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GREEN INDUSTRIALISATION IN AFRICA: CHALLENGES & OPPORTUNITIES

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Defining (catch-up) industrialization

- Incremental innovation in existing production process & products
- Radical innovation based on proprietary technology
  - Both increase capital intensity
- Organizational & managerial innovations in the firm
- Supporting national infrastructure & institutions (external economies)

These produce the 'increasing returns' associated with industrialization

- Create high barriers to entry for new firms, leading to market concentration, domestically & globally
- Results in imperfect competition
- Price makers

Generates wealth (or Schumpeterian rents)

- Can support higher wages & incomes
- Spillovers of proprietary technology to other sectors in the economy
  - Increasing productivity
- Experience, knowledge & skills are cumulative

Incumbents maintain leading position

Transition to a new techno-economic paradigm

- Opens window of opportunity
- barriers to entry fall because old technologies are obsolete
- New technologies commercialized
- Early imitators gain from incremental innovation

Techno-economic paradigm	Description	Main carrier and induced growth sectors	Technological leaders
First (1770s/80s to 1830s/40s)	Early mechanization	Textiles, textile chemicals & machinery, iron working	Britain France, Belgium
Second (1830/40s to 1880/90s)	Steam power and railway	Steam engines, machine tools, iron, railway equipment	Britain France, Belgium, Germany, USA
Third (1880/90s to 1930/40s)	Electrical & heavy engineering	Electrical engineering & machinery, cable & wire, armaments, steel ships, heavy chemicals	Germany, USA Britain, France, Belgium, Switzerland, Netherlands
Fourth (1930/40s to 1980/90s)	Fordist mass production	Automobiles, aircraft, consumer durables, petro-chemicals, synthetic materials	USA, Germany Other European, **Japan**, USSR, Canada, Australia
Fifth (1980/90s to now)	Information & communication	Computers, electronic capital goods, microelectronics, software, telecom equipment, optical fiber	**Japan**, USA, Germany, Sweden **Taiwan**, **Korea**, Canada, Australia

Opportunities for catch-up industrialization in the 21st century

Catching up can only be achieved through acquiring the capacity for participating in the generation and improvement of technologies, as opposed to just using them

- Get into leading sectors at the beginning

Sixth techno-economic paradigm

- eco-modernization: driven by decoupling global economic growth from finite resource consumption
- ***Cluster of new technologies around circular economy***
  - Solar hydrogen economy: with hydrogen as core general purpose tech, but requiring renewable energy
  - Biotech: replacing polymer technology

Disruptions in existing global supply chains

- Opens space for firms in SSA countries

Challenges

- ***Look forward, not backward***
  - Build new, NOT rebuild
- ***Technological forecasting***
  - understanding what technologies are being developed, how they are likely to change industries and/or lead to new industries
  - being in a position to take advantage of the window of opportunity temporarily created by technological transitions
- ***Taking risks*** to invest in building the knowledge and skills required for this new technology

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Example: textile & apparel industry

Reconceiving of T&A as a sunrise, and not a sunset industry

Sustainability shift → 'disrupt' global fashion industry/apparel GVC

- EU eco laws
  - Circular economy Action plan, Textile Strategy, Action plan on sustainable finance, due diligence laws, EPR laws
- Driving innovations in alternative fiber technologies
  - Cotton → organic & man-made cellulosic alternatives
  - Recycled fibers

Raw material of clothing production will be based on advancements in chemical recycling technologies & biofabrication

- ***Future fibers will have a high technology content and require licensing technology***

Innovation was always in fiber & fabric production, but now focused on fiber

- African T&A industries need to be based on mastering the next generation of fiber production technology

Mastering this technology opens up other opportunities

- Spillovers of biotech
  - Could be similar to technological advancements in chemistry that led to the ***polymer revolution*** in the 1920s
- Recycling tech and cross-sectoral waste management systems → also spillovers to other sectors

This requires

- Linking into global production networks
- Attracting the 'right kind of FDI' and leveraging foreign technology through JVs, tech agreements, & other types of partnerships
- Local private investment in R&D that initially is focused on commercializing new innovations
- Public investment in creating knowledge and skills in chemistry and R&D labs required to support this industry

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