ST4TE

NEWSLETTER #3

February 2026

Welcome to the ST4TE project!

We live in a world of transitions, with a shift to green forms of production and consumption and to more digital ways of working and living. Both processes are expected to generate long-term environmental benefits and draw new opportunities for economic growth. A green and digital divide is however emerging, not only slowing down overall progress, but also widening the gap between individuals, regions, and social groups, leading to increased inequality in both the short and long run.

ST4TE (Strategies for Just and Equitable Transitions in Europe) is an EU-funded project dedicated to understanding these dynamics. It examines the drivers of the twin transition, the inequalities that emerge or intensify through it, and the policies needed to build greener, fairer, and more productive societies.

Over its three-year duration, ending in January 2027, ST4TE is carrying out research and outreach activities across Europe, engaging researchers, stakeholders, and policymakers with evidence-based insights.

In this third newsletter, we are pleased to share recent research results, project outputs, and upcoming events.

Activities

Europe's twin transition: A promising future, but only if it's fair

Co-creation workshop in Gothenburg, Sweden 25 March 2026

The green and digital transitions are reshaping Europe, but new findings from the ST4TE project show that not everyone can participate on equal terms. In March 2026, ST4TE will host its third co-creation workshop on site in Gothenburg. This workshop will delve into research insights on how the transitions shape people's everyday lives, highlighting unequal starting points, digital overload, rural–urban divides, and the limits of green consumerism.

Invited practitioners working in transition and policy processes will join ST4TE experts to deepen the understanding of intersectional inequalities, both as conditions for, and outcomes of, the twin transition, and to begin co-creating pathways toward more inclusive solutions.

Europe's twin transition: Mapping impacts with ESPON TIA and ST4TE indicators

Co-creation workshop, online

ST4TE will host (date tbc) an online workshop to apply a Territorial Impact Assessment (TIA) to the EU policy framework

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on Regional Skills Partnerships (RSPs). Building on ST4TE's new indicators of regional technological and scientific specialisation and labour-market readiness, the workshop will combine these datasets with the ESPON TIA Quick Check tool and expert judgements of partners and invited stakeholders. Participants will assess how RSPs may differently affect rural peripheries, coal-dependent regions and metropolitan centres – identifying where opportunities for green and digital jobs are likely to emerge, where skills systems may struggle to keep up, and which territories risk being left behind. The results will generate maps and narratives on regional vulnerabilities and capacities, feeding directly into ST4TE's typologies of regions and its final policy recommendations for more place-sensitive, socially just twin transition strategies.

ST4TE workshop Green and Digital Transformations: Skills, Jobs, and Policy

The workshop, held in Ferrara on 6–7 November 2025, was organised within the framework of two Italian National Research Projects involving partners of the ST4TE consortium, namely the University of Ferrara (UNIFE) and the Gran Sasso Science Institute (GSSI). The event brought together economists, labour market scholars and policymakers to discuss new empirical evidence on how the green and digital transitions are reshaping firms' strategies, the content and quality of jobs, and the demand for skills. Given the strong thematic proximity with the core research agenda of ST4TE, the workshop also saw the active participation of other ST4TE partners, in particular UM, UU and AUTH. Research presentations covered a wide range of topics, including the impact of artificial intelligence and automation on job tasks, the emergence of green and hybrid skill profiles, skill mismatches and reskilling needs, as well as the territorial and sectoral heterogeneity of labour market adjustments associated with the twin transition. These contributions provided novel insights into how technological and environmental transformations interact with inequality, job quality and worker mobility across regions and sectors. A central element of the workshop was a policy round table entitled "Building a future-ready labour market: data, policy and scenarios in the twin transition", which brought together representatives from European and international institutions, including the European Commission (JRC and DG EMPL), European policy agencies and leading academic experts, fostering a dialogue between research, policy design and implementation. The discussion emphasised the need for integrated, data-informed and place-based policy frameworks that jointly combine skills, industrial and labour market policies in order to support just and inclusive transitions.

ST4TE at the REGINNPOL conference

ST4TE partners contributed a dedicated session at the **19th Regional Innovation Policies Conference – REGINNPOL 2025**, held at the Venice School of Management, Ca' Foscari University of Venice, on **23–24 October 2025**. Presentations in the session explored how green and digital occupations spread across regions, how evolving skills demand shapes productivity, how a Twin Transition Index can reveal regional readiness and vulnerabilities, and which capability and diversification patterns

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underpin successful twin transition pathways. Together, they offered an integrated picture of how labour markets, skills and innovation dynamics interact in the twin transition, and what this means for designing more just and place-sensitive strategies across Europe.

The session included the following presentations:

- **Stefano Basilico** – *The Determinants of the Diffusion of Green and Digital Occupations*
- **Sidharth Rony** – *Skills Demand and Regional Productivity*
- **Christina Kakderi** – *Towards a Twin Transition Index: Measuring Regional Readiness and Vulnerabilities in Green and Digital Transformation*
- **Oscar Romero Goyeneche** – *Regional Pathways to Twin Transitions: Regional Capabilities, Technological Diversification, and Policy Implications for Green and Digital Convergence in Europe*

Europe's twin transition: Tracking progress and gaps, and measuring what matters

Co-creation workshop in Athens, Greece 26 August 2025

In August, the ST4TE partners and invited experts met in Athens for the project's first validation workshop "Mapping and Measuring the Twin Transition: Revealing Transformations and Identifying Inequality." The event brought together researchers, representatives of EU and national institutions, and regional practitioners working on green, digital and labour-market policies. During the morning, ST4TE teams presented new indicators on green, digital and "twin" technologies, based on patent and publication data, as well as measures of twin-relevant jobs, skills, and labour-market mismatches across European regions. These tools help identify where innovation and skills are concentrated, where vulnerabilities and "trapped" regions may emerge, and where there is hidden potential that policy could unlock. In interactive breakout discussions, participants tested the robustness and policy relevance of these indicators, challenged the emerging typologies of regional trajectories, and debated how a future Twin Transition Inequalities Index could best inform cohesion, industrial and skills policies. A key takeaway from the workshop was the shared need to translate complex evidence into clear, digestible messages for decision-makers, so that Europe's twin transition can be steered in a more place-sensitive, inclusive and forward-looking way.

Research results

The geography of the green, digital and twin occupations in Europe (D1.3)

This report, led by the University of Ferrara, provides valuable insights into the geographic distribution and evolving trends of green, digital, and twin occupations in Europe, offering a comprehensive understanding of how these transformative sectors are reshaping the continent's job market. It maps green, digital, and twin occupations across European regions to assess the geography of jobs related to the twin transition. Using ESCO-based taxonomies and EU-LFS microdata, it highlights the uneven distribution of employment: digital jobs cluster in

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metropolitan, innovation-intensive regions, while green roles are more broadly spread across sectors and skill levels. Twin occupations remain limited and predominantly anchored in green capabilities. The analysis underscores regional disparities, the importance of enabling occupations, and offers reflections on potential policy responses. Green and digital transitions in Europe are often seen as mutually beneficial, but policy coherence is limited. Green policies have a stronger territorial focus, addressing regional employment and growth. Digital policies cover broader sectoral changes and look more closely at individual inequalities.
Read the full report here

The uneven regional implications of twin transition and globalisation D1.4

This report, led by the Gran Sasso Science Institute, considers how the presence of different the twin-transition capabilities relate to uneven patterns of participation in globalisation dynamics. Regions have different capabilities to transition towards green and digital objectives. The local availability of those skills could make the regions internationally competitive and engaged with globalisation patterns, both in the form of foreign direct investments (FDI) and exports. Global actors may be attracted to invest in the knowledge pools where the green and digital competences are developed. This report assesses the different aspects of the regional endowment of green, digital and twin occupations and their relation to the attractiveness of FDI and exports. The focus of the report is on the regional endowment of green, digital and twin skills and the role of the enabling (complementary) skills. The report shows how regions with different green, digital and twin capabilities can attract FDI or have a high volume of exports. The results convey positive effects of enabling skills on inward FDI and exports. Digital and twin skills are generally not related to a higher level of FDI attractiveness or a higher level of exports. Green skills may even have detrimental effects. Thanks to the insights brought upon by this report, policymakers will be able to target places with complementarities between green, digital, and twin competences and a high participation in global dynamics, serving as hubs for twin transition. Finally, they could also support the European regions falling behind the twin transition process, unable to attract international investors, and needing policy support.

Read the full report here

The impact of twin transition on income inequality and employment quality D2.2

This report, led by the University of Ferrara, examines how Europe's "twin transition" relates to income inequality and employment quality. Inequality levels are persistent and heterogeneous across countries, with limited convergence over time. Digital employment expands broadly yet unevenly, while green employment displays mixed trajectories; twin jobs remain a small and slowly growing share. At the national level, green employment is relatively more prevalent in higher-inequality economies whereas digital employment is more common in more egalitarian settings; the association for twin jobs is weak. Regional and worker-level evidence highlights pronounced distributional asymmetries: women are over-represented in lower income deciles, younger workers are concentrated toward the bottom, temporary contracts map to lower deciles, and work-from-home opportunities skew to the top. Digital and twin occupations are disproportionately represented in upper deciles, while green roles are more evenly distributed.

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We conclude that the twin transition is not distributionally neutral. Targeted policies are required to ensure transitions that are both effective and inclusive.

Read the full report here

Algorithmic fairness and inequality (D2.4)

This report, led by CLIMAFIN, examines algorithmic fairness and its implications for social inequality within the digital transition. It presents new evidence on how recommendation algorithms, now central to how people connect, access information, and build social capital online, can generate or amplify unequal outcomes. Through analytical and computational modelling, the task Algorithmic fairness and inequality, assesses how these systems influence fairness, efficiency, and the wider dynamics of the twin green–digital transition.

Our findings reveal clear, quantifiable patterns of emerging inequality. Recommendation algorithms strongly shape the structure of online social networks, determining who becomes visible, influential, or well connected. This affects individuals' access to information and socio-economic opportunities. We find that:

a. Hierarchical algorithms, which rapidly amplify popular choices, are efficient when user preferences are closely aligned but also the most likely to produce unfair outcomes, especially when preferences are only moderately correlated;

b. Uniform algorithms consistently ensure perfect fairness and perform as well or better when user preferences vary widely by encouraging broader exploration of network connections;

c. Unfairness peaks when central "star" nodes can emerge, but multiple efficient network structures are possible, conditions under which hierarchical systems intensify inequality.

Crucially, the results point to a viable intervention: adaptive algorithm design. Platforms can begin with hierarchical recommendations to support early adoption and later transition to more uniform recommendations to restore fairness without reducing efficiency. Evidence suggests major platforms already shifted in this direction in 2024.

These insights have broad implications for the twin transition. Because network structures shape technological diffusion, public opinion, and polarisation, fairness-oriented algorithmic monitoring, transparency, and regulation are essential to ensure that digital infrastructures contribute to, rather than undermine, a just and socially cohesive transition.

Read the full report here

Living the twin transition (D2.5)

This report, led by the University of Gothenburg and the Department of Sociology and Work Science, presents the results of an extensive qualitative study on how Europe's green and digital transitions are experienced across diverse social groups, revealing how existing inequalities shape and are intensified by transition processes. Drawing on 402 narrative interviews conducted in nine European countries in 2025, the analysis shows that socioeconomic, spatial, and other inequalities decisively influence who can participate in, benefit from, or meaningfully shape the green, digital, and twin transitions.

Limited income, time, digital skills, and infrastructural access restrict participation for many groups, including low-income households, rural residents, migrants, older adults, and people with disabilities. Respondents described the green transition as largely voluntary and values-driven, often pursued "against the grain"

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of existing infrastructure. Conversely, the digital transition was seen as fast, mandatory, and exclusionary for those lacking digital literacy or trust in institutions. Structural barriers, fragmented policies, misaligned infrastructure, and the dominance of tech and energy monopolies, further deepen exclusion. Rural communities in particular reported feeling like "sacrifice zones" for renewable-energy infrastructure. Although some promising synergies exist, such as digital tools enabling circular practices, these remain exceptions rather than widespread experiences. The implications are clear: without addressing structural inequalities, the twin transition risks reinforcing rather than reducing divides. A just transition requires policies that reflect differentiated capacities; investments in social networks and community learning; infrastructures that enable low-carbon mobility and digital inclusion; and governance that limits concentrated corporate power.

ST4TE's findings underscore that individual behaviour alone cannot deliver the twin transition. Structural, collective, and justice-oriented approaches are essential for ensuring greener, more equal, and more productive European societies.

Read the full report here

Publications and presentations

Andrea, A., Barbieri, N., Basilico, S., Dimarco, G., Marzucchi, A., & Rizzo, U. (2025). *The impact of twin transition on income inequality and employment quality.* Zenodo. https://doi.org/10.5281/zenodo.17630637

Ascani, A., Barbieri, N., Basilico, S., Gilli, M., Marzucchi, A., Rizzo, U., & Sciavicco, G. (2025). *The geography of the green, digital and twin occupations in Europe. Mapping digital and green occupations and twin skill readiness in EU regions*. Zenodo. https://doi.org/10.5281/zenodo.17466337

Ascani, A., Basilico, S., Martinelli, G., & Marzucchi, A. (2025). *The uneven regional implications of twin transition and globalisation.* Zenodo. https://doi.org/10.5281/zenodo.17466471

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character of vulnerability: Dimensions of centre-periphery in narrative interviews about the twin transition. 64th ERSA Congress, Athens, Greece, 26-29 August 2025.

Meet the partners

Aristotle University

Aristotle University of Thessaloniki and its Urban and Regional Innovation Research Unit in Greece is the Project Coordinator. AUTH is responsible for tasks linking the project results to policymaking, e.g. the development of a twin transition index and the analysis of the territorial impact of the transitions.

EFIS Centre |

The European Future Innovation System (EFIS) Centre leads on the policy implications of the project, along with the sustainability, impact, and exploitation dimensions.

University of Ferrara

The University of Ferrara in Italy leads clarifying how European regions are affected by the green and digital transition and determining the influence of these factors on regional disparities.

Uni MERIT |

UNU-MERIT leads on estimating industry and occupation exposure to twin technologies, estimating the impact of inequality on the twin transition, and building a theoretical model to study the impacts on inequality of different energy and digital technology transitions scenarios.

University of Gothenburg |

UGOT's Department of Sociology and Work Science in Sweden leads the task of narrative interviews in different European regions, the stakeholder engagement and validation of research results, and the research communication.

Gran Sasso Science Institute

GSSI in Italy will disentangle a series of effects that the green and digital transformations have on the work content, the health of individuals and the interconnectedness of territories in today's global markets.

CLIMAFIN |

CLIMAFIN in France contributes to mapping and measuring financial risks and opportunities associated with the twin transitions.

Utrecht University |

Utrecht University's Economic Geography Team in the Netherlands is mapping the pathways toward Europe's green and digital transformation to investigate the strengths and challenges encountered by European regions in developing green, digital, and twin technologies.

Sister projects

MOBI-TWIN: Twin Transition and changing patterns of spatial mobility: a regional approach.
MOBI-TWIN aims to comprehend the intricate patterns of mobility and leverage this knowledge to foster regional prosperity.
Website: https://mobi-twin-project.eu/

FITTER-EU: Fair and Inclusive Twin Transitions for a Stronger Social Europe. FITTER-EU is aimed at contributing to existing research on the origins, dynamics and determinants of inequalities and enable anticipatory governance to support a fair and inclusive twin transition in Europe.

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Website: https://www.linkedin.com/company/fitter-eu

READJUST: Just Transition to a Green and Digital Future for all. READJUST strives to address the inequalities created or exacerbated by the twin transitions policies and it aims to suggest policy options for overcoming the potential trade-offs between efficiency and equality in twin transitions in the key sectors of mobility and agri-food. Website: https://readjust.eu/

About the ST4TE project

The importance of the green and digital transitions is evident in addressing the impacts of climate change. As a result, there is a growing need for more data to assess the potential perpetuation or exacerbation of inequalities. Various sectors undergoing the twin transitions (TT) are currently experiencing disparities that could persist, or worsen, during this transformative period.

Therefore, the EU-funded ST4TE project has been designed to comprehend the impact of the twin transitions on green goals and vulnerable European regions. The project will also study the forces behind these transitions, understand potential inequalities and their causes, and collaborate with policymakers. The final objective is to ensure that the green and digital transitions contribute to a more equitable and sustainable future.

The ST4TE consortium has extensive knowledge in the fields of twin transitions, inequalities, and research and innovation (R&I). This expertise, along with experience in participative methodologies, green and digital mapping and various other methodological tools will guarantee sound scientific evidence on TT in Europe towards a just and equitable transition.

Find out more

Check ST4TE's:

- **Website**
- **LinkedIN**
- **Zenodo Community**

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This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No 101132559.