INDUSTRIALIZATION AND INNOVATION STRATEGY POST-COVID-19

KEYNOTE

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I. Innovators first Industrialized

II. Industrial Manufacturing Capacity is Pre-requisite for Innovation

III. Industrialization Pathways: Successful, Premature and Stalled

IV. Suggested Post-Covid-19 Development Strategy

V. Conclusion
Manufacturing is the production of goods through the use of labor, machines, tools, and chemical or biological processing or formulation. It is the heart of the secondary sector of the economy.

INDUSTRIAL MANUFACTURING CAPACITY BASIS FOR INNOVATION

- **Manufacturing Capacity = Infrastructure Capacity**
- **Manufacturing Capacity = Transformation of Agriculture**
- **Manufacturing Capacity = Generates Technological Innovations**
- **Manufacturing Capacity = Transforms Services Sector**
GAINS IN THE PRODUCTIVITY OF INDUSTRIAL AGRICULTURE IN THE 20TH CENTURY WERE BUILT ON FIVE INNOVATIONS

Some were available before 1900

- Irrigation, which goes back several thousand years;
- Chemical fertilizer, based upon the work of a German chemist in 1847;
- Plant breeding, from Gregor Mendel’s discovery of the principles of genetics in the 1860s;
- Short-strawed wheats and rices, from Japanese success dwarfing cereals in the 1880s;
- and Hybrid corn, from development in 1917 at the University of Connecticut.
TOP 10 EXPORTERS OF MANUFACTURES: Chemicals and Foods are same Countries

Fig 3: Top ten exporters of Manufactured goods, 2018 (US$ billion, annual % change)

Fig 4: Top ten exporters of Chemicals, 2018 (US$ billion, annual % change)
### Index scores for the most innovative economies worldwide (2021)*

<table>
<thead>
<tr>
<th>Economy</th>
<th>Score</th>
<th>Rank Change</th>
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<tbody>
<tr>
<td>South Korea</td>
<td>90.49</td>
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<tr>
<td>Singapore</td>
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<tr>
<td>Austria</td>
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</tr>
</tbody>
</table>

* Taking into account R&D spending intensity, patent activity, efficiency of tertiary education, value-added manufacturing, productivity, high-tech density and researcher concentration

Source: Bloomberg
Structural Transformation: Propelled by continuing Innovation

Movement of labour from low-productive activities to higher productive activities.

Agriculture
Manufacturing
Services

THROUGH...

➢ ECONOMIC DIVERSIFICATION: Shift from one to many sectors
➢ PRODUCT DIVERSIFICATION: New Innovative Products.
➢ MARKET DIVERSIFICATION: New Markets for new or same products
SHARE OF AGRICULTURE IN EMPLOYMENT DECLINED AS NATIONS INNOVATE & BUILD INDUSTRIAL CAPACITY

• WENT DOWN steadily in countries like China and South Korea.
  • Also went down in countries like Ghana, Egypt and South Africa.

• BUT WENT UP, or remained steady in Zambia, Nigeria, DRC, and other economies which are commodity rich
MANUFACTURING SHARE OF EMPLOYMENT RISES

- Successful countries have **over 30%** of manufacturing share of employment.
- Other countries, the share has been **rising** (China, India) but slowly.
- In many others, it has **gone down** again—South Africa, Egypt.

GDP per head vs share of industry in employment, 1941 to 2015

The vertical axis shows historical estimates of the share of industry in employment. The horizontal axis shows GDP per head after adjusting for inflation and price differences across countries (figures are in 2011 international $).

Source: Our World In Data based on Herrendorf et al. (2014) and GGDC-10 (2015), Maddison Project Database 2020 (Bolt and van Zanden (2020))

OurWorldInData.org/growth-and-structural-transformation-are-emerging-economies-industrializing-too-quickly/ • CC BY
Three Industrialization Trajectories

SUCCESSFUL INDUSTRIALIZERS

Countries that managed to move labour successfully from agriculture, to manufacturing to services. Agriculture went down, manufacturing went up, led to innovative products across sectors.

STALLED INDUSTRIALIZERS

Countries that managed to move labour successfully for some time, and then got stuck.

PREMATURE DEINDUSTRIALIZERS

Countries that moved labour backwards – from industry to agriculture, because of commodity demand.
In stalled and pre-mature industrializers, to different degrees, there is little/no transformation:

This is due to two main reasons:

- Low technological progress and
- Commodity dependence through international trade
• BOTSWANA, ZAMBIA, AND NIGERIA: Commodity Dependence
  • Extremely large shares of industry in GDP vis-a-vis their industry employment shares.
  • This difference can be attributed to the fact that these countries are major natural resource exporters.
  • The mining or oil extraction industries = very capital intensive and generate a lot of revenue relative to the quantity of labor employed

• SOUTH AFRICA, MOROCCO, EGYPT – Hump shape: Countries have been de-industrialising even before reaching peaks
  • When a country deindustrializes at low levels of per capita.
  • Moves labour backwards, and downwards
  • What causes this?
    • [STATIC] Comparative advantages as you integrate into global trade

You see a movement backward:
Shifts from manufacturing to other non-surplus producing activities (commodities trade) instead of shifts from manufacturing to other surplus producing activities (high tech services)
EXAMPLE: COCOA PRODUCTION IN THE WORLD, 1961 - 2019

- Raw cocoa export = exporting jobs from Africa.
- In 2018 the chocolate industry employed about 70,000 people in the EU and USA.
- The global chocolate industry market in 2019 was valued at US$ 106.6 billion; & $147 billion by 2025.
- Africa’s share of Cocoa beans export = $6 billion
  - Africa only earns 3 – 6% of the chocolate industry’s retail market value even though it is the main producer of cocoa.

80% of Africa’s cocoa production is already sold even before it is harvested.

Africa accounts for about 21% of world’s cocoa grinding, but at most 1% of the global chocolate market.
AFRICA’S POST-COVID19 AGENDA
ECONOMIC DIVERSIFICATION
- ECONOMIC DIVERSIFICATION: A Shift from a single income: eg. oil & Minerals
- PRODUCT DIVERSIFICATION: New Innovative Products. For example, Vaccines Pfizer $12 billion in 2021
- MARKET DIVERSIFICATION: New Markets for new or same products

**WHY DIVERSIFY?**

✓ Diversification increases a country’s ability to meet goals of job creation and improvements in income distribution.

✓ Export diversification reduces export revenue instability and volatilities in imports and capital; it is growth inhibiting.

Without diversification into industrial manufacturing the long-term development prospects of countries are always bleak.
TO MOVE AWAY FROM STATIC TO DYNAMIC COMPARATIVE ADVANTAGES:

1. States need to formulate a long-term vision and goal and pursue it.
   - The technology vision is prominent in the Japanese, Korean and Chinese cases.
   - States achieved optimal resource allocation from a long-term dynamic viewpoint which cannot be accomplished by the market mechanisms alone.
   - These are the critical areas in which industrial investments should play a useful role through a wide array of instruments and incentives to acquire technology, build entrepreneurial (innovation) capacity through targeted and selected intervention in key sectors.

2. Capital formation, create markets and prioritize technological advance helps build linkages:
   - Sectors have inter-sectoral spill-overs.
   - Economies have intra- and inter-economy linkages, especially within regions.
   - Special industrial zones, S&T capacity building, clustering and entrepreneurship promotion through finance are some investments that finance wholesome industrialization.
• In 1970 India made a bold policy choice of denying product patent protection to promote its local pharmaceutical sector: Bangladesh made the same policy in 1986. Today they produce 90% of their domestic medicines.

➢ THE INDIAN PHARMACEUTICAL SECTOR WAS ESTIMATED AT US$12 BILLION IN 2006/2007;
➢ INDIA PHARMA IN 2020 IS WORTH $55 - $70 BILLION;
➢ The Indian pharmaceutical sector supplies over 50% of the global demand for various vaccines, 40% of the generic demand for US and 25% of all medicines for UK. India contributes the second largest share of pharmaceutical and biotech workforce in the world.

• Building Industrial and Innovation Capabilities involves continuous learning, investment over time.
THE REWARDS OF INDUSTRIALIZATION BY TAKING A BOLD POLICY STEP
AFRICA SHOULD  Renew Focus on Academic S&T and Excellence

Increasing academic excellence and proprietary knowledge

Source: WIPO Global Innovation Index, 2020
THANK YOU

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