DISRUPTIVE TECHNOLOGY and FUTURE ECONOMY & SOCIETY

XIAOLAN FU

OXFORD UNIVERSITY

EXPONENTIAL TECHNOLOGICAL CHANGE
ARTIFICIAL INTELLIGENCE
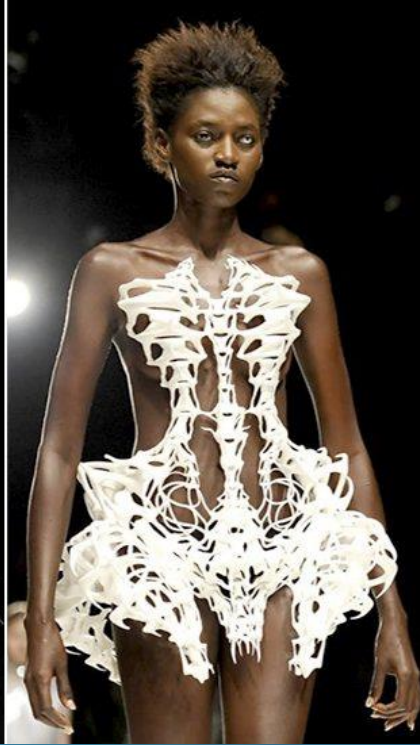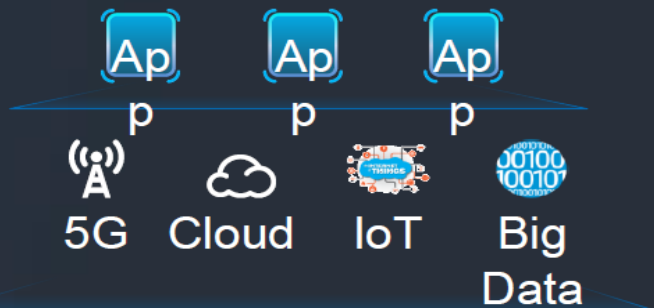

Alpha Go
Driverless car,

...

ROBOTICS

Smart manufacturing, IoT, Industry 4.0, ……

3D PRINTING

WIDE APPLICATIONS IN MANUFACTURING & BEYOND, PRIVATE & PUBLIC SERVICES

Intelligentization

App **Ap**p **Ap**p

5G | Cloud | IoT | Big Data

Everything is connected

Everything is intelligent

Source: Gartner, 2016; Weigel, 2016

Critical Industries Connected

Connected Cars | Smart Manufacturing | Smart Grid | e/m Health

Y2025:100 Billion

10B People

90B Things

Smart cities

IMPACT (Focus on AI, robotics, 3D printing)

- The eve of a new industry revolution
- Changing how value and profit are created
- Labour saving/replacing
- Profound impact on economy and society
- Wider impact than previous industry revolutions, not only on manufacturing, but also services & public administration

OPPORTUNITIES AND CHALLENGES

- Greater efficiency

- Improvement in work conditions & welfare

- Enabling innovations in production & social services

  (precision health care, predictive policing)

- Opportunities for some countries to leapfrogging

EMPLOYMENT CHALLENGE

- Job replacement

- In a wide spectrum of sectors, not only blue collar workers (from lorry drivers, office white collar, to highly skilled financial sector)

- Difficulties in re-employment for some.

- Risk of a lost generation

- Political instability & social un-sustainability

- Disruptive change of labour market structure: more programmers and less others. Progress of civilisation?

DISTRIBUTIONAL EFFECT

- Biased technical change

- Greater income inequality (significant)

- Capital vs labour; Skilled vs un-skilled

- Challenges to low income countries: further backwardness

- Deepening global income divide

CHANGES IN GLOBAL ECONOMY

- Re-shore of manufacturing back to developed countries

- Opportunities for LDCs to catch up narrowed

- Revolution in global production network led by 3D printing

- Distributed localised production replaces mass production

- Challenges to China: the world's manufacturing workshop

ETHICAL CHALLENGE

- Responsibility: robots, programmer, owner

- The power of super programmers

- The power of a few people who have the capital and skills to access, use or even control data and information

- National basic salary system: What is meaningful life for humankind? Would human beings like to live like birds in the cage?

POLICY IMPLICATIONS

- Technical progress moves faster than policy & regulation, and tech groups are influencing policy & regulation.

- Policy&Research to guide technical change for SDG;

- P&R to help society to harness benefits & reduce risks

- Multi-stakeholder instead of industry-driven policy;

- Help the voluntary community through re-distribution

POLICY IMPLICATIONS

- LDCs to embrace new tech for leapfrogging. (training, education, infrastructure, tech transfer)

- LDCs also consider specialisation vs mass production

- Policies to meet the shocks to jobs & income distribution

- Policies not only for manufacturing, but a services and public administration sector

- Space left out by China's structural chang upgrading. Policies to help countries to o this space.

Figure 1. Estimated year-end operational stock of industrial robots, selected countries and regions, 2013–2018 (Thousands of units)
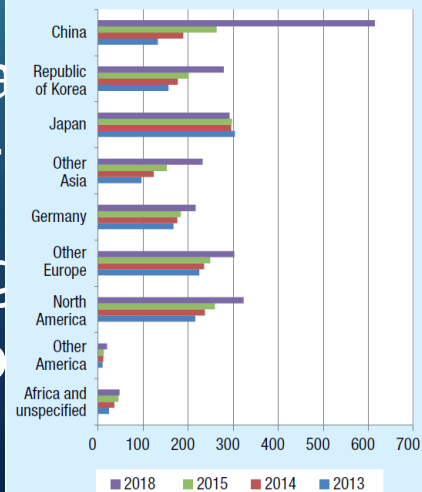
GLOBAL PARTNERSHIP & EFFORTS

- 2030 global Sustainable Development Goals (SDGs)

- UN Technology Transfer Mechanism (TFM)

- UN Technology Bank for LDCs

MORE ABOUT FUTURE:

Acknowledgement: pictures from internet