



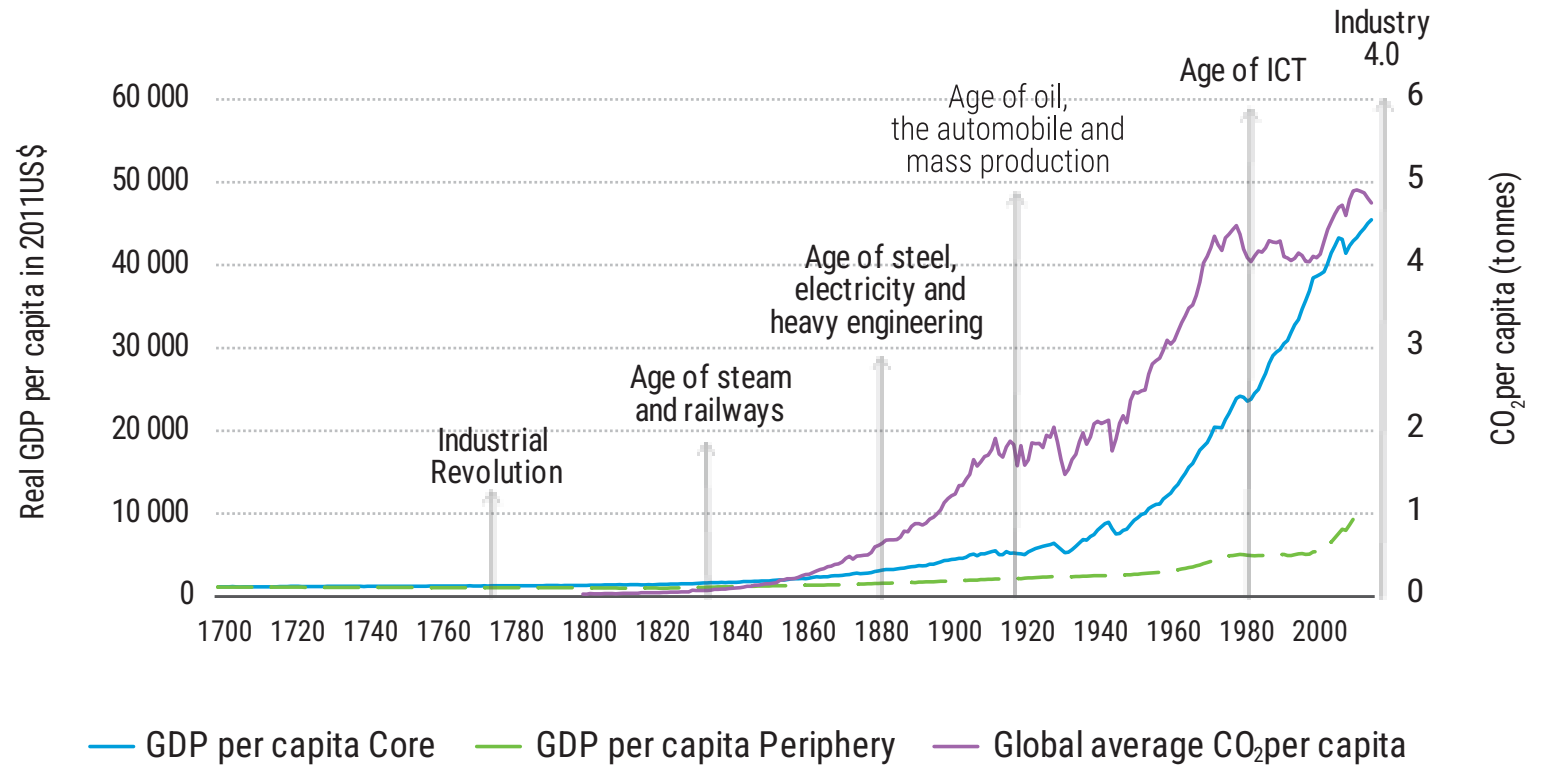
TECHNOLOGY AND INNOVATION REPORT 2023

Opening green windows
*Technological opportunities
for a low-carbon world*



Developing countries must catch the green technological revolution early

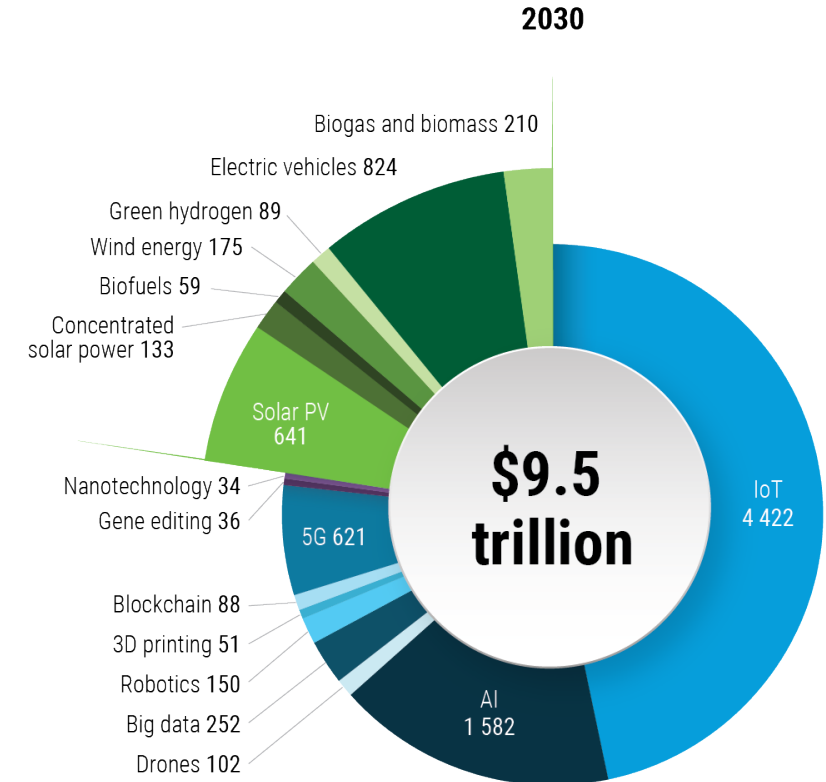
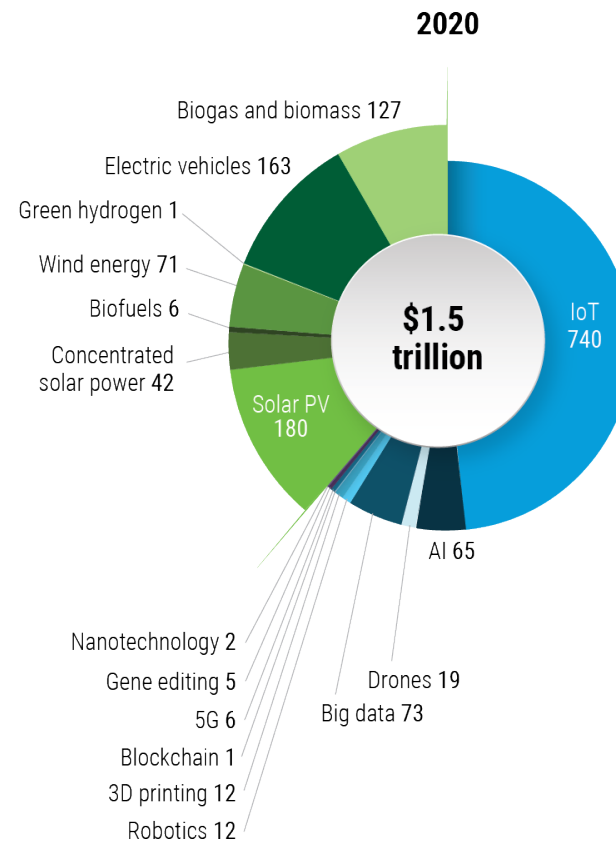
The great divide, rise in CO₂ per capita, and waves of technological change



Notes: "Core" corresponds to Western European countries and Australia, Canada, New Zealand, the United States and Japan. "Periphery" corresponds to the rest of the world.
 Source: UNCTAD, based on data from Our World in Data and the Maddison Project Database, version 2018, Bolt et al. (2018), Perez (2002), and Schwab (2013).

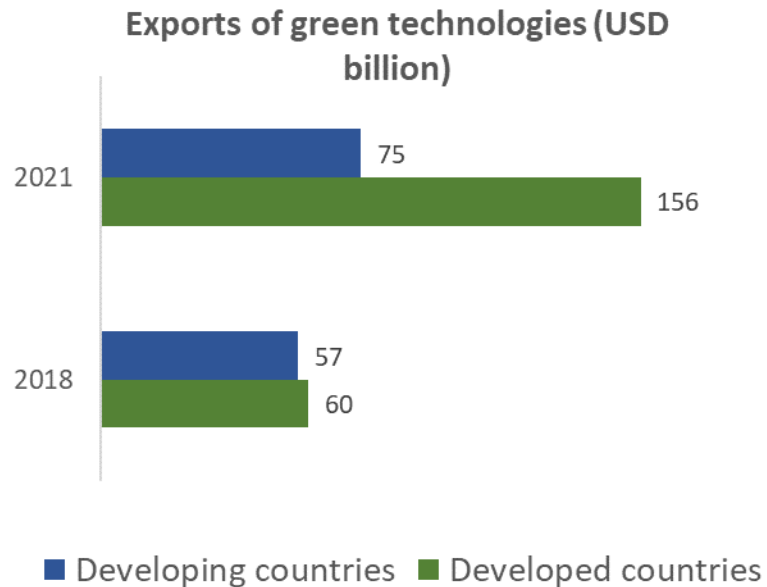
There are enormous opportunities in the development of green frontier technologies

Market size estimates of frontier technologies, \$ billion

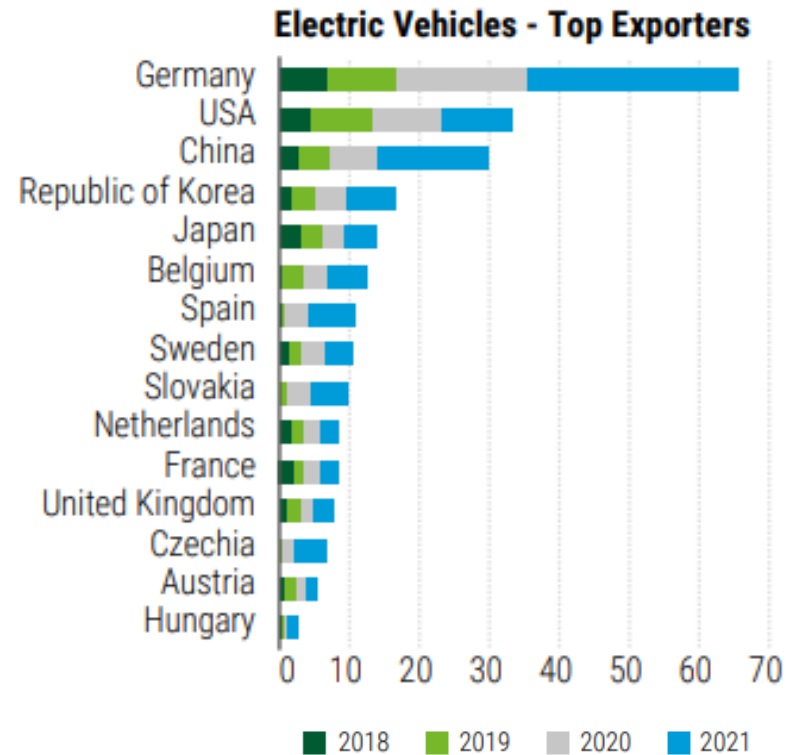


Source: UNCTAD based on various estimates.

But so far, developed economies are seizing most of the opportunities



Technology imports and exports by top countries, 2018-2021 (\$ billions)



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Readiness index combining ICT, skills, R&D, industrial capacity and finance indicators

	Rank in 2022	Rank in 2021	Movement in rank	ICT ranking	Skills ranking	R&D ranking	Industry ranking	Finance ranking
Top 10								
United States of America	1	1	—	11	18	2	16	2
Sweden	2	4	▲	6	2	16	11	18
Singapore	3	5	▲	7	8	17	4	17
Switzerland	4	2	▼	21	13	12	5	5
Netherlands	5	6	▲	4	9	15	10	31
Republic of Korea	6	7	▲	15	26	3	9	7
Germany	7	9	▲	24	17	5	12	40
Finland	8	17	▲	22	5	21	20	30
China, Hong Kong SAR	9	15	▲	9	23	29	2	1
Belgium	10	11	▲	13	4	23	19	48
Selected transition and developing economies								
Russian Federation	31	27	▼	43	32	13	54	69
China	35	25	▼	117	92	1	8	4
Brazil	40	41	▲	50	55	18	51	57
India	46	43	▼	95	109	4	22	75
South Africa	56	54	▼	71	77	36	67	25



Paths to seize benefits from the new technological revolution

1

Developing and using
renewable energy
technologies

2

Greening traditional
global value chains
by switching to digital
technologies

3

Diversifying towards
production sectors
that are more
complex and greener

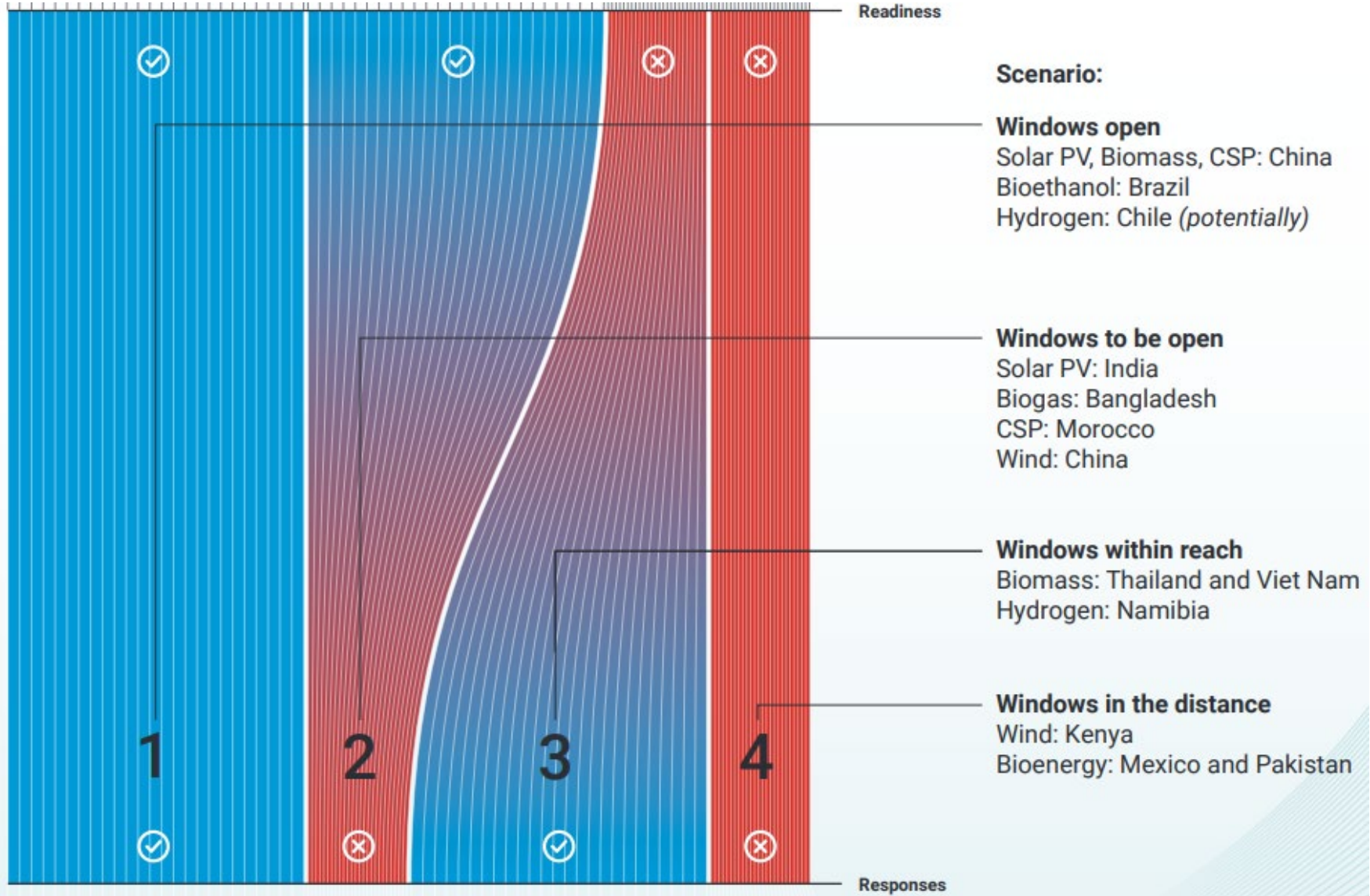
1

Developing and using renewable energy technologies

Combining strong initial conditions and strong responses make up the best scenario to seize GWOs but weak conditions can be compensated by strong efforts

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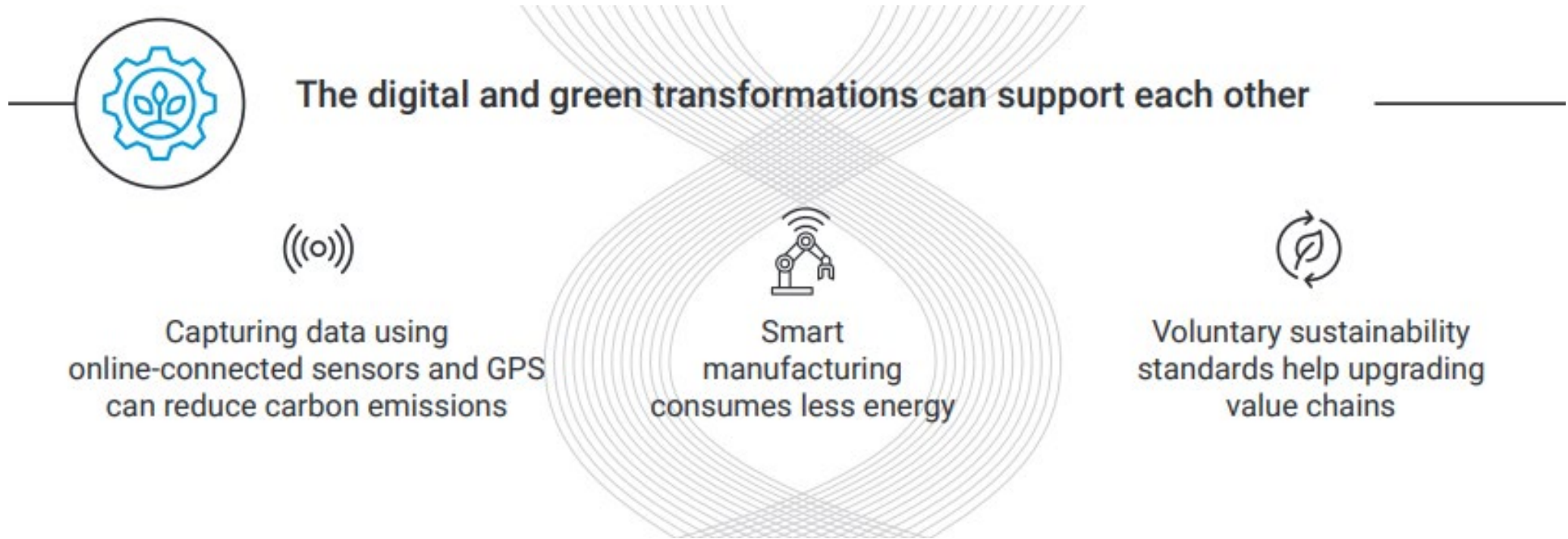
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Greening traditional global value chains by switching to digital technologies

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The digital and the green transformations can be twins if there are strong enough policy responses



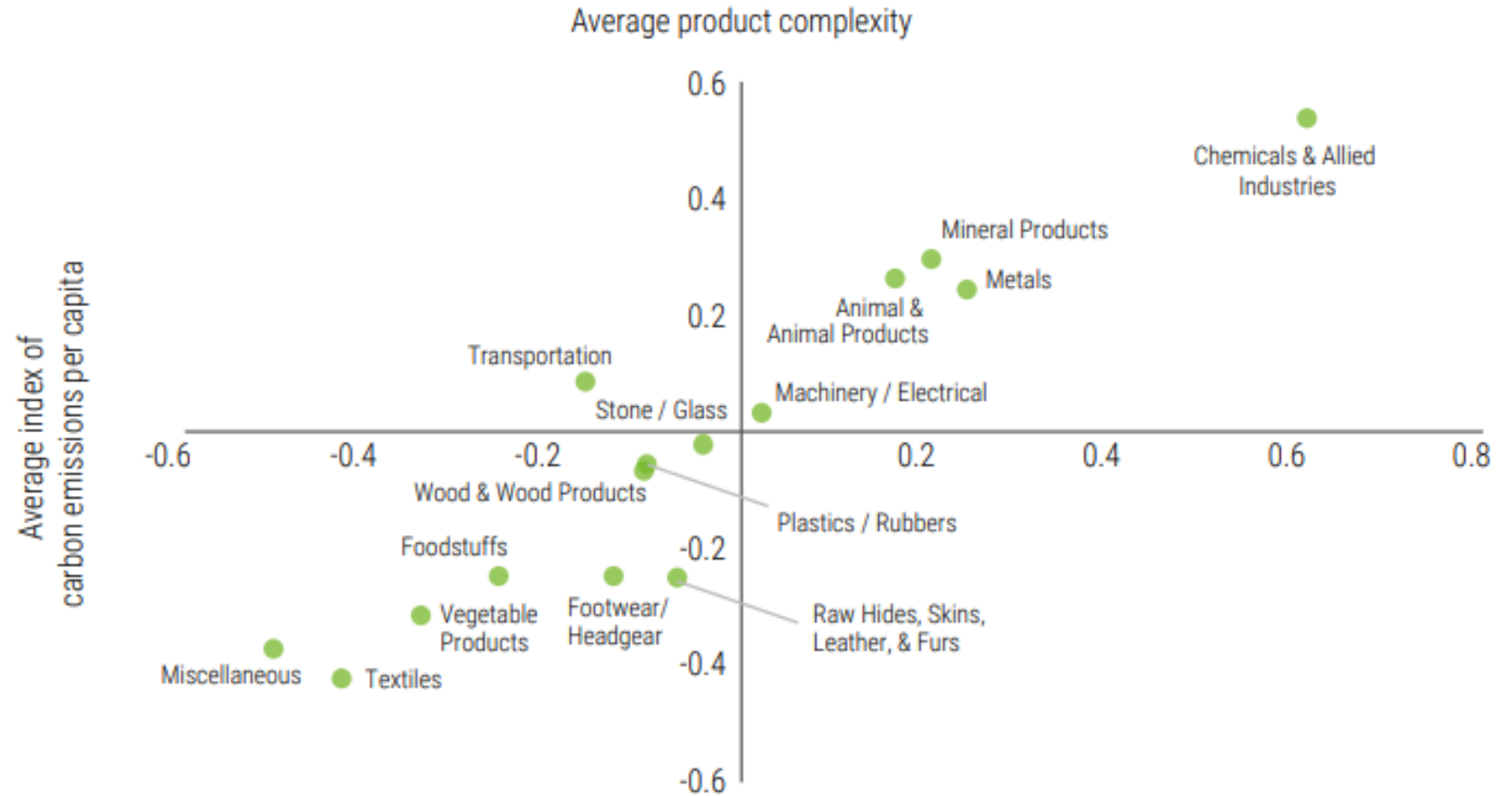
3

Diversifying towards production sectors that are more complex and greener

There is a path to diversify towards more complex and greener production, but taking it might be harder for developing countries

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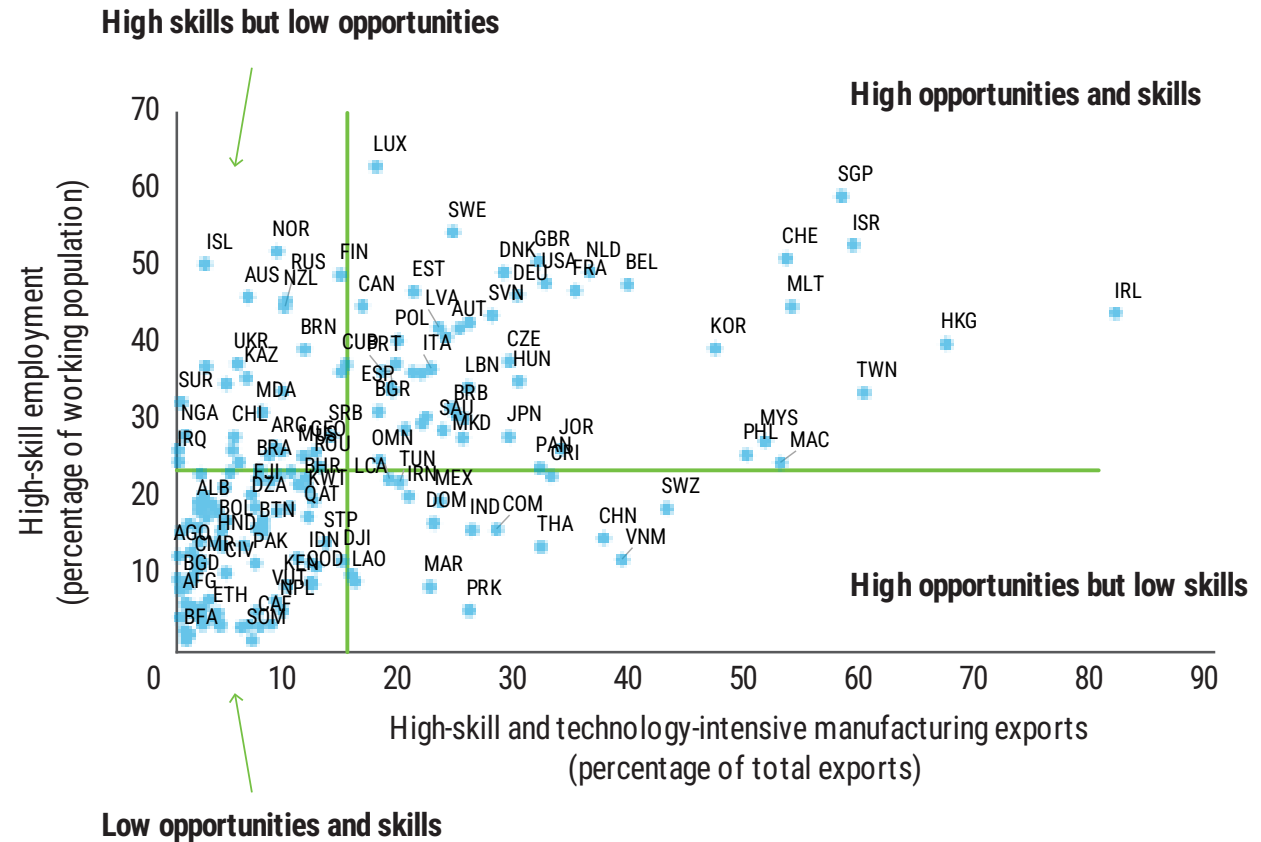


Source: UNCTAD based on data from the United Nations Commodity Trade Statistics Database (COMTRADE).

Note: On both axes, zero represents the global average, and 1 is the standard deviation of the distribution.

Challenge: low level of existing technological and innovative capacities

Readiness to benefit from the diffusion of Industry 4.0



Opening green windows



Set the direction towards green technologies and innovation

Align environmental and industrial policies
Invest in more complex and greener sectors
Incentives and infrastructure to shift demand



Build green productive and innovative capacities

Invest in R&D
Raise awareness of green technologies
Develop digital infrastructure and skills

International cooperation

Consistency between international agreements on trade, intellectual property and climate change is critical for green technology revolution

Trade rules should permit developing countries to protect infant green industries through tariffs, subsidies and public procurement

Intellectual property should have greater flexibilities for developing countries with regard to green technologies

Conclusion

Technologies already exist

Political will needed

Developing countries should catch the green technological revolution early

Thank you!



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