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TWIN TRANSITION AS A NEW MODEL OF EUROPEAN COMPETITIVENESS

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Abstract. *This article explores the synergy between digital transformation and the green transition as a powerful multiplier for EU sustainable competitiveness and strategic tool for Ukraine's post-war recovery. The EU's "twin transition" integrates digital technologies – such as AI, smart grids, digital twins, and data platforms – into climate and energy policies, enhancing productivity, innovation, and resilience while supporting climate neutrality and circular value chains. Therefore, the twin transition forms a new paradigm of EU competitiveness, where sustainable development, innovation and resilience are mutually dependent components. For Ukraine, key policy priorities based on twin transition comcept include developing digital skills, strengthening cyber-resilience, supporting innovative ecosystems, promoting decentralised energy, and deepening EU partnerships.*

Key words: *digital transformation, green transition, EU competitiveness, twin transition, Ukraine's post-war recovery.*

Introduction.

The twin transition – the simultaneous advancement of digital transformation and the green transition – has become a defining pillar of the European Union's modern competitiveness model. In the EU strategic vision, digitalisation is not only a

technological trend but a key driver enabling the achievement of climate neutrality, energy security and sustainable growth. At the same time, the green transition generates demand for innovative digital solutions, creating a mutually reinforcing cycle of technological and environmental progress. For Ukraine, twin transition is a strategic tool for post-war recovery, EU integration, and long-term economic security.

The purpose of the study is to prove that the synergy between digital transformation and the green transition can serve as a powerful multiplier for EU sustainable competitiveness, as well as provide a new basis for Ukraine's economic recovery

Research results. EU policy frameworks, including the Digital Decade Policy Programme 2030 [1], the European Green Deal [2], Fit for 55 [3] and the REPowerEU Plan [4], consistently highlight that climate goals cannot be achieved without digital technologies. Smart grids, advanced data spaces, IoT systems, digital twins and automated transport solutions optimise energy consumption, reduce emissions, modernise infrastructure and enhance economic resilience. These tools enable more efficient integration of renewable energy, support real-time monitoring of climate risks, and strengthen cross-sectoral coordination in industry, transport, energy and construction.

Over the past decade, digital transformation within the EU has evolved from basic adoption of digital tools into a systemic redesign of value chains, business models and public administration. By 2024, almost three-quarters of SMEs had reached at least a basic level of digital intensity, and the use of AI, cloud computing and big-data analytics continues to expand [5]. The Recovery and Resilience Facility has further accelerated these processes, with more than 25% of its funding directed toward digitalisation [6]. However, persistent challenges remain, including digital skills shortages, uneven levels of digital maturity across Member States and the increasing energy consumption of data centres and digital infrastructure. These challenges require balanced strategies that combine innovation with energy efficiency.

The green transition reinforces technological modernisation by stimulating demand for clean, efficient and transparent solutions. In the energy sector, digital

monitoring tools, automated control systems, smart meters and predictive modelling tools support the integration of renewable energy and increase the flexibility of energy systems. In the transport sector, intelligent routing, multimodal mobility platforms and the European Mobility Data Space contribute to reducing congestion and emissions. The building sector, responsible for nearly 40% of EU energy use, benefits from digital optimisation systems that improve heating, cooling and electricity efficiency. The introduction of Digital Product Passports [7] in industry enhances transparency and facilitates the shift toward circular production models.

Therefore, the twin transition forms a new paradigm of EU competitiveness, where sustainable development, innovation and resilience are mutually dependent components. Digitalisation improves productivity and economic efficiency, while the green transition guarantees long-term environmental and energy security.

For Ukraine, the twin transition has strategic significance in the context of post-war reconstruction, integration into the European Union and the strengthening of economic and energy resilience. Ukraine has demonstrated considerable progress in the digital domain: in 2022, the country joined the Digital Europe Programme, gaining access to EU initiatives in cybersecurity, digital innovation and digital-skills development [8]. The Diia platform, widely recognised as one of the most advanced digital public service systems, provides more than 140 e-services and has become a symbol of resilience and administrative continuity during wartime. This experience positions Ukraine as a valuable digital partner for the EU.

Simultaneously, Ukraine is advancing its green transition, despite large-scale destruction caused by the war. The share of renewable energy increased from 3.9% in 2014 to 9.2% in 2020, and the ambitious “30 GW by 2030” strategy reflects the country’s intention to become a contributor to Europe’s future energy security [9]. The digitalisation of energy systems, transparent reconstruction monitoring mechanisms and the introduction of smart-grid solutions are essential for building a resilient and decentralised energy sector.

The synergy of digital and green developments also strengthens Ukraine’s foreign-policy position. Digital tools allow transparent resource management and

enhance accountability of reconstruction processes, while innovations in cybersecurity and artificial intelligence have already proven to be strategic assets in Ukraine's defence. The combination of technological and green priorities therefore becomes a comprehensive strategy for recovery, integration and long-term competitiveness.

To fully benefit from the twin transition, Ukraine should focus on several key policy areas. First, investment in digital skills is essential: only about 54% of Ukrainian citizens possess basic digital competencies, compared to over 70% in the EU. Closing this gap is a prerequisite for integration into the European digital market. Second, cybersecurity of critical infrastructure must be strengthened, including through the development of Security Operations Centres and closer integration with European cybersecurity mechanisms. Third, the implementation of green transition goals requires access to EU financial instruments and the development of decentralised renewable energy solutions. Fourth, innovative ecosystems uniting business, science and government should be supported in order to promote technologies at the intersection of digital and green domains. Finally, strategic partnership with the EU should be deepened to ensure Ukraine's involvement in shaping the future of the European digital and climate architecture.

Summary and conclusions.

The synergy between digital transformation and the green transition in the European Union have been considered. It is proven that the twin transition represents a new model of European competitiveness, where digital and green transformations function as interconnected drivers of growth, sustainability and resilience.

For Ukraine, the adoption of this model is not only crucial for recovery and modernisation but also opens the path to successful integration into the EU and long-term economic security. To maximise the benefits of the twin transition, Ukraine should focus on several key policy directions:

- ✓ Investing in digital skills and human capital.
- ✓ Strengthening cyber-resilience in critical sectors.
- ✓ Using the green transition as a foundation for energy independence.
- ✓ Supporting innovative ecosystems.

✓ Deepening strategic partnership with the EU.

Thus, the digital-green transformation should become a key driver of Ukraine's post-war recovery, integration into the EU, acceleration of economic growth and boosting sustainable competitiveness.

References:

1. Digital Decade Policy Programme 2030. URL: https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/europe-fit-digital-age/europes-digital-decade-digital-targets-2030_en

2. The European Green Deal (2019). URL: https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal_en

3. European Commission (2024) Fit for 55 package. URL: https://www.consilium.europa.eu/en/policies/fit-for-55

4. European Commission (2022) REPowerEU Plan. URL: https://commission.europa.eu/topics/energy/repowereu_en

5. Eurostat. URL: https://ec.europa.eu/eurostat

6. European Commission (2024) Recovery and Resilience Facility (RRF). URL: https://commission.europa.eu/business-economy-euro/economic-recovery/recovery-and-resilience-facility_en

7. CID Harvard (2025) Ukraine's Digital Transformation: Innovation for Resilience. URL: https://www.hks.harvard.edu/centers/cid/voices/ukraines-digital-transformation-innovation-resilience

8. Catena-X (2025) Digital Product Passports as the enabler for the Circular Economy. URL: https://catena-x.net/wp-content/uploads/2025/05/DPP_Catena-X_FINAL.pdf

9. European Commission (2022g) Supporting Ukraine through digital. URL: https://digital-strategy.ec.europa.eu/en/policies/support-ukraine

10. Національний план дій з відновлюваної енергетики на період до 2030 року (2024). URL: https://zakon.rada.gov.ua/laws/show/761-2024-%D1%80#Text

11. ENISA (2024) EUCC – European cybersecurity certification scheme. URL:

https://certification.enisa.europa.eu/certification-library/eucc-certification-scheme_en

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