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

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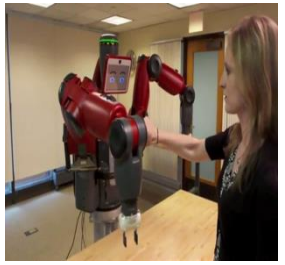
The fourth industrial revolution?

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, Artificial intelligence , Control technologies, Monitoring and diagnostics technologies, Sensors an 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 will the implementation of SDG9 will 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

- What resource and energy intensity of emerging technologies?
- Emission reducing or enhancing technological change?
- 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?

UNIDO's Institutional Approach

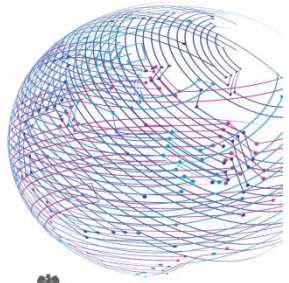
What is UNIDO doing and can do to address the impact on SDG 9 of the 4th industrial revolution?

UNIDO's response

- **Forum activities: GMIS, conferences, seminars, workshops, expert meetings**
- **Research:**
  - IDR 2016
  - Future of Manufacturing publications
  - G20/OECD/UNCTAD
- **Capacity Building**
  - Technology Facilitation Mechanism (TFM)
  - Executive training
- **Policy**
  - Investment and financing
  - Technology and innovation
  - Skills and employment
  - Technology transfer
- **Normative**
  - Standards setting
- **Technological cooperation**
  - Investment promotion
  - Trade promotion: fairs
  - Technological collaboration/demonstration: north-south, south-south
- **Partnerships**
  - Academia and research community: Stanford, IfM Cambridge, UNU-MERIT
  - UN: IATT, ITU, UNCTAD
  - Governments and private sector

The Future of Manufacturing:
Advanced Manufacturing
Overview of Implications to
Technology, Industries, Skills and Policies

INSTITUTE
Global Executive Programme
The Future of Manufacturing: Trends and Policy Options
17-21 October 2016 - Warsaw, Poland




SUSTAINABLE DEVELOPMENT GOALS
1 NO POVERTY
2 ZERO HUNGER
3 GOOD HEALTH AND WELL-BEING
4 QUALITY EDUCATION
5 GENDER EQUALITY
6 CLEAN WATER AND SANITATION
7 AFFORDABLE AND CLEAN ENERGY
8 DECENT WORK AND ECONOMIC GROWTH
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
10 REDUCED INEQUALITIES
11 SUSTAINABLE CITIES AND COMMUNITIES
12 RESPONSIBLE CONSUMPTION AND PRODUCTION
13 CLIMATE ACTION
14 LIFE BELOW WATER
15 LIFE ON LAND
16 PEACE, JUSTICE AND STRONG INSTITUTIONS
17 PARTNERSHIPS FOR THE GOALS
SUSTAINABLE DEVELOPMENT GOALS

MANY THANKS


Happy New Year