Industry 4.0 for Development: A Tale of Two Cities

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4th Industries Revolution and Development Opportunities & Challenges

- Greater efficiency
- Improvement in work conditions & welfare
- Enabling innovations in production & social services (precision health care, predictive policing)
- Digital windows of opportunities for some LDCs to leapfrog

- **It's the best of the times;**
- **It's the worst of the times.**

Opportunities & Challenges to development

- Human replacing
- Income distribution & inequality
- A new digital divide
- Challenges to privacy and consumer rights

- **Changes in world economy**:
- Re-shore of manufacturing back to DCs
- A risk that opportunities for LDCs to catch up narrowed
- But a digital windows of opportunity for some LDCs to leapfrog

Study 1: Industrial Robots and Inclusive Growth

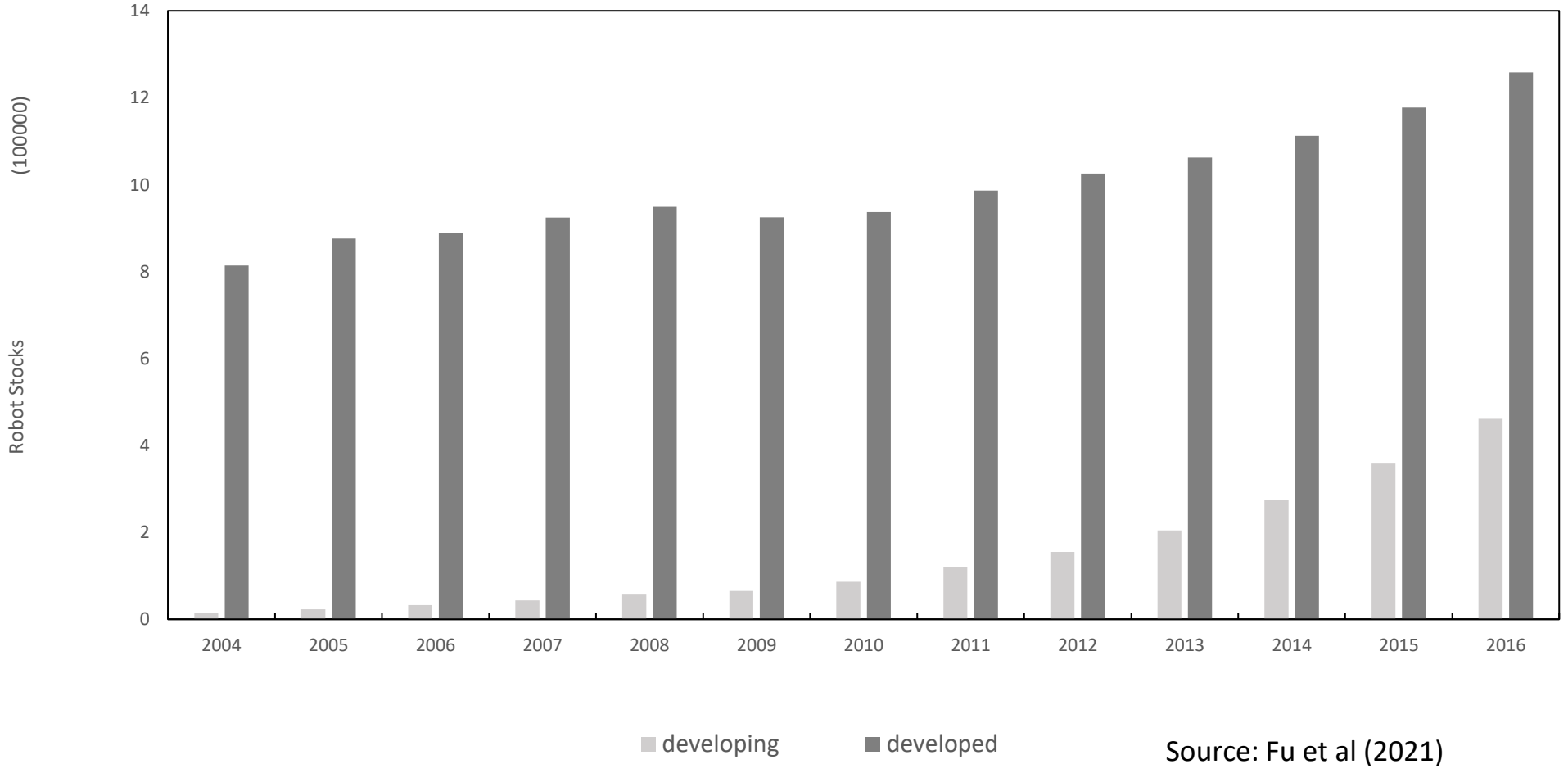
- Cross country panel data of 75 economies for 2004-2016.
- 43 are classed as developed economies and 32 as developing economies
- Data source: IFR, ILO, WDI, PWT

- Base model:
- Fixed effects model to control for country specific effects

$$Y_{i,t} = \alpha + \beta * LNROBOT_{i,t} + \delta * CV_{i,t} + \varepsilon_{i,t}$$

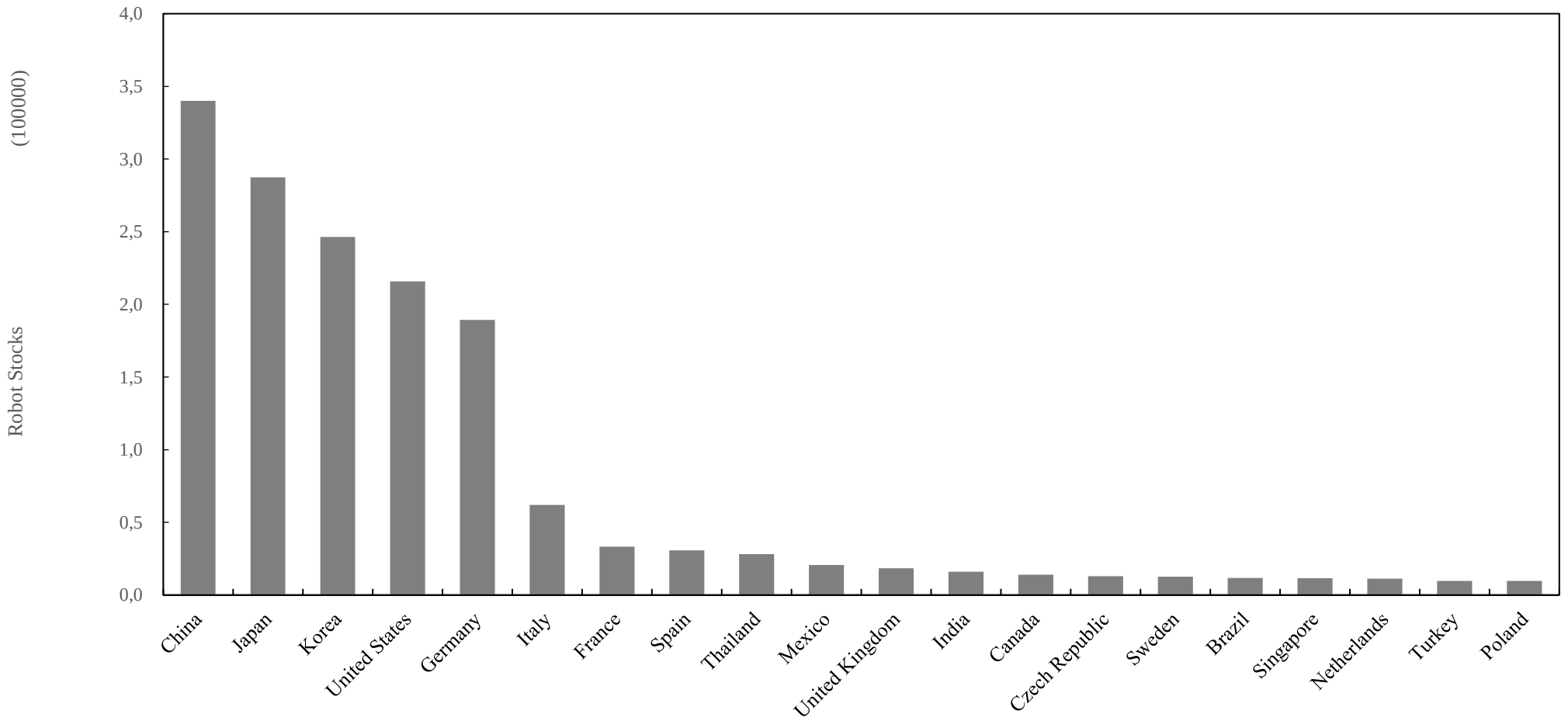
Source: Fu, et al (2021)

Robot stocks 2004-2016: Developed vs. developing economies



Source: Fu et al (2021)

Robot Stocks in 2016: Top 20 economies



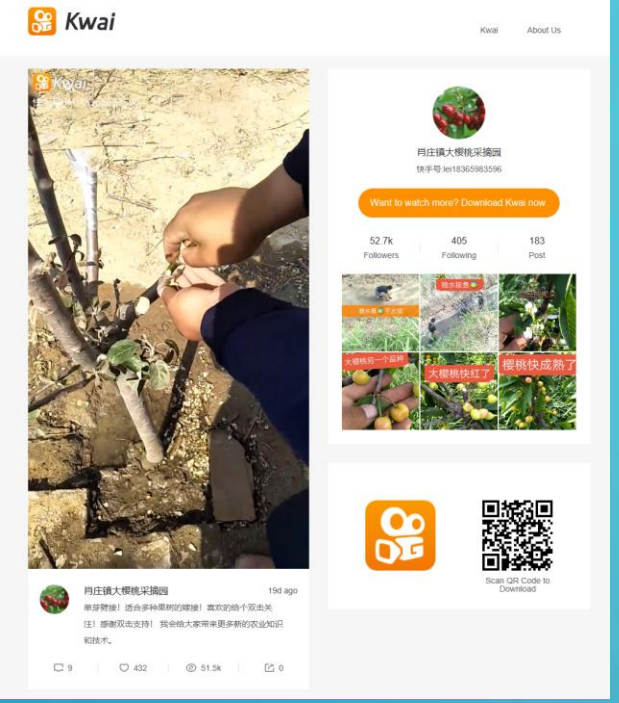
Findings

- Positive impact of the adoption of industrial robots (IR) on labour productivity
- The impact on jobs and distribution however differ between developed and developing countries
- IR adoption is positively associated with labour income in GDP in developed countries
- But it's negative while insignificant in developing countries

- IR adoption does not have significant impact on employment of the workers at the two ends of the labour market: those illiterate and those with advanced education
- IR adoption has a positive impact on the employment of those middle-cohort workers in the developing countries
- IR adoption appears to have a greater effect on jobs for women creation in the developing countries, but only marginally significant.

Study 2. Digital windows of opportunity & business model innovation

A combination of international technology transfer and indigenous under-the-radar innovative applications



The case: Short video platforms

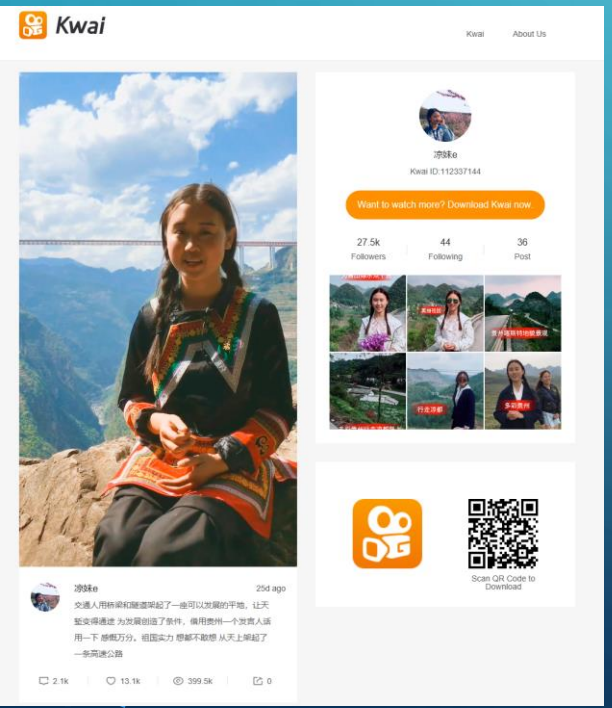
Kwai in China

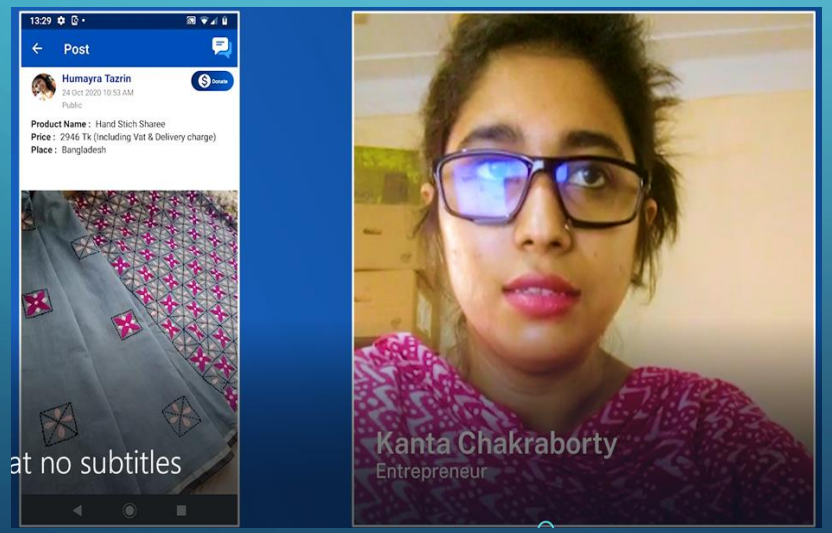
Share Work, life & skills

2020: 200mil **rural** Users

650 mil. Short video/day (rural)

55 mil. Viewers/day (rural)





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In BANGLADESH

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Short-video platform & entrepreneurship at the Base of the Pyramid

Findings from the Inclusive Digital Model (IDMODEL project)

- **Overcome constraints**, eg. information poverty, market access, transaction costs
- Short video: easier to communicate, **lower skill entry barrier; rich information**
- Content based value creation: **reduced the capital requirement**
- Role models and social interactions/mechanisms on platform: **Aspiration & social K**
- Enabling conditions: Infrastructure dev., costs reduction, skills, regulatory safeguard

  ---- **Tech Appro**. – accessible & usable (infrastructure, video, skill)

  ---- **Econ Appro**. – affordable (reduction of ICT costs)

  ---- **Socially Appro**. -- BOP income creation, capabilities building, aspiration; safe equal exposure algorithm, democratise platform, normal life is valuable.

Source: Fu et al (2022)

FINDINGS FROM BANGLADESH & CHINA

(RCT In Bangladesh Involving 2400 Households 8900 Individuals)

- Digital technology is key to reduce "information poverty", opens doors of opportunity
- Enhance people's resilience and their ability to **cope with economic hardship**, especially during the Covid19 pandemic.
- Creation of alternative sources of income or **diversifying income sources** for marginalised communities.
- Individuals with digital app access and training: income declined 28.9% less; unemployment 3% less, during Covid19 pandemic.
- 20.2 % more likely to utilise mobile APPs to access market & health information.

Policy recommendations

1. LDCs to embrace 4th IR tech for leapfrogging.
2. Support technology to promote inclusive & sustainable development
3. Policy to help society to harness benefits & reduce risks
4. Facilitate access to digital technology: improve infrastructure & lower costs.
5. Design bespoke training programs, esp. for women and young people.
6. Raise awareness and inspire MCs.
7. Strengthening regulations to protect consumers' rights and data privacy
8. Consider future of work, policies facing the future.

Digitisation & upgrading Under-the-radar innovation in LDCs in 4th IR

- Fu (2020) find the prevalence of the under-the-radar innovation in LDCs
- Firms use URI innovations under the constraints to survive and grow.
- But LDCs cannot leapfrog the innovation gap in 4th IR through these under-the-radar innovations.
- Need to digitise and strengthen the STI intensity in LDC innovations

Global partnership & efforts

United Nations

- 2030 global Sustainable Development Goals (SDGs)
- UN Commission on Sci & Tech for Dev (CSTD)
- UN Technology Transfer Mechanism (TFM)
- UN Technology Bank for LDCs
- UNIDO, UNCTAD, WIPO, ITU, UNESCO (ind + STI, ind+uni)