Some insides from

Technology Innovation Challenges for Industry 2030 (TIC 2030) 2019-20
&
Innovation for Green Deal (INNO4GD) 2021-22

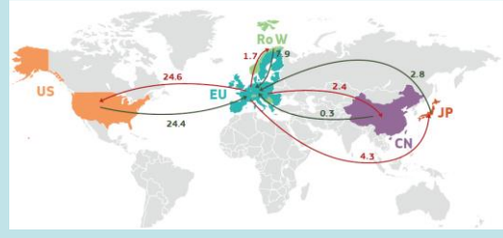
Science-to-Policy activities

Joint Research Centre
the European Commission's
in-house science service

The challenge: From R&D policies to sustainable R&I policies

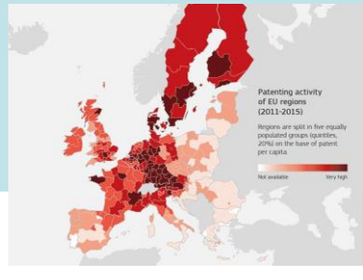
INVESTMENT GAPs

GLOBAL RACE



R&I for competitiveness & sustainability

TERRITORIAL GAPs

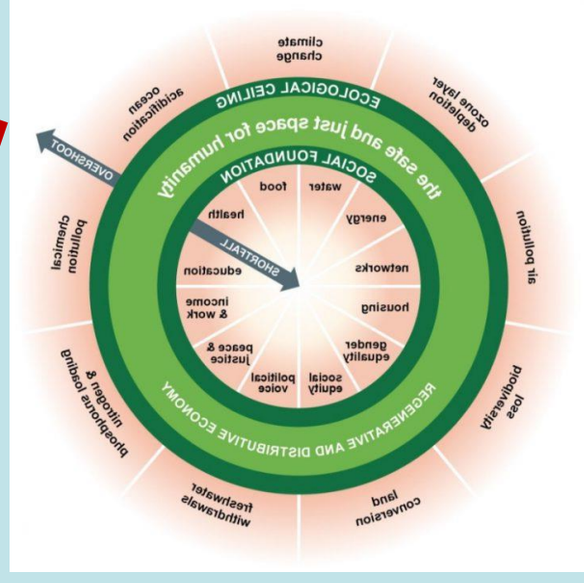


HOW ???

TECHNOLOGICAL GAPs

Field of Technology	Europe	United States	Japan	Korea	China	Rest of the World
Digital communication	0.9 ↘	1.3 ↗	0.6	1.2	3.9 ↘	0.9 ↘
Surface and coating	0.9 ↗	1.1	1.2 ↗	0.7	0.4 ↗	0.7 ↘
IT methods	0.8 ↘	1.7	0.7	0.9 ↘	2.0 ↗	0.8 ↘
Basic communication	0.7	1.2 ↗	0.9 ↘	1.1 ↗	0.5 ↘	1.8
Telecommunications	0.7	0.8 ↗	1.1	1.2 ↘	1.9 ↘	1.5 ↗
Textile and paper machines	0.6	0.5 ↘	2.1 ↗	0.1 ↘	0.1 ↘	0.1 ↘
Semiconductors	0.5 ↗	0.6 ↘	1.0	1.9	1.2 ↗	1.8 ↗
Computer technology	0.5	1.1 ↘	0.8	1.6 ↗	1.9 ↗	1.8
Audio-visual tech.	0.4 ↗	0.6 ↗	1.1 ↘	1.7 ↗	1.4 ↗	2.0
Optics	0.3 ↗	0.4 ↘	1.7	1.0 ↘	1.4 ↗	1.2 ↗

PROSPERITY



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Our approach

Micro-Data

- R&D Scoreboard
  - Financial indicators
  - IP bundle
  - Etc…
- Other databases
  - Orbis, Patstat, Regpat
  - WoS, Scival
  - EUIPO
  - deakroom, fdi
  - Trade, etc…

Techniques

- Quantitative
  - Big data and complexity
  - Econometrics
  - Text mining, etc…
- Qualitative
  - Own survey
  - External expertise, etc.

Analyses

- Monitoring global private R&D
- Firm Characterisation
  - Technologies & sectors
  - Matching datasets
  - Building indicators
- Firm-based view
  - R&D&I competitiveness
  - GINs, ecosystems
  - Mappings

GLORIA 2021

- Green technologies
- Industrial transformation
- Technology leadership
- New actors
  - Start-ups
  - Technology-based
  - Firm growth

Synergies within the JRC and the EC:
R&I
GROW
ECFIN
REGIO

Complexity project

6 Commission priorities for 2019-24

A European Green Deal

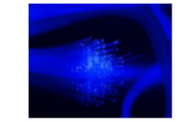
Striving to be the first climate-neutral continent

An economy that works for people

Working for social fairness and prosperity

A Europe fit for the digital age

Empowering people with a new generation of technologies



Promoting our European way of life

Building a Union of equality in which we all have the same access to opportunities.

A stronger Europe in the world

Europe to strive for more by strengthening our unique brand of responsible global leadership

A new push for European democracy

Nurturing, protecting and strengthening our democracy

Foresight

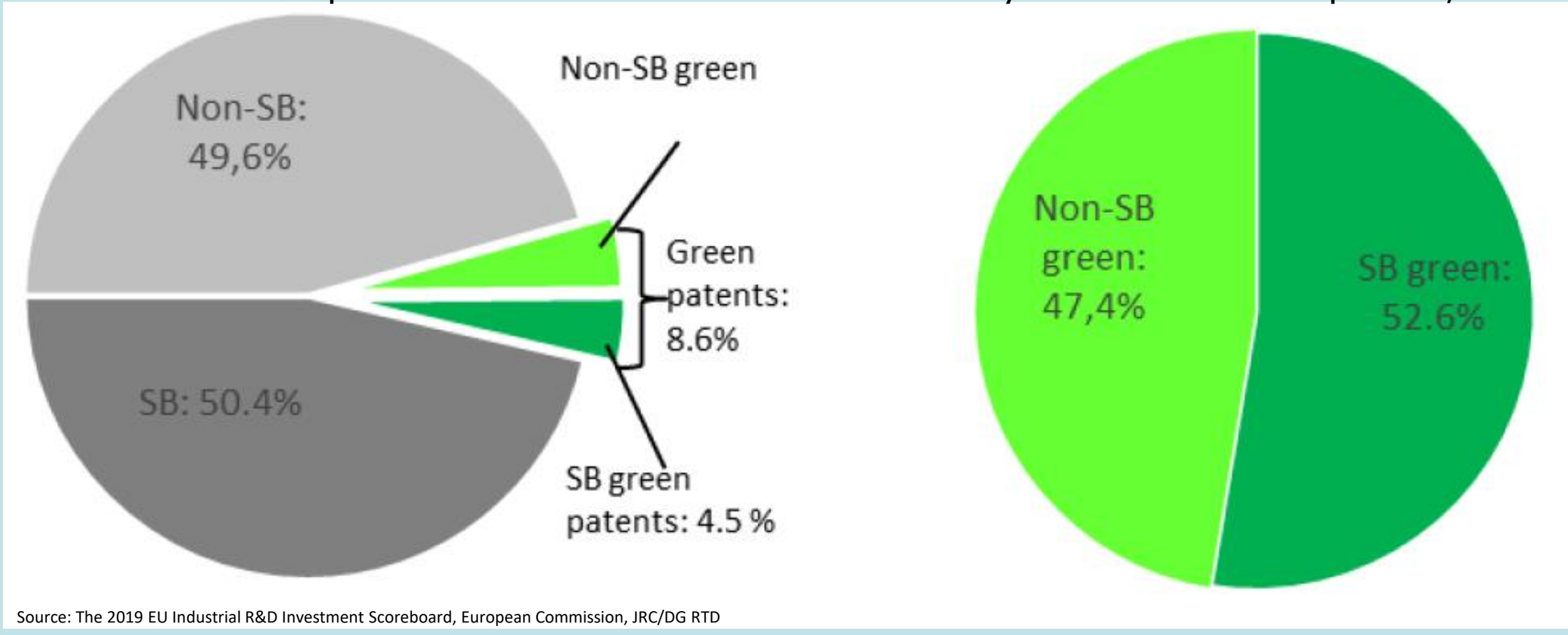
Global Research & Innovation Analyses (GLORIA) 2021-22: enhancing the green knowledge

Support to EC's R&I policy (DG R&I)

- **Identify promising technologies expected to produce the major green/sustainability impacts** (through existing tech. taxonomies, foresight exercises or ad-hoc expert consultation).
- **Codify the list of technologies** to be able to characterise them with available metrics.
- **Identify main players** developing such technologies, including localisations of the innovation activities Complement with some analysis of **market uptake of such technologies**, incl. main barriers and critical tech diffusion mechanisms.
- Thus, **benchmark the performance of the EU industry** in this context among global competitors.

A green example:
The top R&D investors are highly relevant Green players

Distribution of total patents filed in the USPTO and EPO by Scoreboard companies, 2012-15



Source: The 2019 EU Industrial R&D Investment Scoreboard, European Commission, JRC/DG RTD

Analysing the technologies and IP portfolios of these companies and identifying additional players is a promising way to develop the concept of sustainable R&I competitiveness

A second green example:

New companies' sustainability indicators

Data from *Covalence* on

1. **Environmental, Social and Governance (ESG) practices**
   - ESG indicators from Refinitiv (formerly Thomson Reuters)
2. **ESG-Sustainable Development Goals (SDG) mapping**
   - Recoding from ESG to SDG done with a AI/human analysis

Pilot

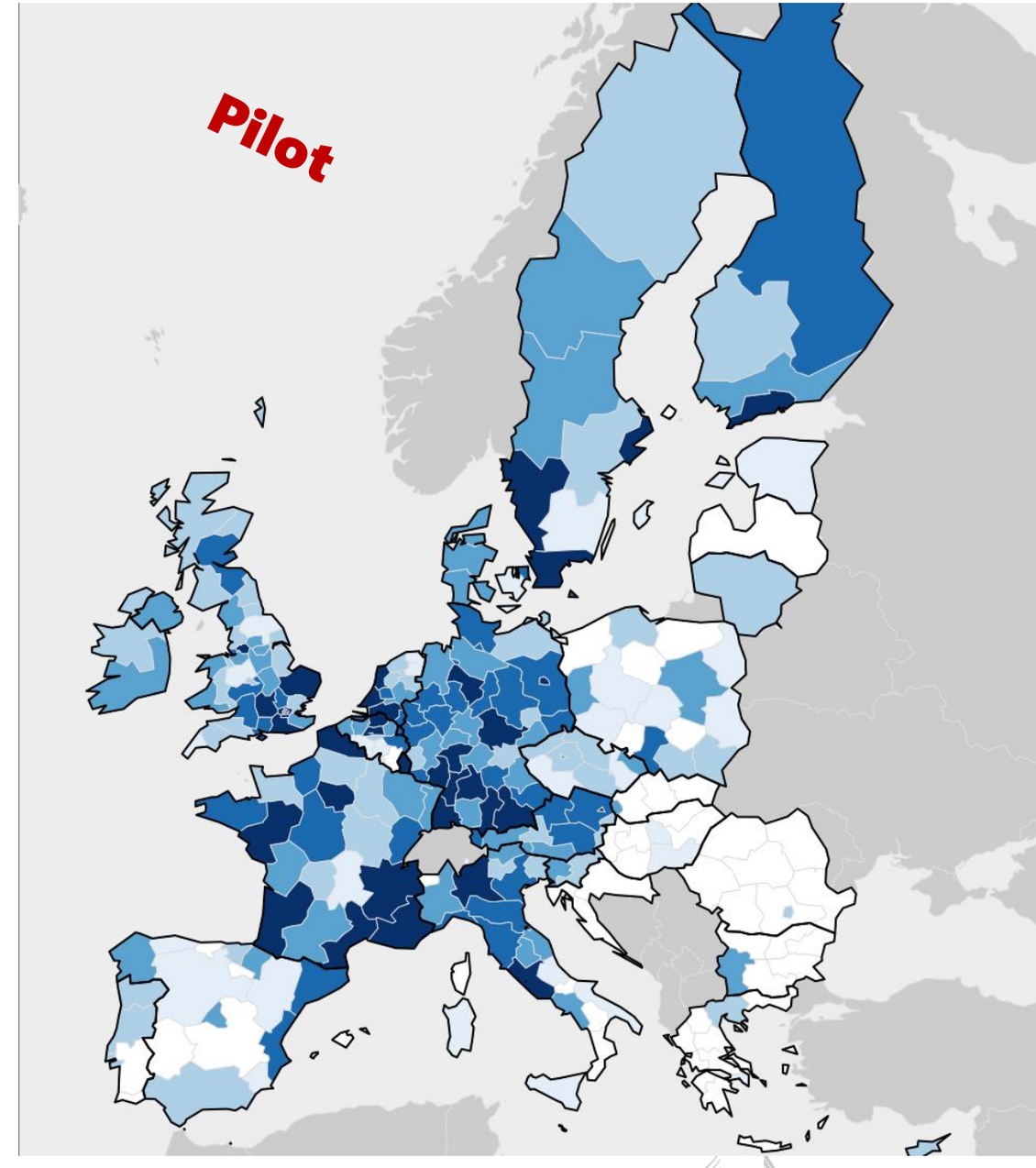
- **Quantitative (ESG indicators, e.g. CO2 emissions, water consumption, women in executive positions,…)**
- **Qualitative (sustainability-related corporate communications; web pages, articles, comments,…)**

Company name	9. Industry & Innovation			5. Gender Equality			13. Climate Action		
	SDG score	Disclosure	Reputation	SDG score	Disclosure	Reputation	SDG score	Disclosure	Reputation
ABB Ltd.	90.59	83.33	97.84	56.28	61.77	50.80	76.76	60.00	93.52
Danone	79.60	66.67	92.53	71.62	64.07	79.17	67.67	50.00	85.33
Equinor ASA	62.57	41.67	83.48	52.06	50.53	53.60	68.12	70.00	66.25
Microsoft Corporation	74.59	58.33	90.85	59.84	65.88	53.80	64.12	50.00	78.25
Akzo Nobel NV	49.20	33.33	65.07	48.42	44.81	52.03	62.88	60.00	65.75
Kimberly-Clark Corporation	65.15	33.33	96.97	65.25	63.31	67.19	71.56	50.00	93.11

A third green example:

Product specific Regional Technological *Fitness Index*

A measure of the **technological capabilities of a regional innovation system** to deal with the export of a specific product, in this case the **green**-related, *Lithium Ion Batteries*



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An example related to Industrial Transformation :

For a transformative industry & innovation policy strategy

To **integrate** horizontal industrial and innovation with sector/technology specific **policies**

A ***framework*** that fits the **industrial and entrepreneurial profiles** with the associated threats and opportunities due to different patterns of **structural change** with **specific technological dimensions** reflecting radicalness & uncertainty

Box 1: Sorting transformative industrial and innovation policies

	Type of structural change	Technological dimension	Radicalness (uncertainty)	Examples of appropriate policy instruments
Strategic/Industrial setting	Radical foundation of a domain	New technologies/sectors	High	• Large-scale mission oriented projects • Invest in and support to basic research • Intellectual property protection • Access to risk capital • Support to nascent industries
	Narrow diversification through synergies	Technological fusion	Medium-High	• Industrial cross-fertilization • Economies of scope • Skill broadening • Support R&D and other intangibles
	Transition to new domain from existing commons	Technological redeployment	Medium	• Economies of scale and scope • Skill upgrading • Support R&D and other intangibles • Support capital investment
	Modernization	Technological adoption	Low	• Economies of scale • Skill updating • Support capital investment (new processes)

It helps **to identify few objectives** coupled with **targeted industrial technology and entrepreneurial policies** in a coherent **strategic framework** where **countries and regions** can choose the **instruments more suitable** for their idiosyncrasies.

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Thanks

Questions?

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