

Manufacturing the Future: the 4th Industrial Revolution and the 2030 Development Agenda

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Key themes

Megatrends

Global trends driving changes in Manufacturing

The fourth industrial revolution?

Emerging challenges from transformational technical change

UN's Response

Why will change occur?

Which technological breakthroughs will transform manufacturing?

How the implementation of the agenda 2030 may be affected by the 4th industrial revolution?

What can UN do to address the impact on Agenda 2030 of the 4th industrial revolution?

Megatrends

Global trends driving changes in Manufacturing

Why will change occur?

'Megatrends'



Globalisation



Demographic change



Urbanisation



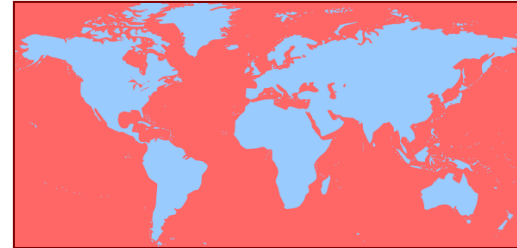
**Accelerating product
life-cycles**



**Changing consumer
habits**



Sustainability



**Threats to global
stability**

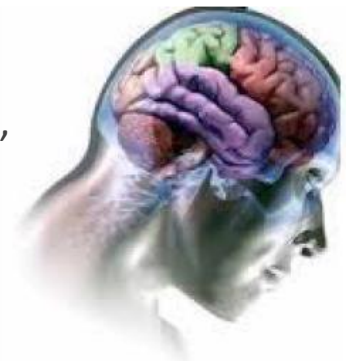


**External industrial
policy trends**

The fourth industrial revolution?

Which technological
breakthroughs will transform
manufacturing?

Technological breakthroughs



- **New materials:**

- Building blocks or starting point of new products and processes;
- Transform atoms and molecules in ways that can mimic nature;
- Includes: metals, polymers, ceramics, novel composites, biomaterials.

- **Mechanics**

- Range of automation technologies and new automated methods of handling materials, parts and products;
- Includes: Advanced manufacturing technologies, Robots, Automated handling and transporting equipment, Additive manufacturing.

- **Digital technologies**

- Computer systems and devices that can react and take decisions faster and more accurately than people or that facilitate that reaction;
- Includes: Modelling and simulation algorithms, Big data, Artificial intelligence, Control technologies, Monitoring and diagnostics technologies, Sensors and actuators, Cloud computing, Photonics.

- **Environmental technologies**

- Includes: energy technologies (energy-intensive industry, motors, grid management), climate change technologies (CCS, renewables, industrial gases), environmentally friendly approaches (4Rs)

- **Other technological developments (biotechnology, nanotechnology and neuro-technologies)**

- **Convergence**

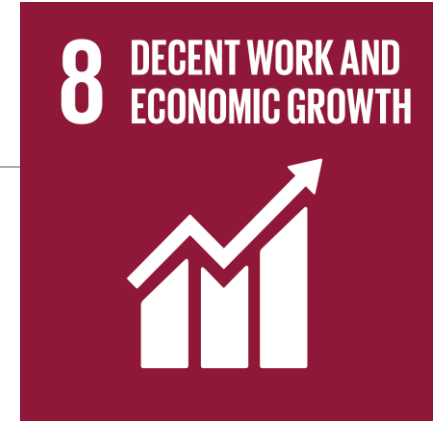
- Distinct entities are merging in a new area providing options for new inventions for a distinct entity
- Types of convergence: Scientific/knowledge (biomimetics), Technological (mechatronics), Application or products (iphone), Industries (car industry)

Emerging challenges from transformational technical change

How the implementation of the agenda 2030 may be affected by the 4th industrial revolution?

PROSPERITY

- Fact or phantasy? Timeline? Impact?
- Interoperability?
- Differentiated impact?
- Is the infrastructure ready?
- Absorption capacity? Technology transfer?
- Job creation or destruction?
- Are the necessary skills available or in the making?
- Offshoring and reshoring? Re-concentration of production?
- Barriers to trade? IPR? Cyber-security?
- The costs of new technologies? Where will the investment come from?



PEOPLE

- Uncertainty
- Pace of change
- People and machines: complements or substitutes?
- Are new technologies gender-biased?
- Access to new education and skills: facilitated or hampered?
- Access to health improvements: will they reach the poor and disadvantaged?
- Dealing with skilled and un-skilled migration?
- Increasing income inequality?



PLANET

12 RESPONSIBLE
CONSUMPTION
AND PRODUCTION



- What resource and energy intensity of emerging technologies?
- Emission reducing or enhancing technological change?
- How much redesign and reuse of previous products and processes will be pursuit?
- What impact on waste, use of hazardous chemicals and recycling? An emerging recycling industry?
- Will new technologies promote an environmentally friendly lifestyle?
- Will new technologies emerging during the 4th industrial revolution suffice to preserve the environment?

13 CLIMATE
ACTION



DEVELOPING COUNTRIES

- Opportunities: Cost reductions/linkages to GVCs and structural change
- Impact by industry (potential for automation/wages):
 - Labour intensive: garments, shoes; diffusion takes longer (Adidas and Sewbot)
 - Electrical, electronics and machinery will be affected depending on wages
 - Automotives: neither automation nor wages but quality
- 'Islands of modernity' vs old capital stock and obsolete ICT, difficult to retrofit with new technologies.
- Lose of production facilities to developed countries
- Skilled jobs at stake with low innovation potential
- Tertiary education institutions able of churning large amounts of quality STEM students
- Exacerbation of existing inequalities
- Telecommunications infrastructure
- Large investments recoverable in the mid-term



UN's Response

What is UN doing and can do further to address the impact on Agenda 2030 of the 4th industrial revolution?

UN's response

Forum activities: Conferences, seminars, workshops, expert meetings

Research:

- Future of Manufacturing publications
- G20/OECD

Capacity Building

- Technology Facilitation Mechanism (TFM)
- Executive training

Normative

- Standards setting

Technology transfer/cooperation

- Investment promotion
- Trade promotion: fairs
- Technological collaboration/demonstration: north-south, south-south
- Facilitate technology transfer

Partnerships

- Academia and research community
- UN: IATT
- Governments and private sector

Policy

- Investment and financing
- Technology and innovation
- Skills and employment
- Technology transfer



Final Remarks

- Anticipating the effects of the 4th industrial revolution is fraught with problems

- Achieving the 2030 development agenda is much more uncertain in the context of the 4IR
- Except in countries spearheading technological change, the world is only now waking up to the potential impact of the 4IR
- There will be winners and losers, both of which will not always be the same of the past
- Economic, social and environmental disruptions could be significant unless transitional mechanisms are put in place
- The UN can play a significant role in helping roll out transitional mechanisms

Many thanks for your attention



SUSTAINABLE DEVELOPMENT GOALS

