SGH
Warsaw School of Economics

Co-funded by the European Union

Innovation, Digital Transformation, and the EU's Role in Global Sustainability

29.09.2025

The Twin Transition Framework

European Green Deal: climate neutrality by 2050, -55% GHG by 2030.

Digital Decade: skills, infrastructure, sovereignty.

The Twin Transition Framework

1. **The European Green Deal (EGD):** The overarching goal of the EGD, approved in 2020, is to make the EU **climate neutral by 2050**. This plan mandates reviewing existing laws and introducing new legislation focused on the circular economy (CE), building renovation, biodiversity, farming, and innovation. The green transition is a top priority, with a target to reduce greenhouse gas (GHG) emissions by 55% by 2030 compared to 1990 levels.
2. **The Digital Decade:** This framework pursues a sustainable vision for digital society to empower citizens and businesses. The Digital Decade Policy Programme (DDPP) provides a strategic governance structure to strengthen Europe's **technological sovereignty**, competitiveness, sustainability, and resilience. Key targets cover digital infrastructure, digital skills, digitalization of businesses, and digital public services.

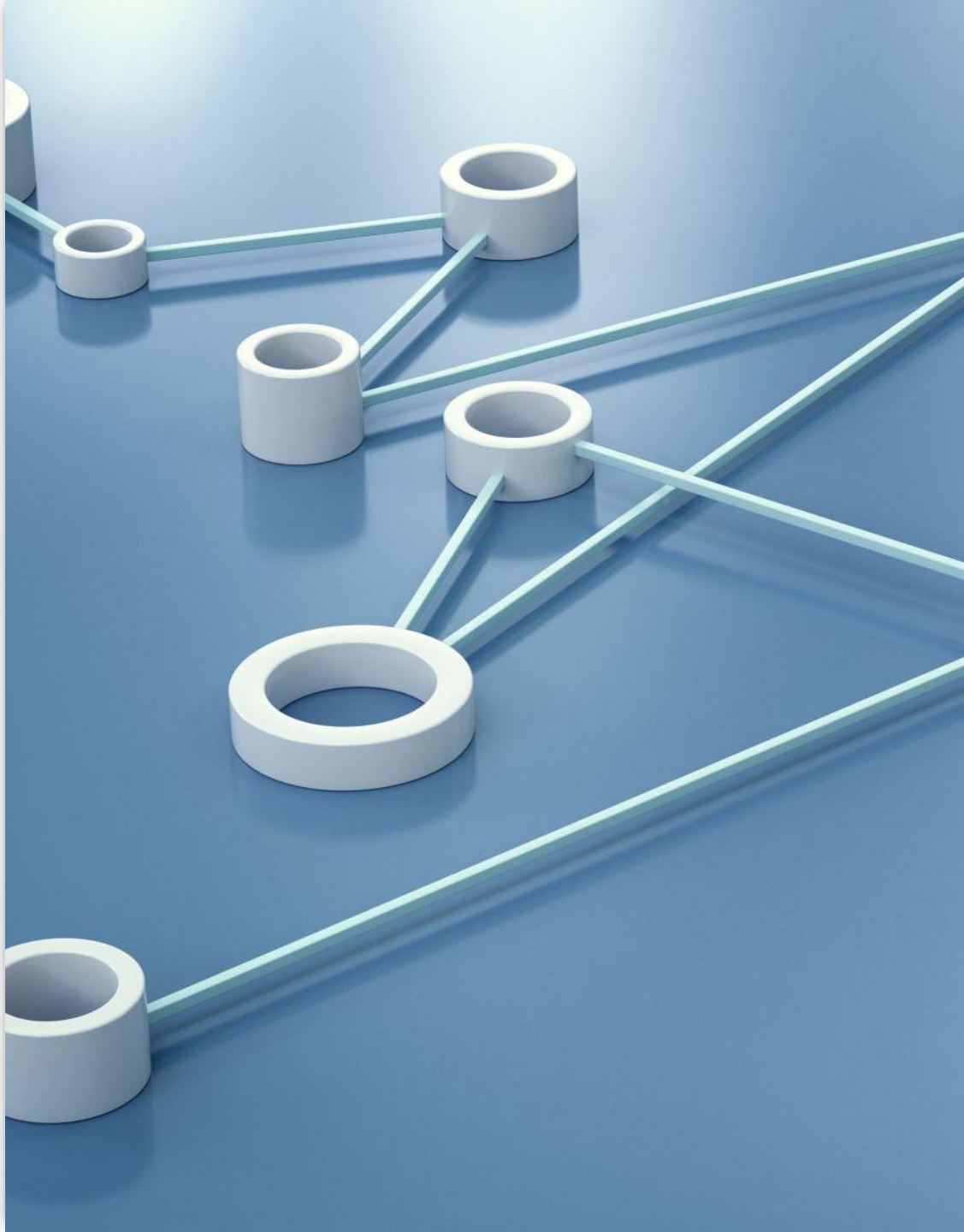
The European Green Deal

Climate neutrality 2050.

Circular economy, biodiversity, renovation, sustainable farming.

Circular Economy (CE)

Digital technologies support the challenging transition to a circular economy. Digitalization enhances connectivity and information sharing, making business models, products, and processes more circular. AI systems can assist designers in creating products with longer lifetimes and improved recycling capacities. At the end of a product's life, AI can assist the inspection, sorting, separation, and disassembling process to circulate materials in the economy, for example, by identifying objects or materials through pattern recognition.

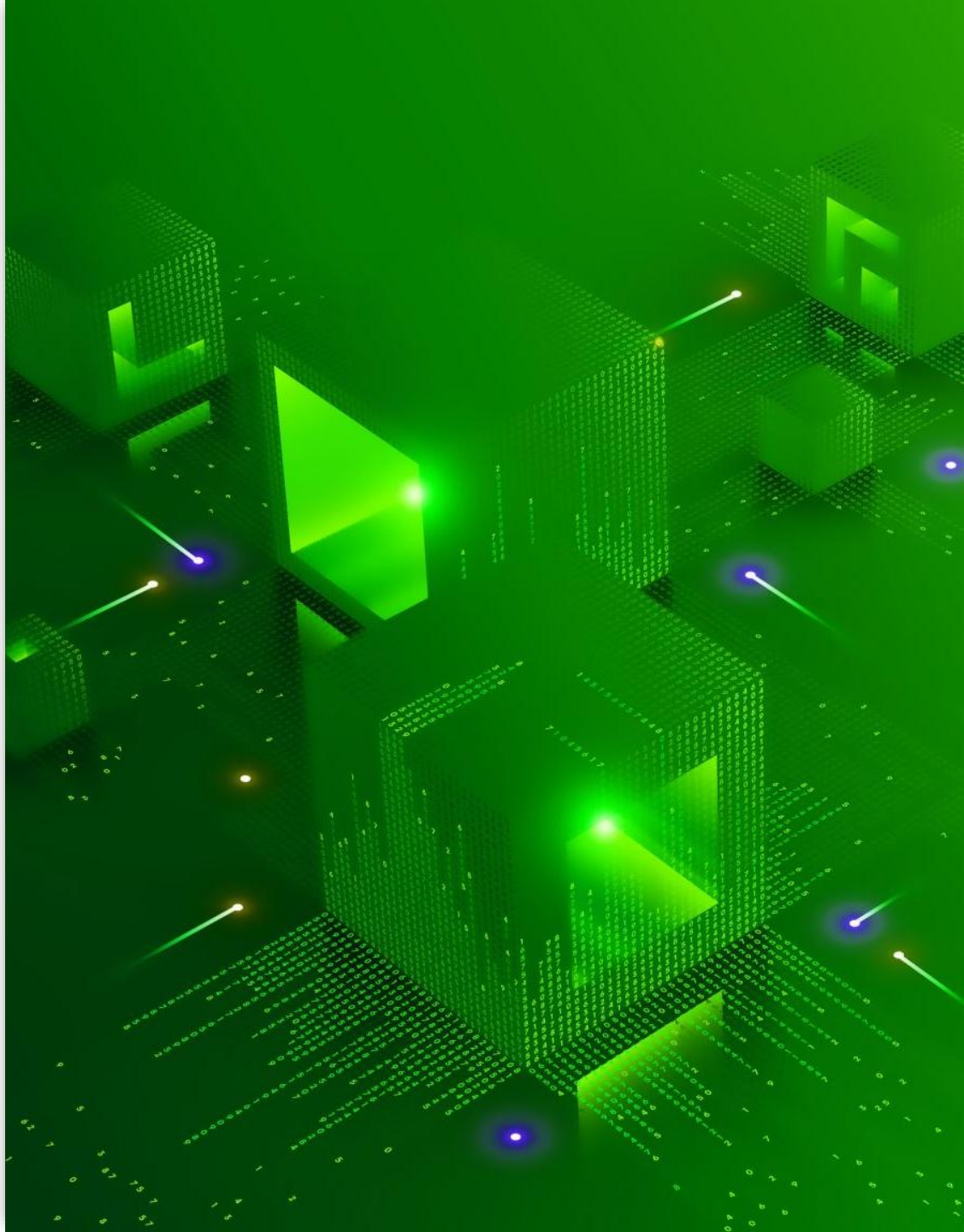


Decarbonisation and Energy Efficiency

AI is indispensable for achieving efficient use and integration of high shares of renewable energies in the future. AI solutions can help coordinate generation, storage, and consumption in **smart grids** to balance power fluctuations. The Commission has announced initiatives to ensure **climate-neutral, highly energy-efficient, and sustainable data centers by no later than 2030**

Sustainable Industry and Agriculture:

AI, big data, blockchain, and digital twins are utilized to drive greener practices in manufacturing, mobility, and agriculture. Within industry, AI can help unlock the potential of Industry 4.0 by providing predictive analytics and intelligent assistance systems to improve resource, energy, and material efficiency. In agriculture, precision farming leverages AI to process data from remote sensing, enabling timely management decisions and more efficient use of water, pesticides, and fertilizers



Environmental Monitoring and Governance

The combination of AI and Earth Observation (EO) data offers more effective and efficient monitoring of environmental impacts and strengthening predictive capabilities. AI can be used to monitor specific offenses, like combating poaching through predictive software (PAWS), or supporting the enforcement of emission limits via smart meters for polluting enterprises. Furthermore, the EU Data Strategy plans for a specific **'Common Europe Green Deal Data Space'** to support priority actions on climate change, circular economy, zero pollution, and biodiversity.

The Digital Decade

Governance, competitiveness, resilience.

Targets: digital skills, business digitalization, digital public services.

Digital Innovation as a Sustainability Enabler

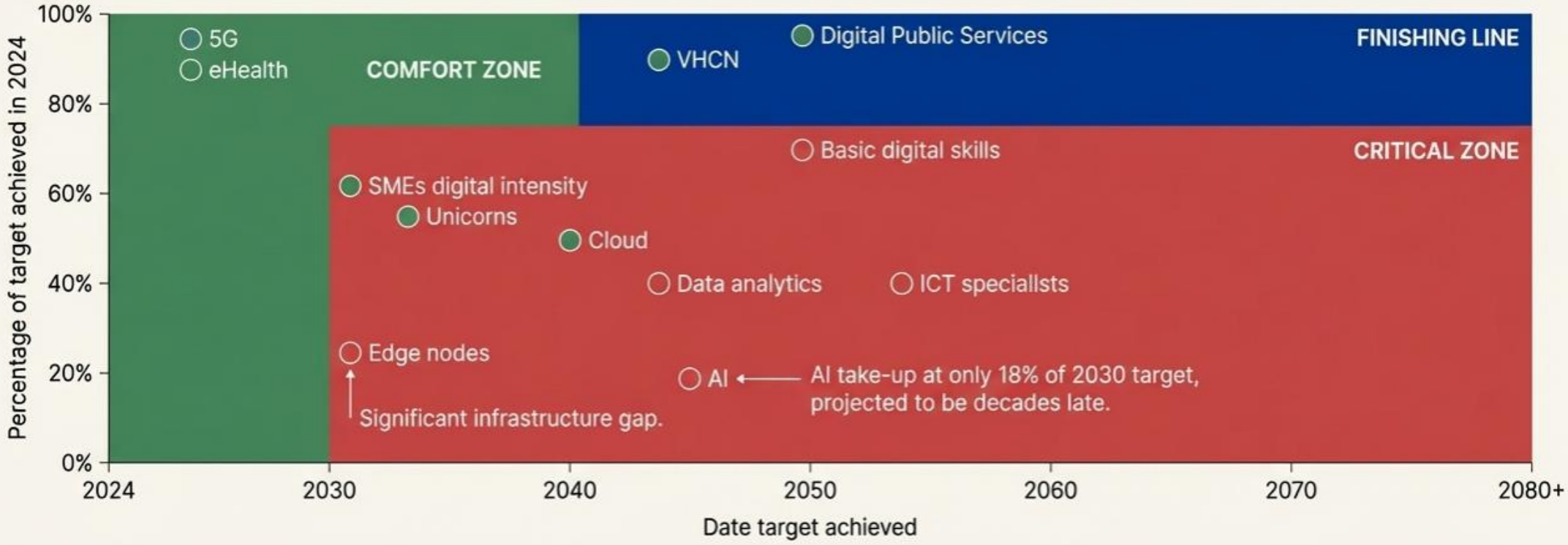
Digital technologies accelerate climate action.

Support: CE, decarbonisation, AI-enabled monitoring.

The Digital Decade Scorecard: Ambitious Goals Meet a Difficult Reality

While areas like basic 5G and eHealth are in a “Comfort Zone,” progress in foundational technologies and skills is in the “Critical Zone,” with the EU projected to miss 2030 targets by decades at the current pace.

Tracking Progress Towards 2030 Targets



Circular Economy & Digital Tools

AI supports design, recycling, material sorting.

Digitalization boosts supply-chain transparency.

Decarbonisation & Energy Efficiency

AI balances smart grids.

Goal: climate-neutral data centers by 2030.

Sustainable Industry & Agriculture

Industry 4.0: predictive analytics.

Precision farming improves resource efficiency.

Environmental Monitoring & EO Data

AI + Earth Observation strengthens monitoring and enforcement.

EU Green Deal Data Space planned.

Funding for Innovation

- Digital Europe Programme, Horizon Europe, STEP.

Challenges to EU Innovation Leadership

R&D gap vs US/China.

Investment deficit €212–380bn/year.

EU = 5% of global VC.

Digital Decade Progress Issues

Slow adoption of AI, cloud, data analytics.

Shortfall of ICT specialists.

Environmental Risks of AI

High energy/resource use of data centers.

Rebound effects increase consumption.

Precautionary vs Innovation Principles

Precaution: manage risk.

Innovation Principle: enable innovation.

Debate: sustainable development covers both.

EU as Global Sustainability Leader

Standard setting in digital & green.

International Digital Strategy, TTCs, Digital Partnerships.

Global Gateway & Digital Diplomacy

Investing in global digital infrastructure.

Secure 5G, resilient connectivity, submarine cables.

EU and Environmental AI Globally

Promoting AI for sustainability.

Supporting developing countries with digital capacity.

Key Takeaways

Twin transition drives EU sustainability.

Digital innovation accelerates climate goals.

EU aims to lead despite structural challenges.

From Regulatory Pioneer to Sovereign Leader

Summary

The Twin Transition is not a simple roadmap but a complex navigation between ambition and reality. Success requires a clear-eyed assessment of the EU's weaknesses and decisive action to close the gaps in investment, policy coherence, and human capital.

Sovereign Leadership

The Strategic Choice

Europe has led the world in setting digital and green regulations (e.g., GDPR, AI Act, Fit for 55). The next decade will determine if it can translate this regulatory leadership into true technological and industrial leadership.

The challenge is to build a future that is not only sustainable and digital, but sovereign, competitive, and resilient.

SGH