



**TECHNOLOGY
AND INNOVATION
REPORT
2021**

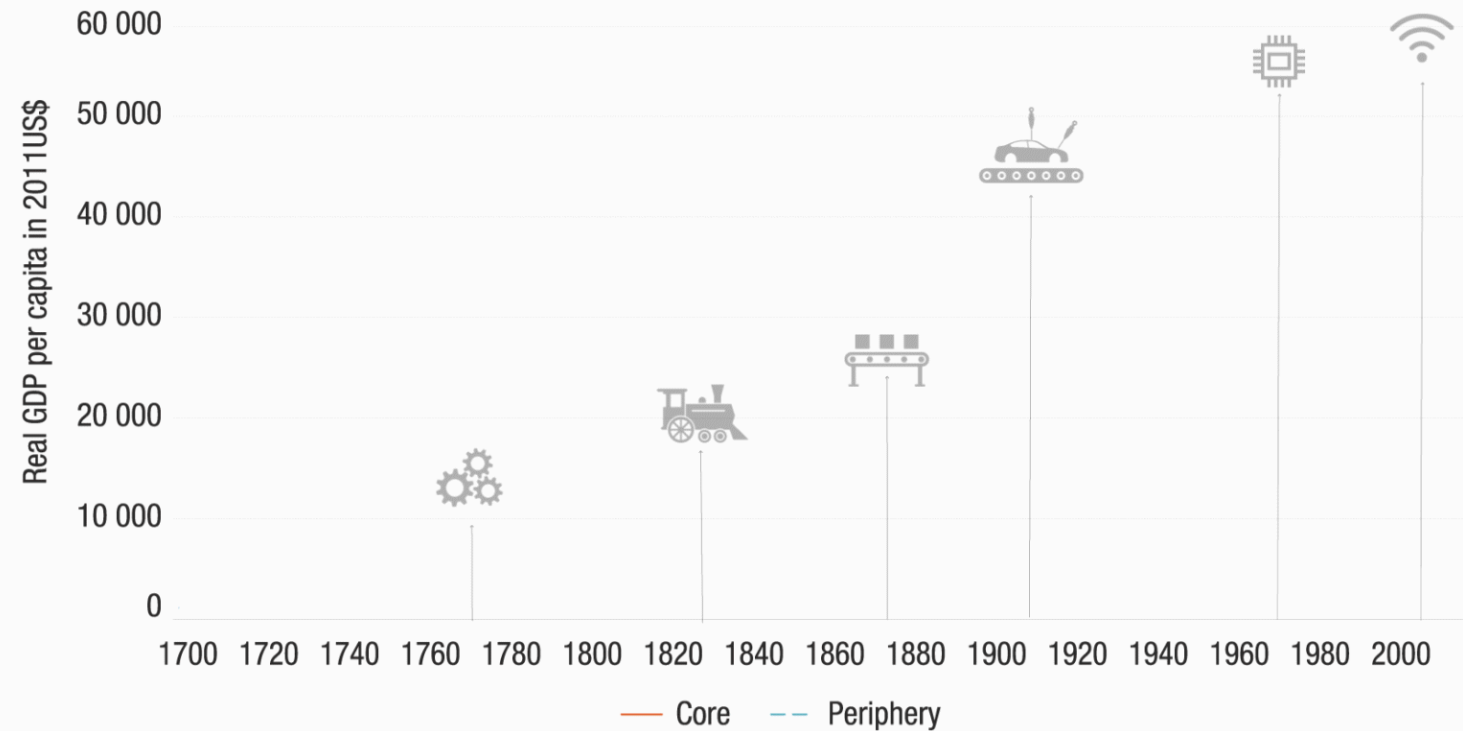


UNITED NATIONS
UNCTAD

CATCHING THE WAVES

The great divide, and waves of technological change.

Technological change and inequality through the ages

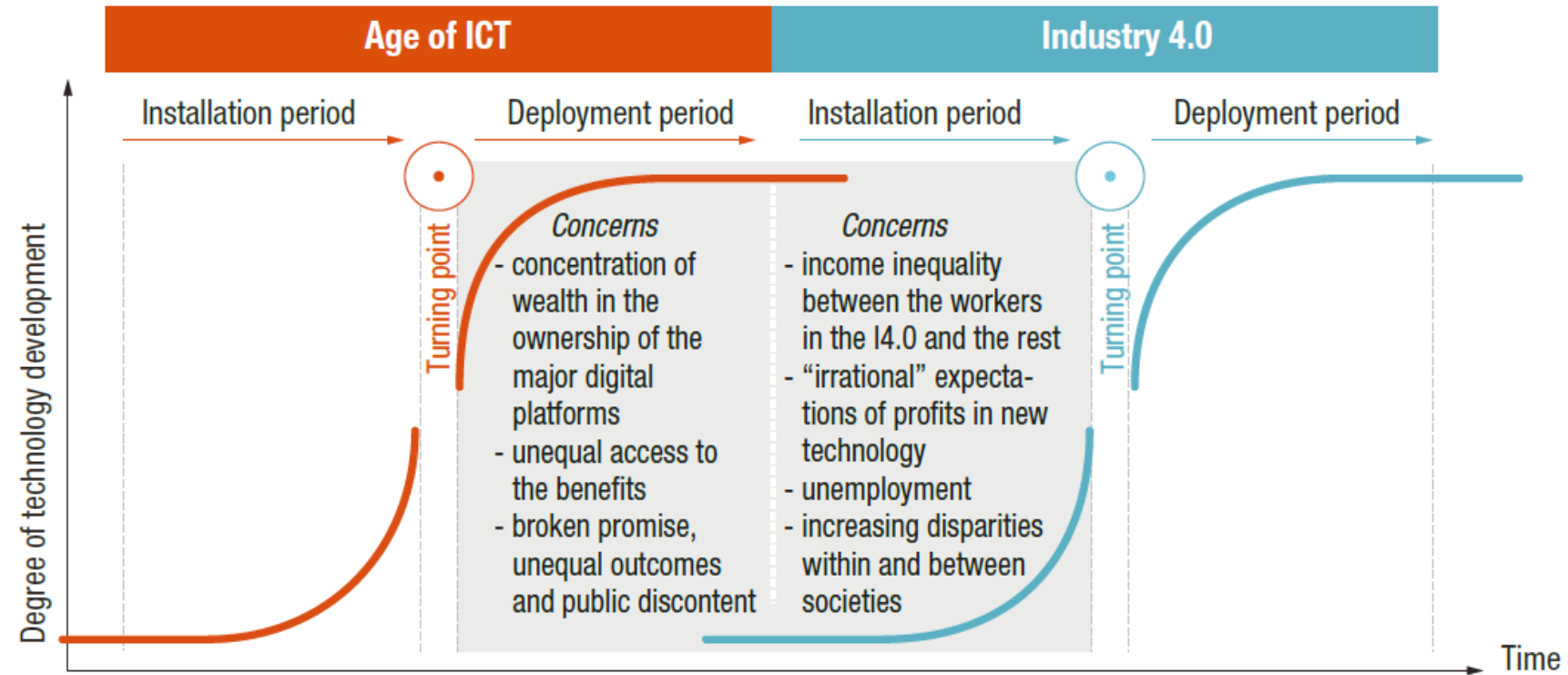


Source: UNCTAD's Technology and Innovation Report 2021

Source: UNCTAD, based on data from Maddison Project Database, version 2018, Bolt et al. (2018), Perez (2002), and Schwab (2013).

Notes: "Core" corresponds to Western Europe and its offshoots (i.e. Australia, Canada, New Zealand, the United States) as well as Japan. "Periphery" corresponds to the world, excluding the "core" countries.

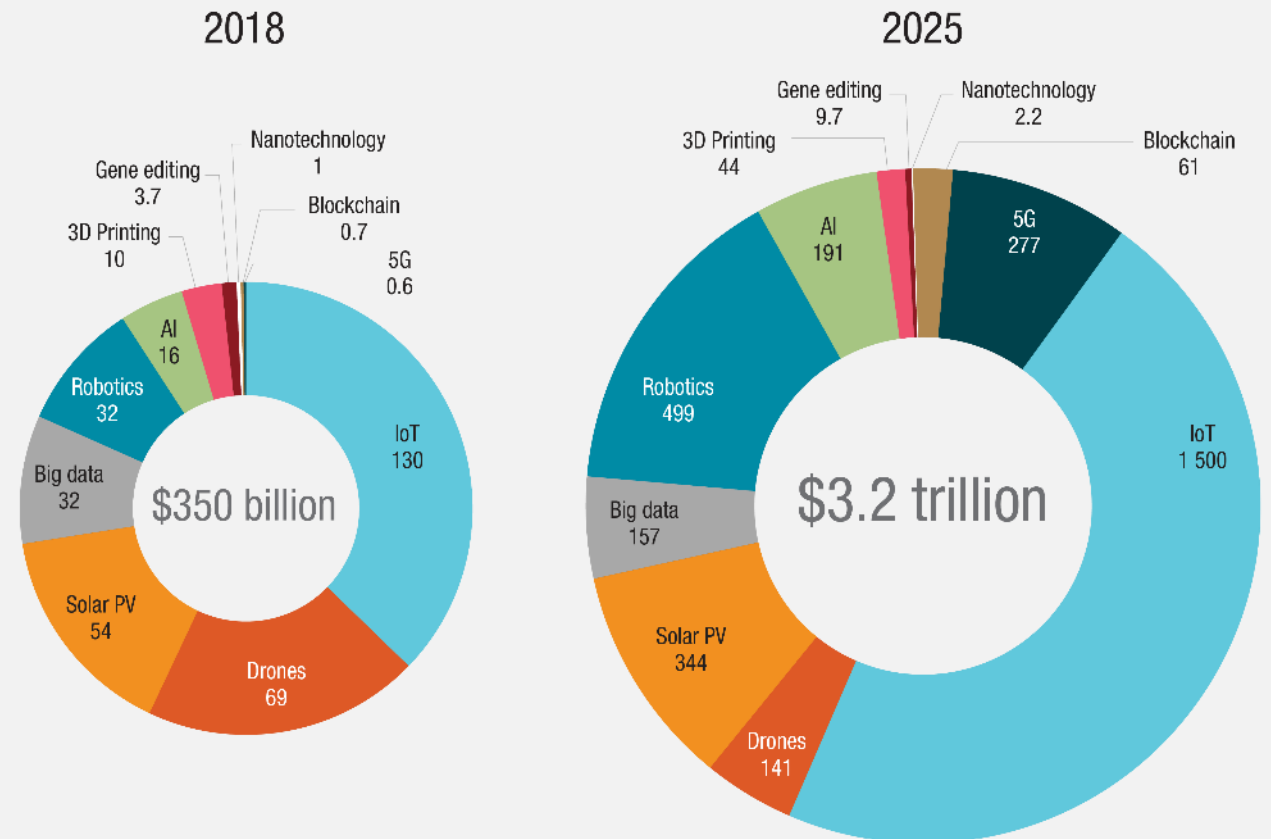
Each wave of technological change brings inequality in new shapes



Source: UNCTAD based on Perez (2002).

Market size estimates of Frontier technologies, \$billions

**FRONTIER
TECHNOLOGY
MARKETS ARE
EXPECTED TO
GROW RAPIDLY**



Source: UNCTAD based on data estimates from Froese (2018), MarketsandMarkets (2018), Sawant and Kakadee (2018), Business Wire (2019), Chaudhary et al. (2019), GlobeNewswire (2019b), MarketsandMarkets (2019), MarketWatch (2019a), MarketWatch (20191), Raza (2019), Tewari and Baul (2019), Wagner (2019b), Mordor Intelligence (2020a).

A COUNTRY READINESS INDEX

Readiness towards the use, adoption and adaptation of frontier technologies, selected countries

Country name	Total ranking	ICT ranking	Skills ranking	R&D ranking	Industry ranking	Finance ranking
Top 10						
United States of America	1	14	17	2	20	2
Switzerland	2	7	13	13	3	3
United Kingdom	3	17	12	6	11	14
Sweden	4	1	7	16	15	16
Singapore	5	4	9	18	4	18
Netherlands	6	6	10	15	8	23
Korea, Republic of	7	19	27	3	9	8
Ireland	8	24	6	21	1	87
Germany	9	23	16	5	10	39
Denmark	10	2	4	25	21	5
Selected transition and developing economies						
China	25	99	96	1	7	6
Russian Federation	27	39	28	11	66	45
Brazil	41	73	53	17	42	60
India	43	93	108	4	28	76
South Africa	54	69	84	39	71	13

Source: UNCTAD (see the complete table in Statistical Appendix. Readiness for frontier technologies index).

COUNTRIES OVERPERFORMING RELATIVE TO PER CAPITA GDP

Gain in ranking position.

	Country	Overperformance (positions)		Country	Overperformance (positions)
1	India	65	11	Morocco	29
2	Philippines	57	12	Kenya	28
3	Ukraine	47	13	Nepal	28
4	Viet Nam	45	14	Serbia	25
5	China	40	15	Korea, Republic of	24
6	Jordan	34	16	Russian Federation	24
7	Brazil	33	17	Lebanon	24
8	Republic of Moldova	33	18	Togo	23
9	South Africa	29	19	United Kingdom	21
10	Tunisia	29	20	Ghana	20

Source: UNCTAD calculations based on GDP data by the World Bank (World Bank, 2020).

Note: Overperformance by gain in ranking position are measured taking the difference in positions between the actual index rankings and the estimated index rankings based on per capita income. For instance, India's actual index ranking was 43 while the estimated index ranking based on per capita income was 108. Hence, India overperformed by 65 ranking positions.

AI AND GLOBAL ECONOMIC INEQUALITIES

TYPE OF INPUT DATA



1

If AI primarily uses 'big data' generated by users, this will mainly benefit the United States and China, whose digital platforms gather massive amounts of such data.



2

If it primarily uses big data gathered by the Internet of Things this would benefit other countries with strong manufacturing – such as the EU, Japan and the Republic of Korea.



3

Allow computers to learn more like humans would still demand resources and capabilities more likely to be found in the developed countries.



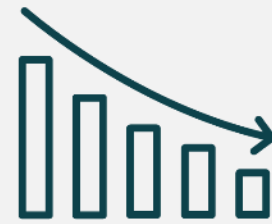
CHALLENGES FOR DEVELOPING COUNTRIES



Demographic changes



Existing technological gaps



Low economic diversification



Weak financing mechanism



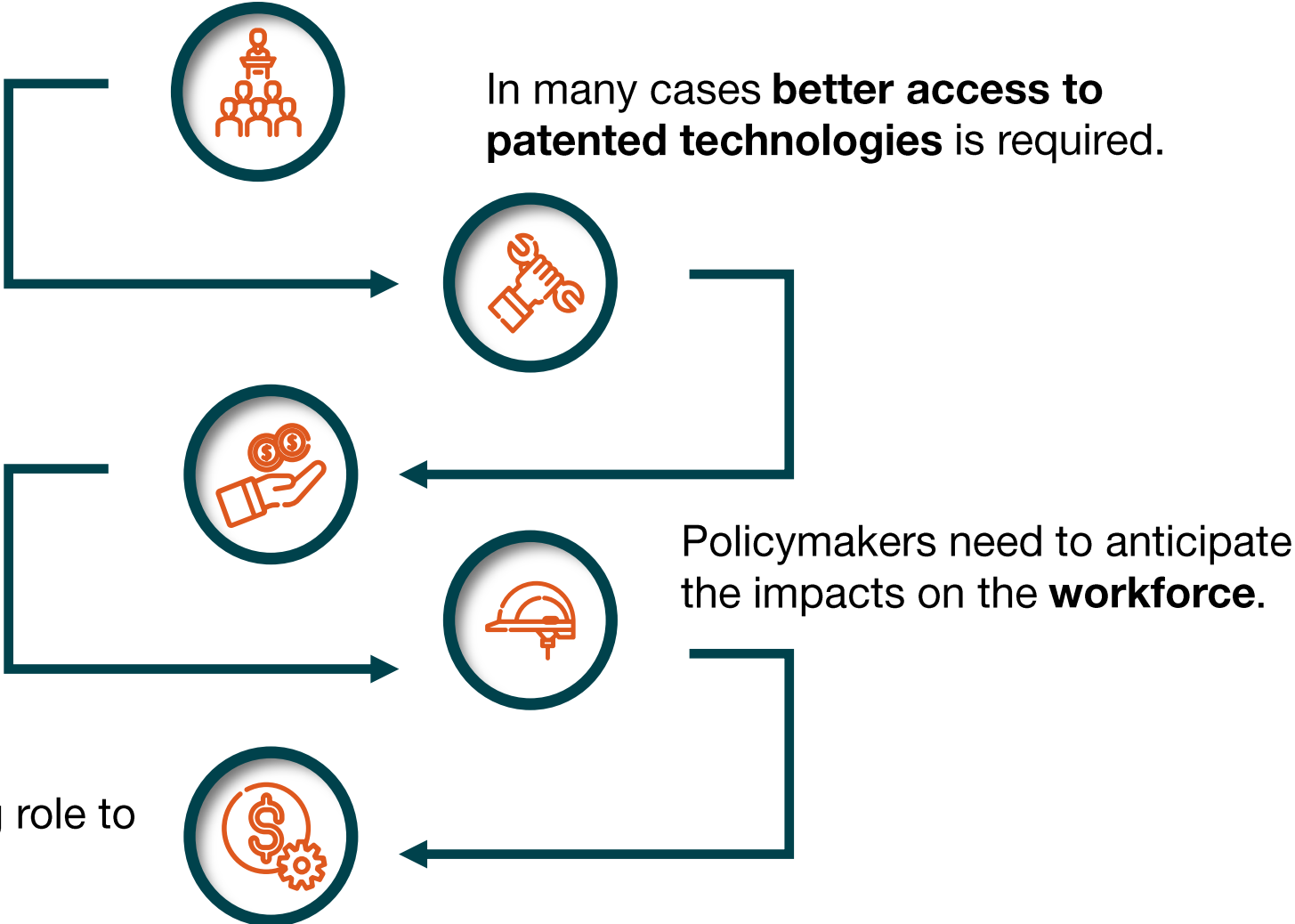
Stringent intellectual property rights

ACCELERATING TOWARDS INDUSTRY 4.0

National innovation policies need to align with industrial policies.

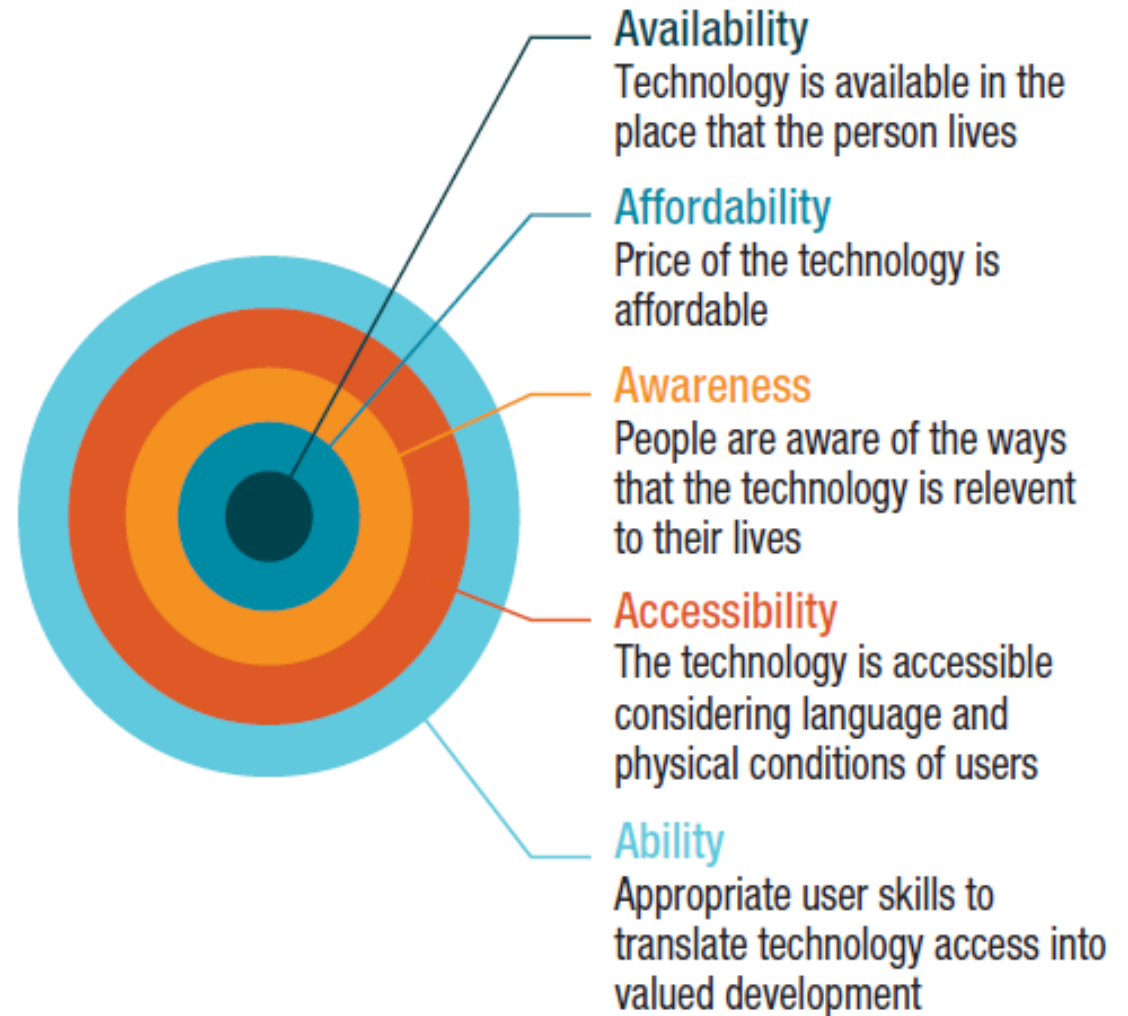
Finance source include official sources, impact investment, venture capital, crowdfunding, and Innovation and technology funds.

Labour unions will also have a big role to play to protect workers



TECHNOLOGIES AFFECTING INEQUALITIES THROUGH ACCESS & DESIGN

Five as of technology access



Source: UNCTAD based on Roberts (2017) and Hernandez and Roberts (2018).

CHALLENGES FOR DEVELOPING COUNTRIES



Higher levels of poverty

Average share of the population living in extreme poverty:
upper-middle-income 2%
low-income countries 45%.



Digital divide

Almost half of the world's population remains offline



Shortage of Skills

in developing countries, the basic computer skills are on average 20 percentage points lower than in developed countries



RISKS OF BIAS AND DISCRIMINATION



AI algorithms with built in bias



Genomic inequalities

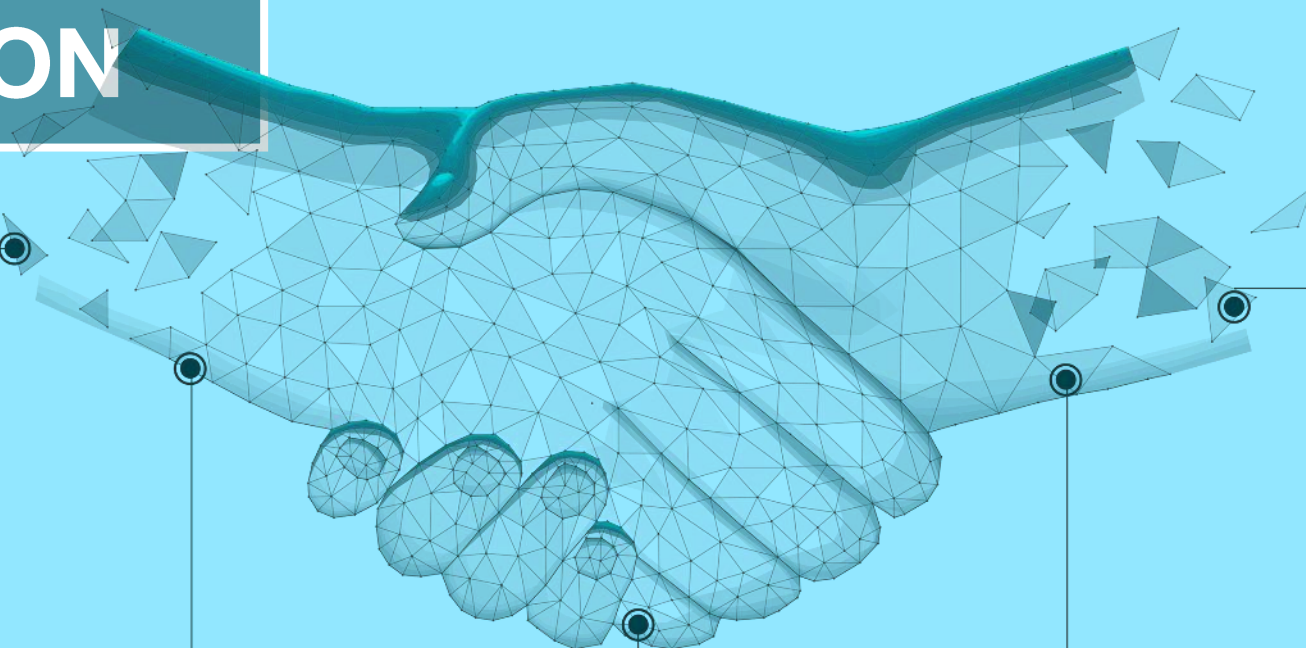


Gene editing and intellectual property



Ethical questions in gene editing

PRIORITIES FOR INTERNATIONAL COOPERATION



Build stronger national capacities in STI

Smooth technology transfer

Increase women participation in STEM

Improve foresight and technological assessment

Promote inclusive debate on frontier technologies



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