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TECHNOLOGY AND INNOVATION REPORT 2018

Harnessing Frontier Technologies for Sustainable Development

SHAMIKA SIRIMANNE

DIRECTOR, DIVISION ON TECHNOLOGY AND LOGISTICS

TRADE AND DEVELOPMENT BOARD
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FRONTIER TECHNOLOGIES CAN BE A POWERFUL FORCE TO DELIVER SUSTAINABLE DEVELOPMENT

Technological change has the potential to achieve SDGs faster, more sustainably and more efficiently.

Key frontier technologies: Big data, Internet of Things, AI, 3D Printing, Biotech, Nanotech, Renewable Energy, Drones, Satellites

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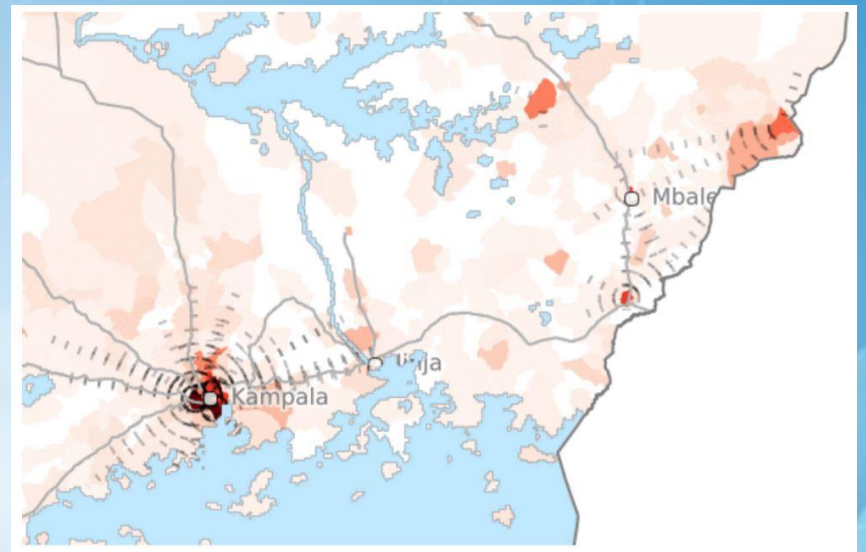
FRONTIER TECHNOLOGIES: A BETTER FUTURE NOW

Uganda: Outbreak data visualization and interactive mapping



Visualisation of sub-county level typhoid incidence and human mobility from highly infected areas.

Bangladesh: Wireless sensors for water quality monitoring

South Africa: 3D printing for prosthetics

Kenya: Big data analytics for affordable agricultural insurance

And more…

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WHAT MAKES FRONTIER TECHNOLOGIES DIFFERENT

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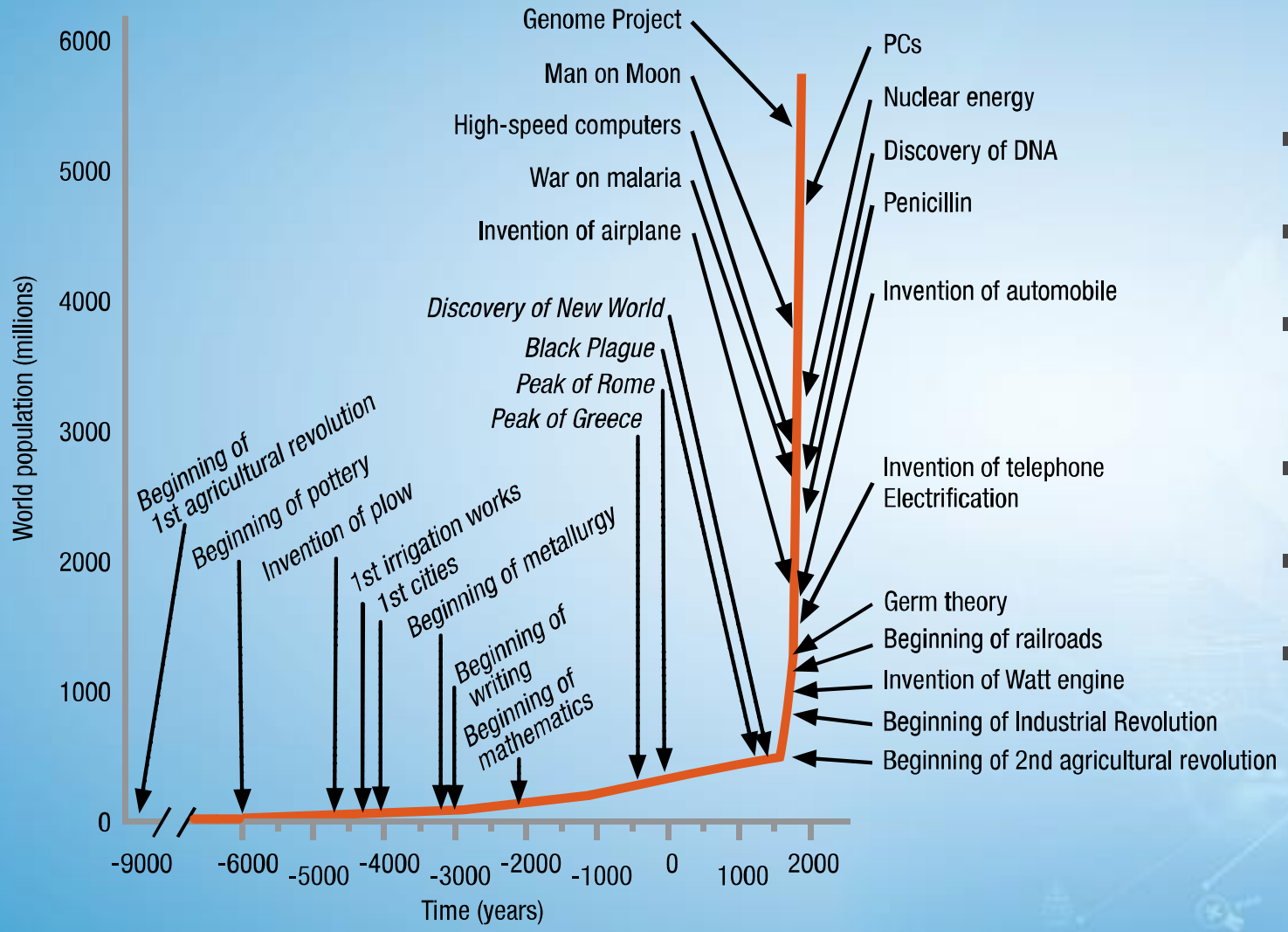

- They build on each other
- Change is exponential
- Technologies converge and recombine
- Dramatic reductions in costs
- Leverage of digital platforms
- Democratizing innovation

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POTENTIAL ECONOMIC IMPACT OF INTERNET OF THINGS IN 2025

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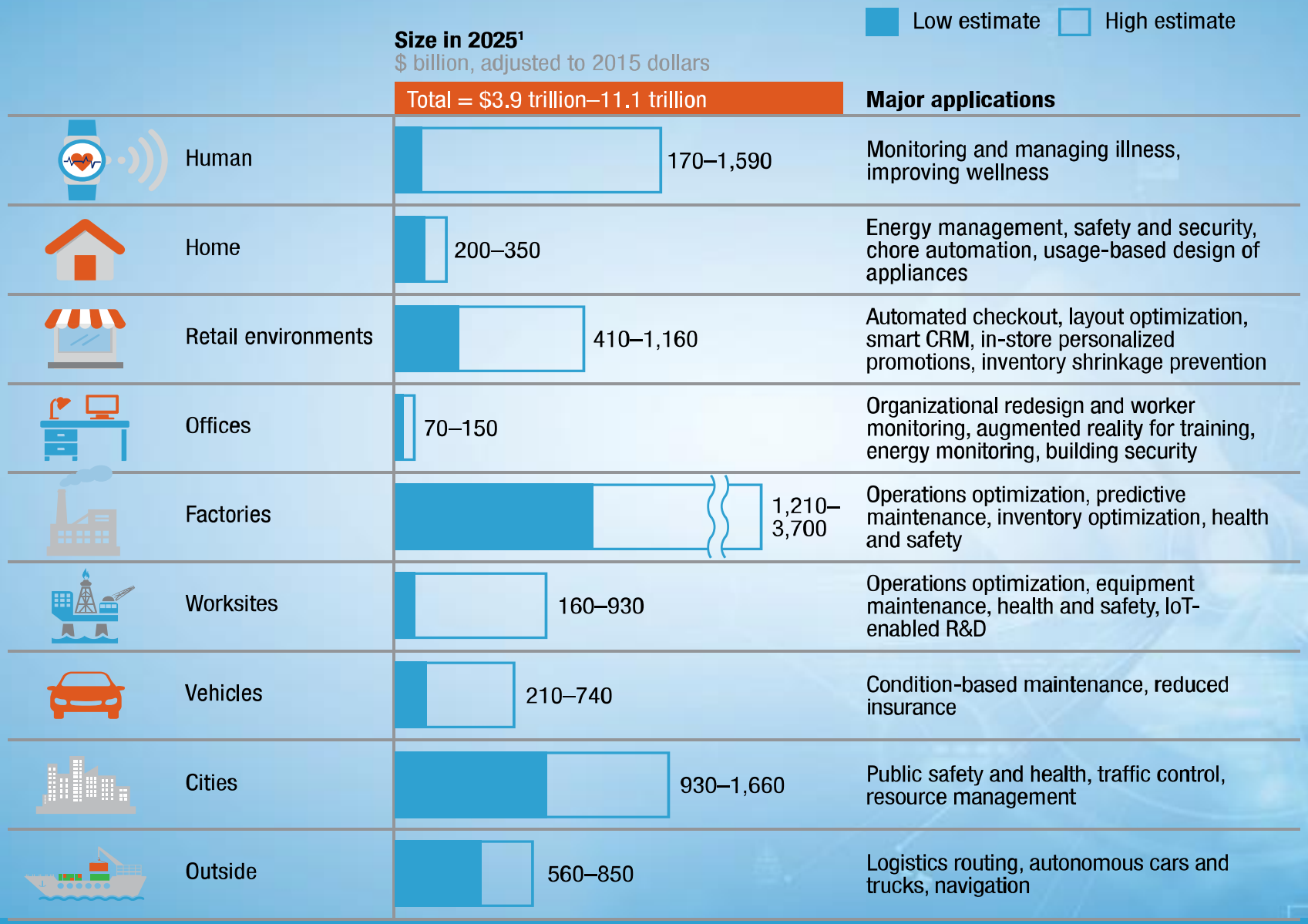

[1] Includes sized applications only.
Note: Numbers may not sum due to rounding.

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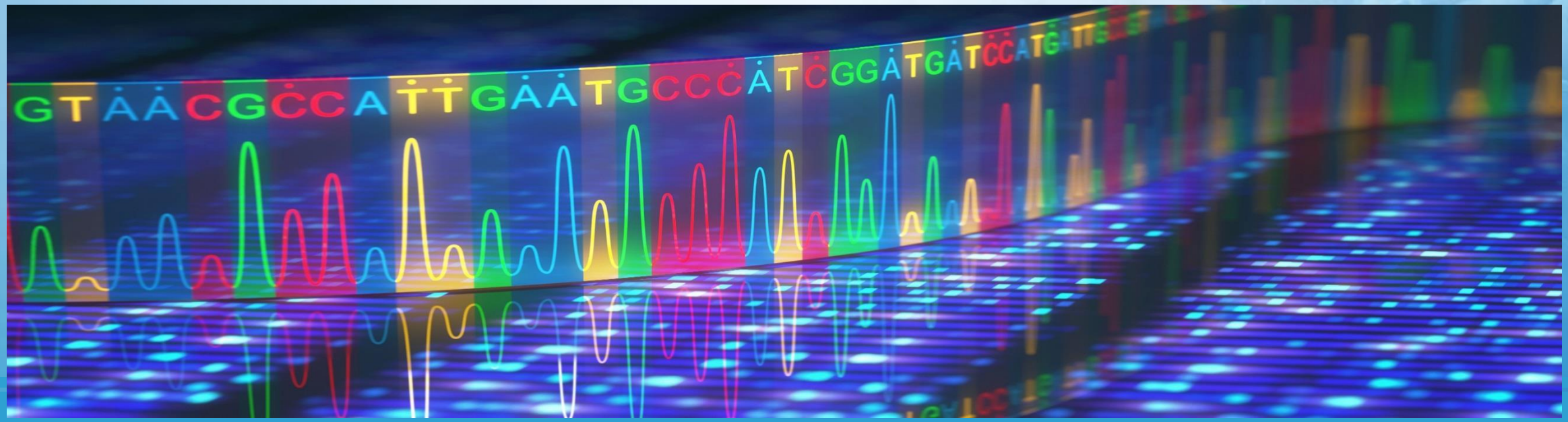
ECONOMIC AND SOCIETAL CHALLENGES

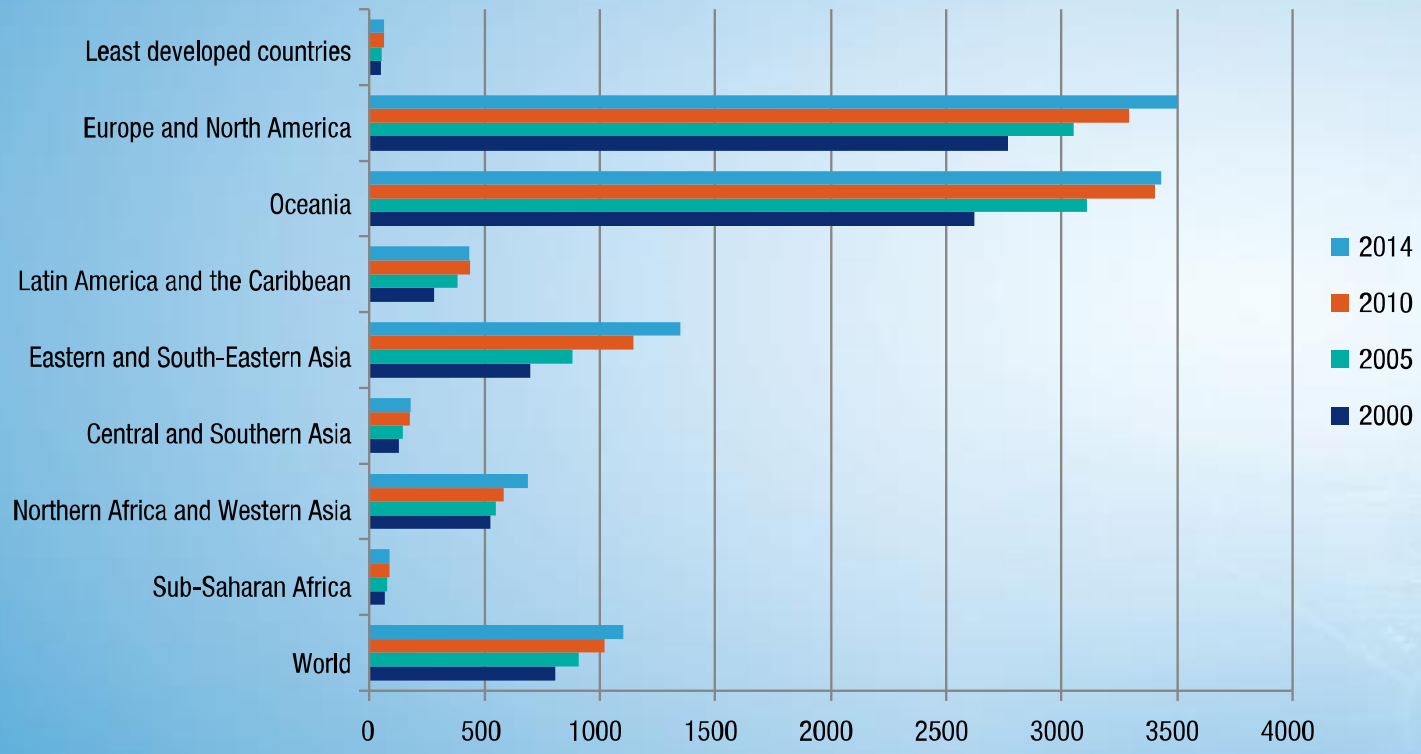
Frontier technologies have effects on:

- Employment, inequality
- Market power concentration
- Economic, social, technological divides among countries
- Privacy, algorithmic transparency, ethical questions



THE DIVIDE IN TECHNOLOGICAL CAPABILITIES

Researchers per million inhabitants

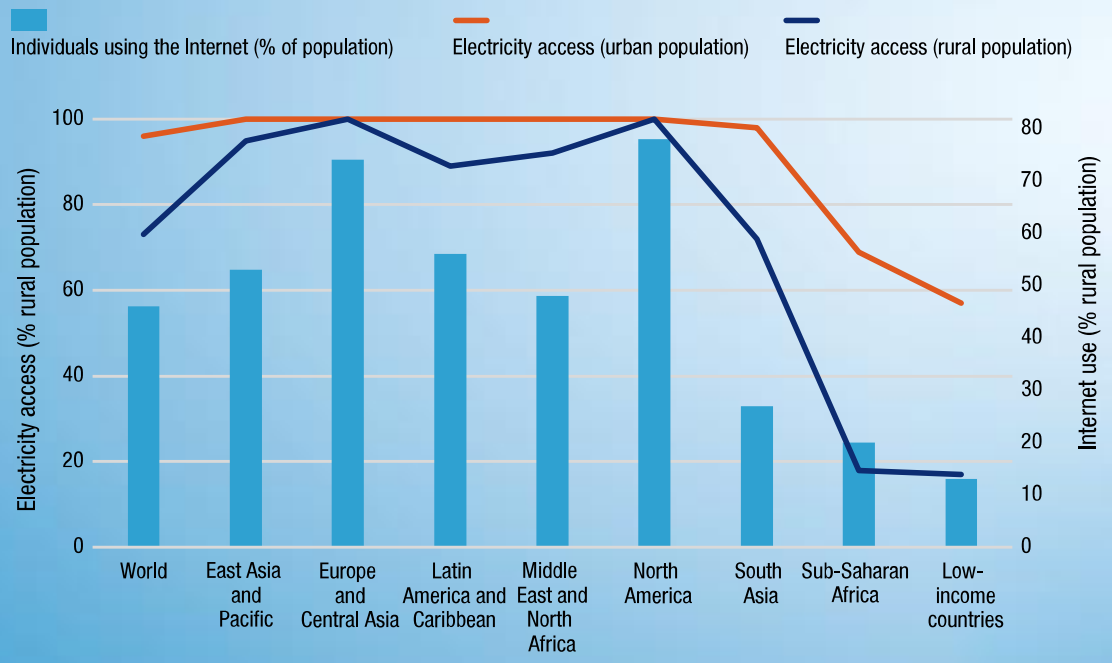


Large divides among countries in technical skills and R&D efforts and capacity. Developing countries, particularly LDCs lag behind in:

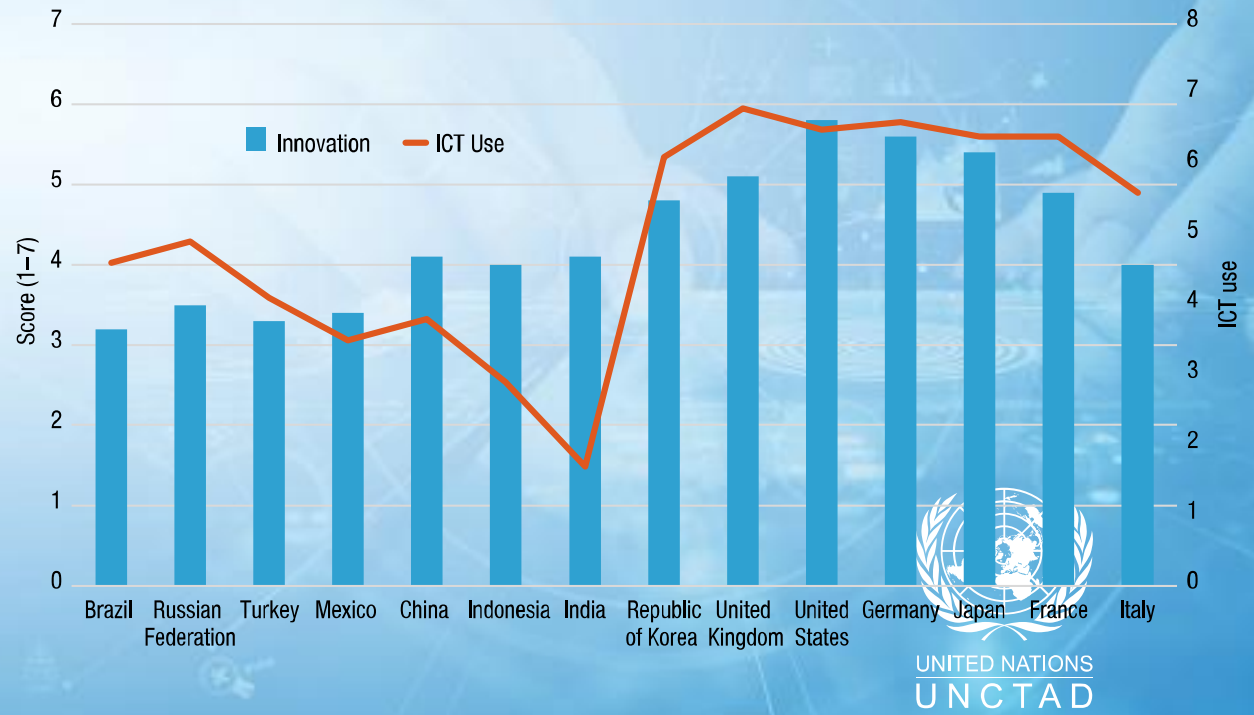
- R&D expenditures
- Number of Researchers
- STEM graduates
- Gender gaps in technical education, employment in the manufacturing and ICT sectors, and in access to ICTs and the Internet.

THE DIVIDE IN ICT IMPACTS INNOVATION CAPABILITY

- The connection between electricity access and Internet use (rural populations are excluded from both).



- ICT is a **CRITICAL** infrastructure: it clearly has an influential role in innovation



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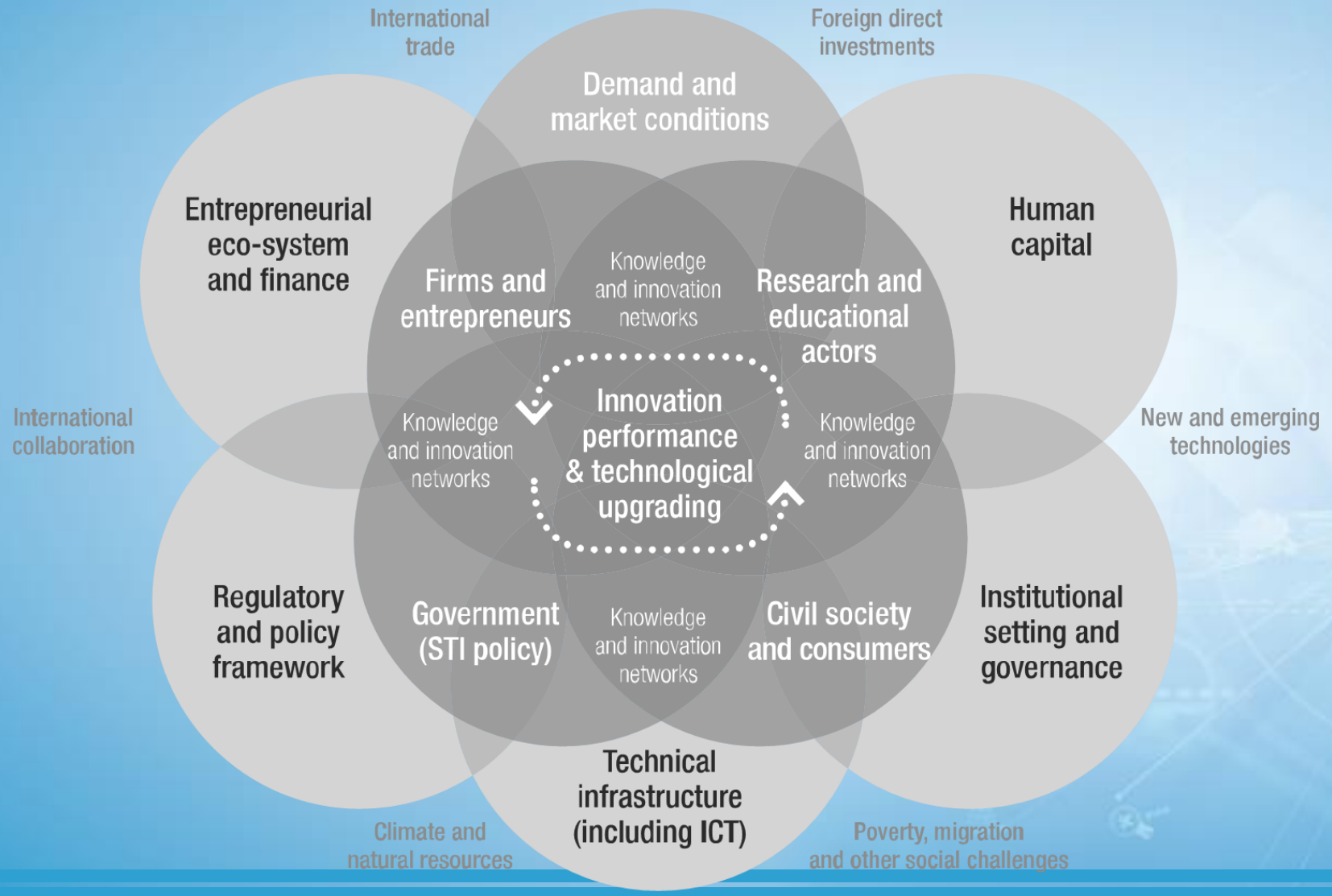
FRONTIER TECHNOLOGIES CANNOT DELIVER WITHOUT THE BASICS OF STI POLICY



- CAPABILITIES
- CONNECTIONS
- ENABLING ENVIRONMENT
  - FINANCING
  - INFRASTRUCTURE

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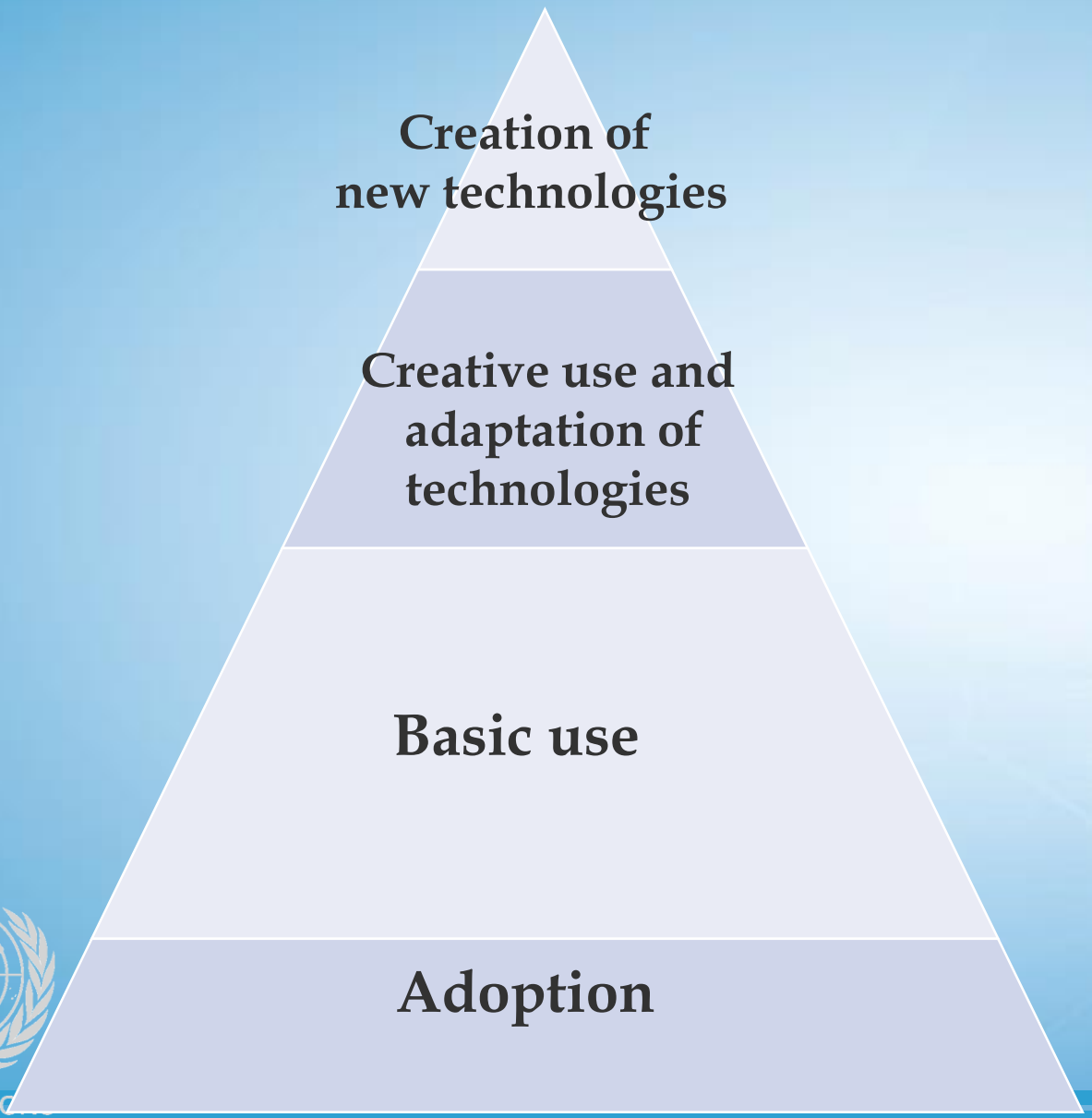
PYRAMID OF DIGITAL SKILLS



- Sophisticated programming skills
- Knowledge of complex algorithms

- Computing skills
- Familiarity with algorithms

- Basic understanding of technologies, software and applications
- Knowledge of digital rights, privacy, security and permanence of data
- Ability to collaborate, communicate and create using technologies

- Basic education and literacy
- Familiarity with technology devices and services

Source: P DiMaggio, E Hargittai, C Celeste and S Shafer, 2004, Digital inequality: From unequal access to differentiated use, in *Social Inequality* (Russell

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FRONTIER TECHNOLOGIES AND INCLUSIVENESS

Rethinking the social compact:

- Lifelong learning,
- Universal Basic Income (UBI)

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LEAPFROGGING: LOOK BEFORE YOR LEAP?

- Leapfrogging has delivered benefits in key technologies (starting with mobile telephony, but also mobile money, off-grid renewable energy, ICTs for education-MOOC)
- Potential second-degree applications in agriculture, health care, industry, transport, sharing economy
- Leapfrogging as a user vs. producer of tech and the need for local technological capabilities

Source: http://www.m-kopa.com/wp-content/uploads/2014/11/Mk-4-for-Web.jpg

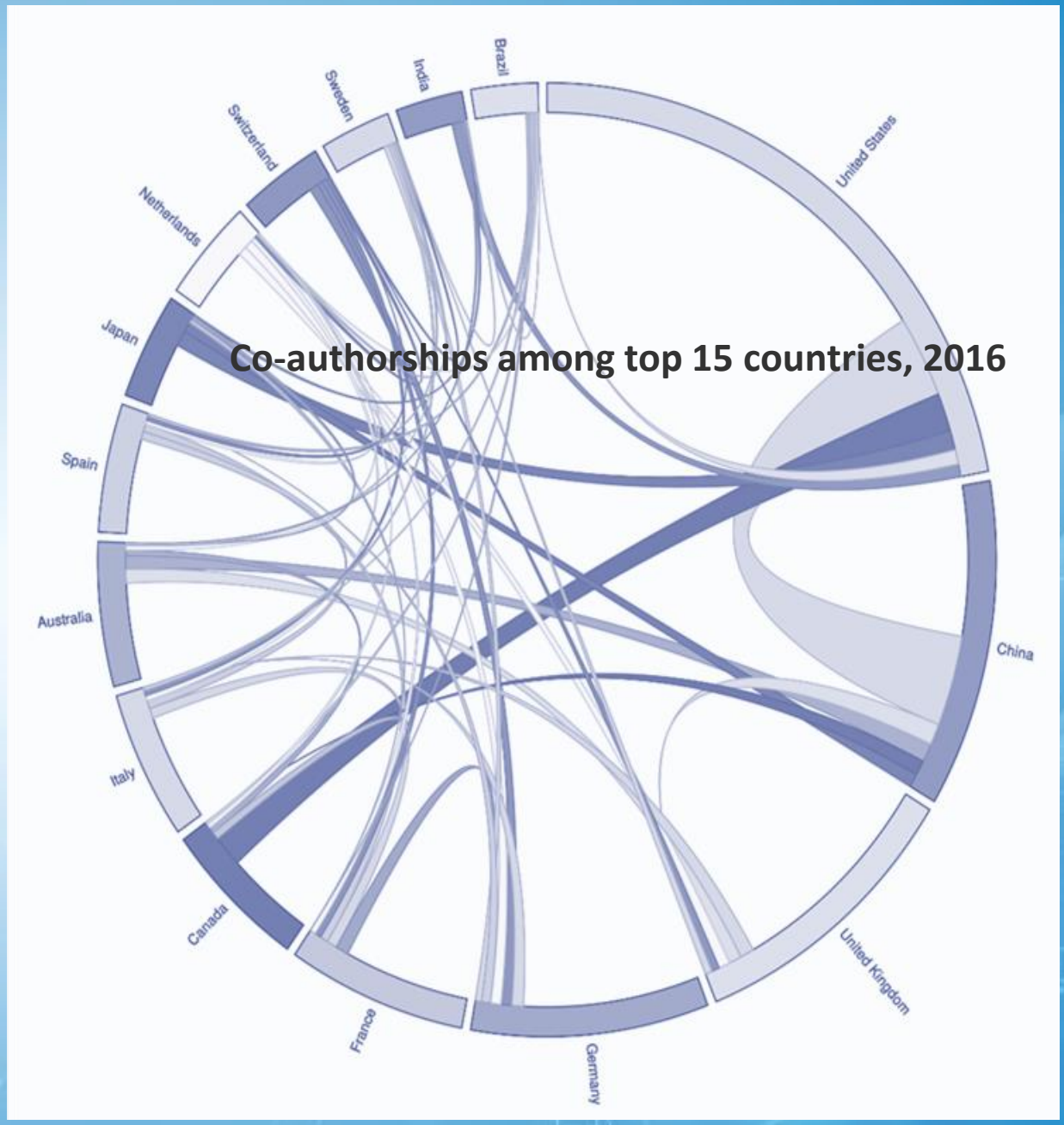
FRONTIER TECHNOLOGIES PROMOTE NEW APPROACHES TO INNOVATION

- Digital technologies greatly assist: scaling-up of low-cost products and services; innovations by the poor; and social innovation
- Smart specialization
- Platforms for economic discovery
- Incubators, accelerators and technology parks

SHAPING RESEARCH COLLABORATION TO ADDRESS THE SDGS

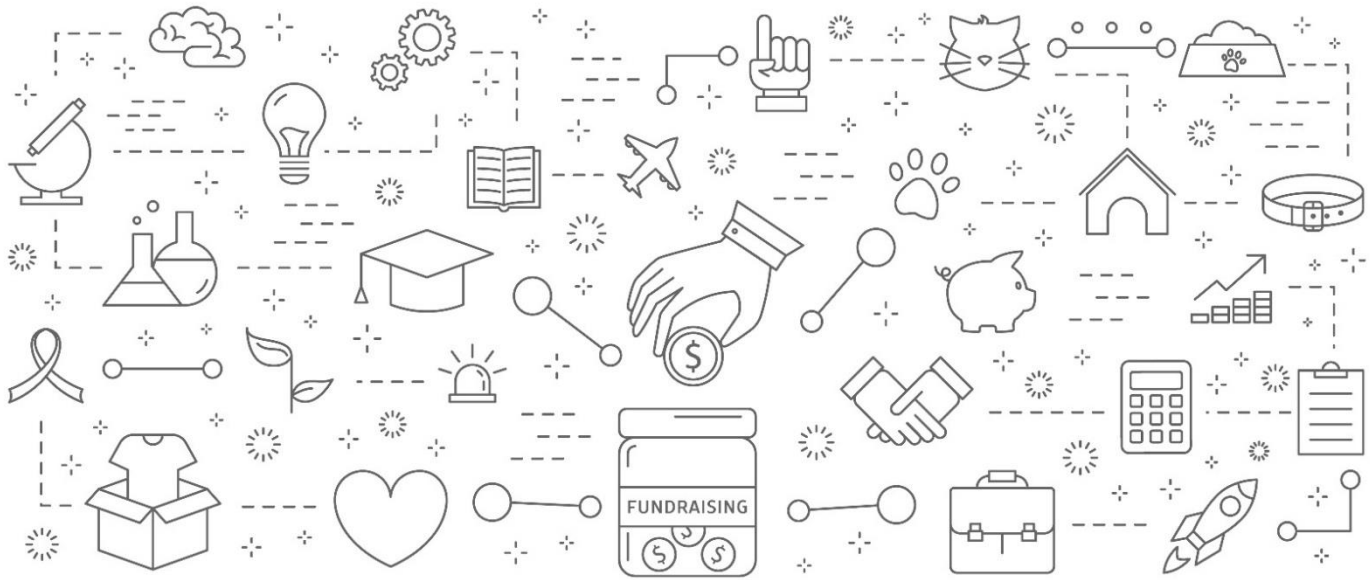
Science is becoming an ever more international enterprise.

Co-authorships are increasing, and internationally co-authored articles are cited more often.



Source: Elsevier, with thanks to Jeroen Baas.

CHANGES IN THE FUNDING OF INNOVATION



Innovative financing:

- Innovation and technology funds,
- New types of bonds
- Crowdfunding
- Venture capital, business angels, impact investment

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A CONCERTED EFFORT IS NEEDED…

Focus on building capabilities and supporting all forms of innovation

UNCTAD and UN CSTD a forum for international policy dialogue about development implications of frontier technologies

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THANK YOU

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