transfer among partner countries affect the extent of trade

Strengthen start-up ecosystem for entrants to thrive

- Strengthen venture capital – including transferability of stock options
- Reform restrictions and administrative burdens on IPOs
Technology and Training: Balance innovation and adoption

**Applied R&D to assist with technology diffusion**

- Private sector’s share in R&D can be relatively low
- Allocate resources where build on related strengths and links to market opportunities; attempts to leapfrog are rarely successful
- **Support firm capabilities (management practices, skills) to adapt and adopt technologies**

**Adapt tools to support services sectors**

- Traditional focus on manufacturing and agriculture have led to instruments favoring investments in capital and machinery rather than intangible capital
- Outreach programs and extension services need to focus on services sub-sectors

Expand industrial IoT and B2B platforms to help more SMEs participate in industrial value chains.
Targeting: Addressing market failures in enabling services

Domestic value added embodied as inputs in economywide production

PMR scores in network services, HICs and LMICs, 2013–17

Calculations based on OECD PMR database and World Bank–OECD PMR database.
Country performance in the 4Ts helps identify reform priorities

With the two strongest correlations among the 4Ts being between training and technology, and between trade and targeting, improving either complementary pair would likely have the biggest impact.

**Training and technology**

Countries relatively stronger in technology (e.g. Vietnam) could leverage it with more training

**Trade and targeting**
Key messages

• Manufacturing will remain a part of development strategies, although likely with fewer dual benefits of productivity and jobs, and with narrower entry points

• Some diversification of GVCs is likely to continue, but full reshoring is unlikely

• But there are new sources of growth that deserve more attention -- Services are both increasingly important for the success of manufacturing and themselves a source of dynamic gains and employment

• For countries to be positioned to benefit – need to focus on strengthening digitization – adopting digital technologies but also openness to services trade, regulation of data, and ensuring availability of complementary enabling services
Thank you

www.worldbank.org/services-led-development

www.worldbank.org/futureofmanufacturing