Globotics and development: When manufacturing is jobless and services are tradeable

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The future is unknowable, but also inevitable
Caveat emptor: This is a think piece
Digital Technology 

Automation 

Globalization 

Development realities 

Implications
This time is different
Machine learning is different

In 2019 computers can read, write, see, speak, understand speech, create visual output, recognize subtle patterns.

In 2015 they couldn’t. What changed?
Programming is different

Coding = thinking slow

Machine learning = thinking fast
IT’s new cognitive capacities =>

➢ Manufacturing may become nearly fully automated, so production is rebundled with consumption (nontraded)

➢ Few jobs for humans
Digitech is ICT, but…

ICT applied to manufacturing (mostly physical + bit of “I” & “C”)

Digitech applied to services (mostly “I” & “C” + bit of physical)
Different physics applies

Matter

Electrons

How fast to double flows?
Radically faster transmission & processing speeds =>

- Labour and labour-services can be unbundled over long distances (tradeable)
- Globalisation’s “3rd unbundling”
The speed is a problem in itself
How humans instinctively think about progress
How digital technology actually progresses
“Holy Cow” moment
Coming ways
few expect
Think “iPhone infiltration”
Radical changes in globalisation are not new
Arbitrage drives globalisation
Arbitrage in 3 things

- Goods
- Knowhow
- Labour services
Arbitrage/Globalisation constrained by 3 costs

- Trade costs
- Communication costs
- Face-to-face costs
Low trade costs makes high-volume trade feasible; Comparative advantage makes it profitable; 1st unbundling begins
Production micro-clusters → Innovation & growth, but innovations stay in G7 ⇒ “Great Divergence”
Information & Communication Technology (ICT) lowers the cost of moving ideas
ICT Revolution makes offshoring feasible; Vast wage differences make it profitable; 2\textsuperscript{nd} unbundling begins
Knowledge arbitrage begins: G7 firms offshore knowhow with the jobs & factories => Great Convergence
Pre-ICT revolution, knowledge is ‘stuck’ in G7

Headquarter Economies (G7)

High Knowhow Labour
High wages

Factory Economies

Low Knowhow Labour
Low wages
Global value chains open a ‘pipeline’ for globalisation as knowledge arbitrage

Headquarter Economies (G7)

High wages

Factory Economies

Low wages

Knowhow
Labour

High Tech + Low Wages revolutionises world manufacturing
Digital Technology lowers face2face costs, making remote workers less remote; 3rd unbundling begins?
Digital technology has opened a ‘pipeline’ for arbitrage: “Telemigration”

**Factory Economies**
- Low wages
- Low labour
- Low knowhow

**Headquarter Economies (G7)**
- High wages
- High labour
- High knowhow

The diagram illustrates the flow of knowhow and labour from factory economies to headquarter economies, capitalizing on the differences in wages and skill availability.
Tele-migration

People in one nation & working in offices in another
International wage differences make telemigration profitable

Digitech makes it possible
Digitech enables tele-migration

1. Domestic remote work paves the way.
2. Online “match making” platforms.
3. Advanced telecomms.
How digitech makes manufacturing jobless & services freely traded
Tradability by sector

![Diagram showing tradability by sector with points A through H on a graph representing proportional cost (S/N) versus sectors.]
Digitech impact on manufactures

Assume: $c_i^n = w^n a_i^n + r$

$w^n a_i^n \equiv$ unit labour cost

$r \equiv$ all other inputs (same in all nations).

Cost difference North vs South is:

$$\frac{c_i^n - c_i^s}{c_i^n} = \theta_{L} \left(1 - \frac{w^s a_i^s}{w^n a_i^n}\right)$$

($\theta_{L}$ is labour cost share)
Digitech lowers labour cost share to (towards) zero, for all goods

\[ \frac{c_i^n - c_i^s}{c_i^n} = \theta_L \left(1 - \frac{w^s a_i^s}{w^n a_i^n}\right) \]
Manufactures become:

- Nontraded (locally produced)
- Jobless
Services: Digitech makes remote workers less remote

Services become traded
Development conjectures
Think of development as a transition between steady state growth paths (Roy 2000)

- From slow growth since poor;
- To slow growth since rich
Traditionally, the transition involved “industrialisation” since WWII, export-based industrialisation. Why? How?
Labour allocation with free trade

Value of Marg’l Prod. of Labour (MPL) in Manuf (external economies of scale)

VMPL in Agriculture (Constant Returns to Scale)
Development = move $E_0$ past $L^B_M$
ISI, big push, etc
India & China contrasted
India v China, Growth Sources

Contribution to Total Annual GDP Growth Rate (percentage points), 1990-2012

- Services: India 4.3, China 4.7
- Manufacturing: India 1.2, China 5.2
- Agriculture: India 0.8, China 0.8

Ghani and O'Connor (2014)
India v China paths, Net Trade

India, 1990 - 2018

- Net Service Exports
- Net Goods Exports

China, 1998 - 2018

- Net Goods Exports
- Net Service Exports
India v China paths, Drivers

Sources of Growth, 1993 –2004

Annual percent points

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<th>Industry</th>
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Factor productivity
- Education
- Physical capital

Bosworth & Collins
China (M-led) vs India (S-led)
Policy conjectures
The Emerging Market miracle will continue and spread
Different structural transformation

“Service-led” development, not “manufacturing-led” development
Same comparative advantage

Emerging Markets’ true competitive advantage is quality-adjusted low-cost labour
Before the advantage was “filtered” through goods, making development difficult

Emerging Markets’ competitive advantage

Low cost labour

Goods

Factories

Exports
Digitech will allow Emerging Markets to export their advantage directly.

- Emerging Markets’ competitive advantage
- Low cost labour
- Factories or Farms
- Goods
- Exports
New role models will emerge
- Think India, not China
- Think “Service Value Chains”, not GVCs
NB: Services are easier

1. Lower scale economies
2. Less complex supply chains & logistics
3. Geographic distance matters less
Geography matters for manufacturing

Factory N.Amer. (19%)  
Factory Europe (20%)  
Factory N.E. Asia (38%)
Conjecture: Time zones will matter more
New, national development strategies will be needed
New Development Strategies

Think cities, services, and training

Not factories, industrial equipment, and technology
Telemigration will foster a new backlash against globalisation in advanced economies
Thanks for listening