Accelerating clean energy through Industry 4.0

Manufacturing the next revolution

Tareq Emtairah

May 2018

Department of Energy

UNIDO and Industry 4.0

- **Industry 4.0 has the potential to achieve Inclusive and Sustainable Industrial Development** and SDG 9 (Industry, Innovation and Infrastructure)
- Specific targets and indicators in SDG 9 emphasize the importance of the manufacturing sector for economic growth, jobs and access to the Internet.
- UNIDO (2017) **launched a report**: "Accelerating clean energy through Industry 4.0: manufacturing the next revolution. "

What is Industry 4.0?

Integration of virtual and physical systems in manufacturing sector

- Also known as the Fourth Industrial Revolution
- Cyber-Physical System (CPS)
- The goal is to create an integrated, optimized and automated production flow

Big Data

IoT

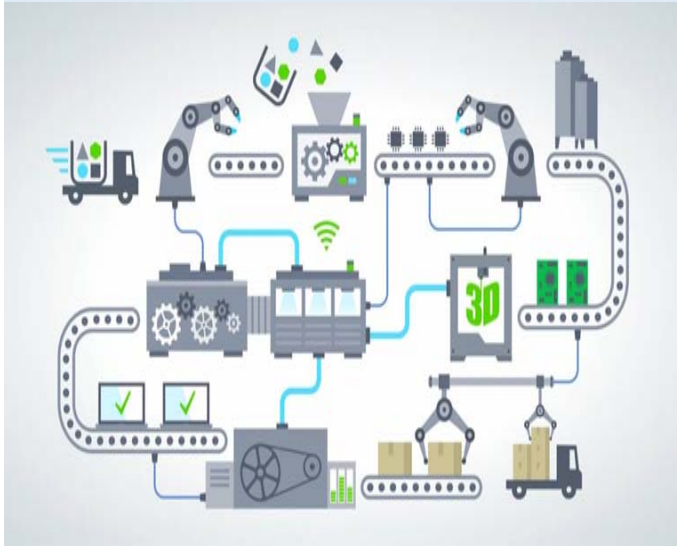
Augmented Reality

Blockchain

Rapid Prototyping

Integration

Manufacturing



Its linkages with sustainable energy
Synergies with sustainable energy depending on a country's level of industrialization

- Country Categories*

Industrialized countries	Emerging industrial economies
Developing countries	Least developed countries (LDCs)

*UNIDO's country classification is primarily based on the manufacturing value added (MVA) per capita as an indicator to assess a country's level of industrial production deflated to its population size.

Number of countries grouped to level of industrialization

Industrialized countries

Country Perspective-Industrialized Countries
Most advanced, but data is still limited in sustainable energy

- Situation
  - Improvement of competitiveness by optimizing and automating production processes
  - Energy and resource efficiency as a welcomed side effect

- Challenges
  - Limitation of data in sustainable energy
  - Smart applications in the production processes for untapped potentials

Emerging industrial countries

Country Perspective-Emerging industrial countries
Most advanced, but data is still limited in sustainable energy

- Situation
  - Driving force from market demands/major commercial customers.
  - Energy efficiency gains as side effects rather than the main objective
  - Beier et al (2017) found 83.5% of medium to large sized Chinese industrial companies see high or very high energy savings. Though only 3% saw a link with renewable energy.
  - Companies are heading to more decentralized approaches

- Challenges
  - Unshared best practices existing in the Northern America and Europe
  - Failure to convince advanced companies to invest
  - Polices aimed for linking investments to these digital technologies.

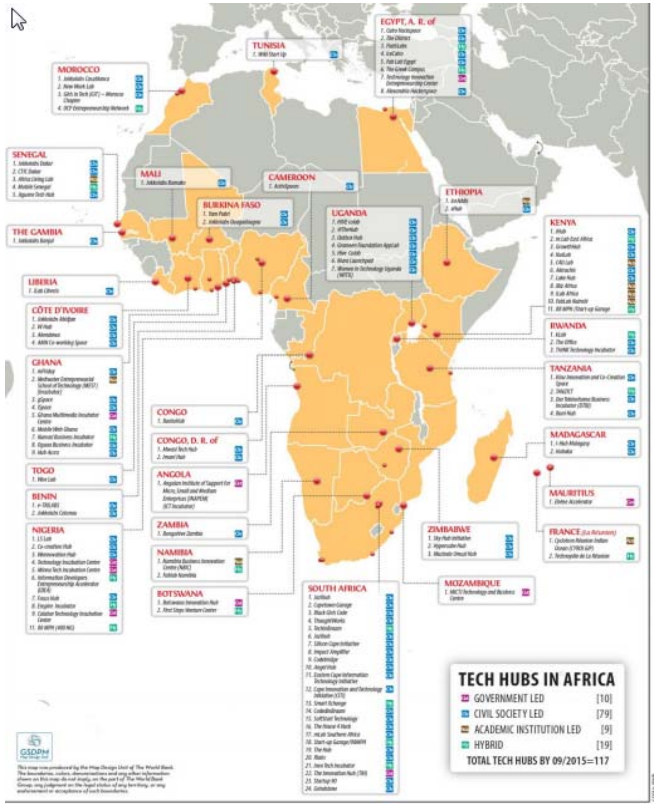
Other developing countries

Country Perspective-Other developing countries
Realization of the potential of digitalization and many tech-hubs

- Situation
  - Low level of automation.
  - Realization of the potential of digitalization with development of digital strategies.
  - Preference for less costly technologies by individuals and small businesses.
  - ICT-based start-ups and tech hubs led by governments in urban areas
  - Makerspaces- community-led working spaces equipped with innovative technologies

- Challenges
  - Interlinkages between digital manufacturing and sustainable energy

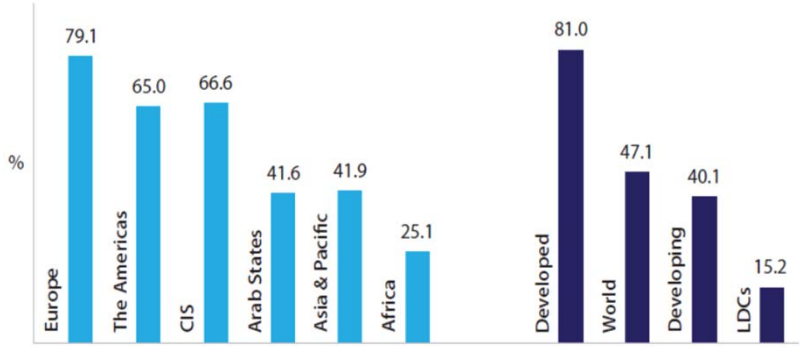
African tech-hubs



Least developed countries

Country Perspective-Least developed countries
Setting digital development priorities

- Situation
  - Huge gap in ICT between LDCs and other world average despite increase in the usage
  - Access to education and development of local business by this technology



Source : ITU (2016)

- Challenges and potential
  - Electrification in rural areas by decentralized mini-grids with ICT
  - Help manufacturing companies as part of the global value chains such as textile.
  - Self-configuration and self-optimization in textile plants by Big Data and ICT
  - Understanding and consideration of risks on jobs and social implications

What can UNIDO offer?

Knowledge-sharing and project development platform

- Collect and analyze relevant data
- Catalyze funding opportunities for project development

Assist countries on two development paths, based on the level of industrialization

- Retrofitting established industrial systems with Industry 4.0
- Leapfrogging technology waves with Industry 4.0

Partnerships with the private sector in both development paths

- Drive technology standards, provide financial solutions and target incentives to accelerate transition.

What UNIDO can offer

Contributing to the Sustainable Development Goals and Paris Agreement

Policy Recommendations

Maneuvering the innovation race

- Suitable regulations for innovation to expand them to newly developing digital branches
- Protecting existing social and environmental standards.

Increasing the agility of governments

- Faster pace of Industry 4.0 technology development driven by economic sphere, and Slower pace of formulation of policies by governments
- More agility in adopting the right type of policies to avoid the adverse effects

Preventing the deepening of global inequalities

- Possibility of global inequalities If the Global South cannot tap into the digital development benefits
- Regulatory frameworks on the national, regional and global scales to ensure equal access and distribution of Industry 4.0 technologies.

Thank You for Your Attention!!