SkillResilience4EU

Resilience through re-skilling and upskilling for European labour markets in transition

D5.1 – Policy mapping and analysis

DISCLAIMER:
THIS DELIVERABLE IS
PENDING EU APPROVAL.

Funded by
the European Union

The participation of the University of Applied Science and Arts Northwestern Switzerland (FHNW) is funded by the Swiss Secretariat for Education, Research and Innovation (SERI)

Project information

Project acronym:	SkillResilience4EU
Full title:	Resilience through re-skilling and upskilling for European labour markets in transition
Grant agreement:	101177821
Programme and call:	HORIZON-CL2-2024-TRANSFORMATIONS-01-03 - Minimise costs and maximise benefits of job creation and job destruction
Project coordinator:	HVL
Contact:	SkillResilience4EU@hvl.no
Project duration:	36 months
Project website:	https://skillresilience4eu.eu/

Deliverable information

Deliverable number	D5.1
Deliverable title:	Policy mapping and analysis
Dissemination level:	Public
Deliverable type:	Report
License:	CC BY-NC-ND 4.0
Status:	Submitted
Due date:	31/03/2026
Submission date:	30/03/2026
Work Package:	5
Lead Beneficiary:	University of Crete

Disclaimer

Funded by the European Union. Views and opinions expressed are however those of the authors only and do not necessarily reflect those of the European Union. Neither the European Union nor the European Research Executive Agency can be held responsible for them.

Revision History

Date	Version	Author	Comment
27/02/2026	V0.01	Maria Tsouri, HVL Ahmed Amine El Azhary, HVL Simon Norheim Colclough, HVL Evangelia Petraki, UoC Panagiotis Skartados, UoC Andreas Panagopoulos, UoC	Creation of document table of contents and outline
01/03/2026	V0.02	Maria Tsouri, HVL Ahmed Amine El Azhary, HVL Simon Norheim Colclough, HVL Evangelia Petraki, UoC Panagiotis Skartados, UoC Andreas Panagopoulos, UoC	First draft contents of sections 1-3
15/03/2026	V0.03	Maria Tsouri, HVL Ahmed Amine El Azhary, HVL Simon Norheim Colclough, HVL Evangelia Petraki, UoC Panagiotis Skartados, UoC Andreas Panagopoulos, UoC	Second draft including all sections
20/03/2026	V0.04	Deyu Li, UU Lars Coenen, HVL	Peer review
29/03/2026	V0.04	Maria Tsouri, HVL Ahmed Amine El Azhary, HVL Simon Norheim Colclough, HVL Evangelia Petraki, UoC Panagiotis Skartados, UoC Andreas Panagopoulos, UoC	Adaptation to the comments of the reviewers
30/03/2026	V0.04	Marthe Vaagen Tjemsland, HVL	Final check and approval for submission
30/03/2026	V1.0	Maria Tsouri, HVL	Final check and submission to the granting authority

Author List

Institution	First name and Name	Contact information
HVL	Maria Tsouri	Maria.Tsouri@hvl.no
HVL	Ahmed Amine El Azhary	Ahmed.A.Azhary@hvl.no
HVL	Simon Norheim Colclough	Simon.Norheim.Colclough@hvl.no
UoC	Evangelia Petraki	PetrakiEvaggelia@gmail.com
UoC	Panagiotis Skartados	PSkartados@uoc.gr
UoC	Andreas Panagopoulos	Panagopoulos@uoc.gr

Abbreviations and acronyms

Abbreviation or acronym used in this document	Explanation
AI	Artificial Intelligence
EFTA	European Free Trade Association
ESF+	European Social Fund Plus
EU	European Union
HE	Higher Education
ILO	International Labour Organization
LLL	Lifelong Learning
LLM	Large Language Model
MLG	Multi-Level Governance
NUTS	Nomenclature of Territorial Units for Statistics
OECD	Organisation for Economic Co-operation and Development
PES	Public Employment Services
R&I	Research and Innovation
RIS3	Research and Innovation Strategy for Smart Specialisation
RRF	Recovery and Resilience Facility
SMEs	Small and Medium-sized Enterprises
VET	Vocational Education and Training

Glossary

Term	Definition used or meaning in the Acronym project	Reference or source for the definition if applicable
Coordination arena	The institutional setting through which policy actors interact and coordinate policy design and implementation.	Capano & Howlett (2020)
Governance paradigm	A dominant policy logic guiding the design and implementation of public interventions.	Capano & Howlett (2020)
Industrial restructuring	The reorganisation of industrial activities in response to technological, economic, or policy changes.	Dawley et al. (2025)
Institutional complementarity	The degree to which different institutional arrangements reinforce each other in shaping economic performance and policy outcomes.	Hall & Soskice (2001); Amable (2003)
Labour-market adjustment	Processes through which labour markets respond to structural change, including reallocation and skill adaptation.	Dawley et al. (2025)
Labour-market resilience	The ability of labour markets to withstand and adapt to shocks while maintaining employment and supporting transformation.	Martin & Sunley (2015)
Multi-Level Governance (MLG)	A system of policymaking in which authority is distributed across multiple territorial levels, involving interaction among EU, national, and regional actors.	Hooghe & Marks (2001)
Place-based policy	A policy approach tailored to the specific characteristics, capabilities, and needs of regions.	Barca et al. (2012)
Policy coherence	The alignment and interaction of policy objectives, instruments, and governance arrangements across domains and levels.	Cairney (2025)
Policy instrument	A tool or mechanism (e.g. regulation, funding, strategy) used by public authorities to achieve policy objectives.	Howlett et al. (2015)
Policy mix	A combination of interacting policy instruments, strategies, and objectives that jointly shape socio-economic outcomes.	Rogge & Reichardt (2016); Kern et al. (2019)
Smart Specialisation (RIS3)	A place-based policy framework promoting regional innovation by building on existing capabilities and competitive advantages.	Foray (2014)
Social investment state	A policy approach focusing on investment in human capital to support long-term economic and social outcomes.	Hemerijck (2017)

Structural reallocation	The movement of labour and resources across sectors or regions as part of economic transformation processes.	OECD (2023)
Twin transition	The combined green and digital transformation reshaping economic structures, labour markets, and skill demands.	Cedefop (2023); OECD (2023)
Workforce resilience	The capacity of workers to adapt to labour-market changes through skill development, mobility, and transitions.	Derived from labour-market resilience literature used in the report

Executive Summary

This deliverable presents the results of a comprehensive policy mapping and descriptive analysis of labour-market and skill-related policies supporting Europe's twin (green and digital) transition. Conducted within the SkillResilience4EU project, the report provides a structured overview of how policy frameworks across European, national, and regional levels address workforce adaptation, reskilling, and labour-market resilience in the context of structural economic transformation.

Background and Rationale

The twin transition is reshaping European labour markets by simultaneously driving decarbonation and digitalisation. These processes are transforming job structures, skill requirements, and regional economic trajectories, crating both opportunities and risks. While new employment opportunities are emerging in green and digital sectors, traditional industries face decline, leading to labour-market disruptions, skill mismatches, and increasing territorial inequalities.

Policy responses to these challenges are inherently complex, as labour-market governance in Europe operates within a multi-level system involving EU institutions, national governments, and regional authorities. Effective policy design therefore depends not only on individual instruments but on the coherence and complementarities of broader policy mixes. Despite the growing importance of the twin transition, there remains limited systematic evidence on how policies across governance levels are structured, combined, and targeted to support labour-market adaptation. This deliverable addresses this gap by mapping and analysing the policy landscape underpinning workforce transformation in Europe.

Approach and Methodology

The report is based on a large-scale policy mapping exercise covering the period 2010-2025 and encompassing 1857 policy instruments across EU, national and regional levels. Policies were identified through systematic searches of institutional sources and coded into a structured dataset using a detailed analytical framework capturing governance level, policy domain, instrument type, transition orientation, labour-market focus, target groups, and governance arrangements.

The methodology combines manual document analysis with AI-assisted validation to ensure both comprehensiveness and consistency. A standardised coding protocol and iterative refinement process were applied to enhance reliability, while quality checks and cross-validation ensured comparability across countries and governance levels. The analysis is descriptive and exploratory, focusing on identifying patterns in policy design, distribution, and governance rather than assessing causal effects or policy outcomes.

Main Findings

The analysis reveals several key patterns shaping the European policy landscape for labour-market adaptation under the twin transition:

- <u>Dominance of strategic and coordination-based policy instruments:</u> Across all governance levels, policies rely heavily on informational and strategic tools such as roadmaps, monitoring systems, and coordination platforms. Regulatory and financial

instruments play a more limited role, indicating a governance model centred on guidance, alignment, and knowledge generation rather than direct intervention.

- Growing but uneven integration of the twin transition: While green and digital objectives are increasingly combined within policy frameworks, integration remains partial. Many policies still address these dimensions separately or implicitly, and green priorities tend to be more deeply embedded than digital ones across most countries.
- Labour-market focus on adaptation rather than protection: Policy interventions are primarily oriented toward skill upgrading, reskilling, and hybrid adjustment strategies, reflecting an emphasis on workforce transformation and employability. Measures related to job protection and social cushioning are present but comparatively limited, suggesting a policy bias toward facilitating structural change rather than mitigating its social impacts.
- Strong role of multi-level governance and division of labour: A clear functional differentiation exists across governance levels. EU and national policies tend to set strategic priorities and provide overarching frameworks, while regional policies focus on implementation and place-based adaptation. This results in a hybrid governance system combining central direction with decentralised coordination and multi-actor networks.
- Territorial and national variation in policy mixes: Despite shared overarching objectives, policy approaches vary significantly across countries and regions, reflecting differences in institutional structures, economic conditions, and development strategies. Regional development and cohesion policies play a particularly important role in addressing spatial inequalities linked to the twin transition.

Key Takeaways and Implications

The findings highlight that Europe's policy response to the twin transition is characterised by increasing strategic coordination and growing integration of green and digital priorities, but also by fragmentation and uneven alignment across governance levels and policy domains.

Three key implications emerge:

1. Policy coherence is critical: Effective labour-market adaptation depends on aligning skills, labour-market, industrial, and innovation policies within coherent policy mixes and generate complementarities rather than gaps or contradictions.
2. Balance between adaptation and protection is needed: While current policies strongly emphasise reskilling and transformation, greater attention to social protection and inclusion is necessary to ensure a just and equitable transition.
3. Multi-level governance must be strengthened: Improving coordination between EU, national, and regional actors is essential to ensure that strategic priorities are effectively translated into place-based interventions that reflect local labour-market conditions.

Overall, this deliverable provides a foundational empirical resource for understanding policy mixes under the twin transition. It establishes the basis for future analytical work within the SkillResilience4EU project, including deeper investigation of policy coherence, governance complexity, and the effectiveness of policy interventions in supporting resilient and inclusive labour markets in Europe.

Table of Contents

List of Figures

1 Introduction

Within the SkillResilience4EU project, policy mapping constitutes a core research activity aimed at systematically identifying and structuring policy instruments that shape labour-market adaptation to the twin (green and digital) transition across Europe. The mapping focuses on policies related to skills development, workforce resilience, employment transitions, and institutional coordination, as these dimensions capture the main mechanisms through which labour markets adjust to technological change and decarbonisation, namely skill formation, worker mobility, employment reallocation, and the governance of these processes (see Section 2). Recognising that such responses are embedded within complex multi-level governance frameworks, the mapping compiles policy instruments from European, national, and regional levels into a structured dataset, providing a comprehensive and comparable overview of the policy landscape relevant to labour-market adjustment. This approach enables the project to examine how different governance arrangements shape workforce transformation, identify patterns of policy concentration and fragmentation, and establish a robust empirical foundation for subsequent analysis of policy coordination, institutional diversity, and governance strategies supporting labour-market resilience under the twin transition.

1.1 Purpose and Scope of Deliverable 5.1

Deliverable 5.1 presents the results of a systematic policy mapping exercise conducted within the SkillResilience4EU project. Its primary purpose is to identify and catalogue policy instruments shaping labour-market adaptation under the twin (green and digital) transition across Europe. In addition to its empirical contribution, the deliverable advances a methodological innovation by integrating Large Language Models (LLMs) into the operationalisation of policy mapping, enabling the systematic identification, classification, and structuring of policy instruments across diverse sources and governance contexts. This approach contributes to emerging advances in computational policy analysis, particularly in the study of policy mixes, by supporting scalable, consistent, and replicable mapping of complex policy landscapes. By compiling policy instruments across multiple governance levels, including European, national, and regional frameworks, the deliverable provides a comprehensive overview of the policy mix supporting workforce resilience, skills development, employment transitions, and policy coordination. In doing so, the mapping establishes a structured empirical foundation for analysing how labour markets respond to technological change, decarbonisation, and broader processes of structural transformation within a multi-level governance context.

The scope of the deliverable is primarily descriptive, focusing on the construction and analysis of a policy mapping dataset developed through a structured coding framework. Each policy instrument is treated as a unit of analysis and systematically coded across a set of analytical dimensions derived from the conceptual framework outlined in Section 2. These include policy domains and instrument types, governance levels, twin transition orientation, labour-market focus, target groups, and governance arrangements. The coding framework, supported by LLM-assisted identification, classification, and standardisation procedures, is implemented through a policy mapping masterfile, enabling consistent classification and comparability across countries and governance levels. The report provides a descriptive analysis of the coded dataset to identify patterns in the distribution of policy instruments, complementarities and fragmentation within policy mixes, and variation across governance levels and territories. In doing so, Deliverable 5.1 establishes a robust empirical basis for subsequent analysis of policy

coordination, policy coherence, and institutional diversity in shaping labour-market resilience under the twin transition, while leaving a more detailed examination of institutional arrangements to future stages of the project.

1.2 Intended readership

This deliverable is primarily intended for researchers, policymakers, and project partners involved in the SkillResilience4EU project and in broader discussions on labour market adaptation under the twin transition. Within the project consortium, the report provides a structured overview of the mapped policy landscape and serves as an empirical reference for subsequent analytical work and methodological development. Beyond the consortium, the deliverable is relevant to policymakers and institutional stakeholders at European, national, and regional levels who are engaged in designing or coordinating policies related to skill, workforce development, and labour market resilience. It may also be of interest to scholars and practitioners working on labour market governance, policy coordination, and the institutional challenges associated with managing structural economic transitions in the European context.

1.3 Relationship to previous SkillResilience4EU deliverables

Deliverable 5.1 builds directly on the analytical foundations established across the earlier work packages of the SkillResilience4EU project. The preceding deliverables collectively provide the conceptual framing, empirical evidence, and methodological groundwork necessary to understand how the twin (green and digital) transition is reshaping European labour markets and generating new challenges for skills development, workforce resilience, and policy coordination. In this context, the present deliverable extends the project's analytical architecture by systematically mapping the policy landscape that governs labour market responses to these transformations. Rather than constituting a standalone exercise, the policy mapping undertaken in Deliverable 5.1 forms part of a cumulative research effort that connects structural labour market dynamics, regional transition pathways, and institutional change with the policy frameworks designed to address them.

The contributions of WP1 provide the theoretical and empirical baseline for this task. Deliverables 1.1-1.4 established the conceptual understanding of labour market resilience in the context of the twin transition and documented how green and digital transformations affect employment structures, regional development trajectories, and skill demands across Europe. Though the development of regional employment indices, the analysis of skill supply and demand mismatches, and the formulation of a place-based framework for labour market resilience, these deliverables highlighted the spatially uneven and structurally embedded nature of transition pressures. Building on this evidence, Deliverable 5.1 shifts the focus from structural labour market dynamics to the policy instruments that seek to address them, examining how policy mixes across European, national, and regional governance levels attempt to facilitate labour market adjustment and skill adaptation under conditions of technological and environmental change.

The analytical perspective developed in subsequent WPs further informs this policy-oriented lens. Deliverable 2.1 provides a macro-level assessment of regional resilience to the green and digital transitions, demonstrating the path-dependent and territorially differentiated nature of transition capacities across Europe. At the same time, Deliverables 3.1 and 4.1 introduce complementary qualitative perspectives on how sectoral dynamics, institutional change, and

governance processes shape labour market adaptation on the ground. Together, these deliverables reveal that labour market resilience emerges from the interaction of structural conditions, institutional arrangements, and policy interventions across multiple governance levels. Against this background, Deliverable 5.1 contributes by mapping the policy instruments and governance arrangements that structure these interactions, providing a descriptive overview of the policy landscape that underpins labour market responses to the twin transition and establishing an empirical foundation for subsequent analytical work within the project.

1.4 Structure of the Deliverable 5.1

Deliverable 5.1 is structured to guide the reader from conceptual foundations to empirical analysis and future research directions. Following the introduction, which defines the purpose, scope, audience, and positioning of the report within the SkillResilience4EU project, Section 2 presents the theoretical background, covering key concepts such as multi-level governance, policy mixes, and the twin transition. Section 3 details the data and methodology, including research design, data collection, coding framework, and analytical strategy. Section 4 provides an overview of the mapped dataset, while Section 5 delivers the core descriptive analysis, examining patterns across policy domains, instruments, transition orientation, labour-market focus, target groups, and governance arrangements. Section 6 outlines future research directions, and Section 7 concludes with key implications for policy and further analysis. The report is complemented by references and annexes containing supporting methodological materials and dataset documentation.

2 Theoretical background

This section develops the conceptual and analytical foundations for the policy mapping and analysis presented in this deliverable. It draws on key strands of literature on policy mixes, multi-level governance, the twin transition, labour-market adaptation, and policy targeting to frame how labour-market policies in Europe can be systematically understood and compared. Rather than providing a purely theoretical overview, the section aims to link these perspectives to the empirical focus of the report, showing how they inform the selection of analytical dimensions and the structure of the policy mapping dataset.

2.1 Policy mixes and policy instruments

To analyse labour-market policies in the context of the twin transition, it is necessary to move beyond individual policy instruments and adopt a policy mix perspective. Rather than treating policies as isolated interventions, the policy mix literature conceptualises public action as a combination of interacting instruments, strategies, and objectives that jointly shape socio-economic outcomes (Capano & Howlett, 2020; Howlett et al., 2015; Kern et al., 2019; Rogge & Reichardt, 2016). This perspective emphasizes that policy effectiveness depends not only on the design of individual instruments, but on how different tools, such as regulatory measures, financial incentives, and strategic frameworks, are combined and coordinated over time and across governance levels (Kern et al., 2019; Rogge & Reichardt, 2016).

A central concern in this literature is the degree of policy coherence and complementarity. Policy instruments may reinforce each other, generating synergies, or they may create tensions and inconsistencies that undermine effectiveness (Cejudo & Michel, 2021; Edmondson et al., 2019; Lindberg et al., 2019; Magro & Wilson, 2019). Importantly, coherence should not be equated with

uniformity. In the European context, variation in policy design often reflects necessary adaptation to different institutional settings, labour-market structures, and regional capabilities (Tödtling & Trippl, 2005). As such, evaluating policy mixes requires attention to how instruments interact within broader governance systems and whether they generate credible pathways for implementation (Cairney, 2025; Flanagan et al., 2011; Moghadam-Saman et al., 2026).

In this deliverable, the policy mix perspective provides the core analytical lens for examining how labour-market adaptation is governed under the twin transition. By systematically mapping policy domains, instrument types, and their combinations, the analysis captures how different tools are deployed across European contexts and how they contribute to shaping workforce resilience and structural transformation.

2.2 Multi-level governance and territorial policy variation

Labour-market policies in Europe are embedded within a complex system of multi-level governance (MLG), where authority is distributed across supranational, national, and regional levels (Hooghe & Marks, 2001; Marks et al., 1996; Piattoni, 2010). Rather than operating through a single hierarchical chain of command, policymaking in the EU involves interactions among multiple actors, including EU institutions, national governments, subnational authorities, and non-state stakeholders (Ansell & Torfing, 2022; Hooghe & Marks, 2001; Hooghe et al., 2016; Liesbet & Gary, 2003). This results in a governance structure characterised by coordination, negotiation, and shared competencies across levels (Kleider, 2020).

Within this framework, it is common to distinguish between Type I MLG, based on general-purpose territorial jurisdictions, and Type II MLG, consisting of more flexible task-specific governance arrangements (Hooghe & Marks, 2001; Piattoni, 2010). This deliverable focuses primarily on Type I MLG (Figure 1), capturing policies developed at European, national, and regional levels. A key implication of this governance structure is that policy design and implementation are shaped by territorial variation in institutional capacities, economic structures, and policy priorities (Halpern, 2014; Maggetti & Trein, 2019; Noferini et al., 2020; Stephenson, 2013).

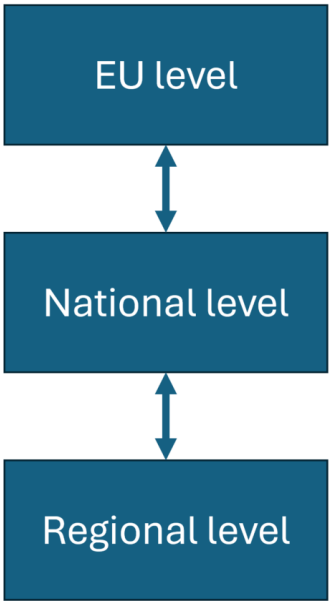

Figure 1: The three territorial scales (Type I MLGs) we focus on in our mapping and analysis of twin transition policies within the EU

Importantly, such variation should not be interpreted as fragmentation per se. Instead, it may reflect place-based adaptation to diverse labour-market conditions and regional opportunity spaces (Grillitsch et al., 2025; Rodríguez-Pose & Bartalucci, 2024). At the same time, the dispersion of authority introduces coordination challenges, as responsibilities overlap across levels and require alignment between strategic direction and local implementation. Understanding how policies are distributed and coordinated across governance levels is therefore essential for analysing policy mixes in the European context.

2.3 The twin transition as policy coordination challenge

The green and digital transformations are increasingly conceptualised in European policy debates as a "twin transition", reflecting their simultaneous and interdependent nature (Aloisi, 2024). European policy frameworks such as the European Green Deal and the Digital Strategy provide strong directionality by shaping economic priorities towards decarbonisation and digitalisation (Grillitsch et al., 2025). However, these transitions are not inherently aligned. While digital technologies can support environmental objectives, they may also generate new resource demands and inequalities, creation both synergies and trade-offs (Muñoz de Bustillo Llorente, 2024).

A central challenge identified in the literature is achieving coordination across policy domains, instruments, and governance levels. The twin transition spans multiple areas, including climate industrial, innovation, and labour-market policy, and involves actors operating within a multi-level governance system (Gao, 2025). As a result, policies often evolve in parallel rather than as fully integrated frameworks, leading to fragmentation, overlaps, or inconsistencies (Gao, 2025; Kovacic et al., 2024). Moreover, directional policies such as smart specialisation (RIS3) and mission-oriented approaches may introduce tensions between top-down strategic priorities and the need for place-based adaptation (Abbott & Fitjar, 2025).

These coordination challenges have important implications for labour markets and skill systems. The twin transition reshapes employment structures, generates new skill demands, and amplifies regional disparities. As such, effective policy responses require integrated policy mixes that align economic, social, and environmental objectives while remaining adaptable to diverse territorial contexts. In this deliverable, the twin transition is therefore approached as a policy coordination problem, focusing on how policy instruments are combined and whether they reflect integrated or fragmented approaches.

2.4 Labour market adaptation and skills systems

The twin transition is fundamentally transforming labour markets by altering skill demands, employment structures, and occupational trajectories. Technological change and decarbonisation are driving the decline of certain jobs while creating new roles requiring hybrid combinations of green, digital, and transversal skills (Bachmann et al., 2024; Cedefop, 2023; Vandeplas et al., 2022; Vona et al., 2018). These dynamics contribute to growing skill mismatches, where the competencies of workers do not align with evolving labour-market needs, and to increasing regional disparities in employment opportunities (Bianchini et al., 2023; Chhibber et al., 2025).

At the same time, labour-market adaptation is not limited to job creation and destruction but involves broader processes of structural adjustment, including skill upgrading, labour reallocation, and the emergence of new hybrid occupations (OECD, 2023). These processes are

unevenly distributed across social groups, with low-skilled workers facing higher risks of displacement and high-skilled workers benefiting from new opportunities (Samaan et al., 2023). This has led to increased attention to education and training systems, lifelong learning, and active labour-market policies as key mechanisms for supporting workforce adaptation (Bachmann et al., 2024; Busemeyer, 2014; Thunqvist et al., 2023).

However, existing institutional frameworks often struggle to keep pace with the scale and speed of transformation. Persistent mismatches, infrastructure gaps, and inequalities, including gender disparities, continue to constrain effective adaptation (Petit et al., 2024). As a result, labour-market resilience depends not only on economic dynamics but also on the design and coordination of policy interventions that support skill development, mobility, and inclusion.

2.5 Targeting and distributional dimensions of policy

An important dimension of policy design concerns how policies target and how their effects are distributed across individuals, firms, sectors, and territories. Labour-market policies are inherently selective, aiming to address specific vulnerabilities and structural imbalances rather than applying uniformly across populations. Policy design literature emphasises that targeting is central to effectiveness, as different actors face distinct constraints in adapting to structural change (Barca et al., 2012; McCann & Soete, 2020).

In the context of the twin transition, distributional effects are particularly significant. While some regions and groups benefit from new opportunities, others, especially those in carbon-intensive or low-tech sectors, face higher risks of job loss and economic decline (Bianchini et al., 2023). This uneven distribution of costs and benefits raises important questions about equity, inclusion, and just transition, highlighting the need for policies that balance economic efficiency with social cohesion (Alexandri et al., 2024; Alexopoulos et al., 2025; Lambros & Melo, 2025).

Policy responses increasingly incorporate place-based and targeted approaches, aiming to tailor interventions to specific territorial and socio-economic contexts. However, this also introduces trade-offs between universal and selective policies, as well as challenges in ensuring that interventions reach the most affected groups. Analysing targeting strategies is therefore essential for understanding how policy mixes distribute opportunities and risks across the labour market.

2.6 From theory to policy mapping dataset

The theoretical perspectives outlined above, policy mixes, multi-level governance, the twin transition, labour-market adaptation, and targeting, provide a comprehensive foundation for analysing labour-market policies in Europe. However, to enable systematic empirical analysis, these concepts must be translated into a structured analytical framework, under which we composed our policy mapping dataset. Following policy design research, this involves operationalising theoretical insights into observable dimensions that capture the key components of policy interventions (Capano & Howlett, 2020; Howlett, 2019).

In this deliverable, the analytical framework is organised around a set of core dimensions that reflect the multidimensional nature of policy mixes. These include policy domains and instrument types, capturing the substantive focus and tools of policy interventions; governance levels, reflecting the multi-level structure of policymaking; labour-market focus, reflecting how policies address workforce adaptation; targeting strategies, identifying the actors and territories addressed; and governance arrangements, capturing coordination mechanisms and policy paradigms.

These dimensions are operationalised through a structured coding framework, where each policy instrument is treated as a unit of analysis and classified across multiple variables. This approach enables systematic comparison across countries, governance levels, and policy areas, and provides the empirical basis for the descriptive analysis presented in subsequent sections. By linking theoretical concepts to a clearly defined analytical structure, the framework ensures coherence between the conceptual foundations and the empirical findings of the report, while also supporting future research on policy coordination, complementarities, and effectiveness within the SkillResilience4EU project.

3 Data and Methodology

Data and methodology section outlines the data sources, research design, and methodological approach underpinning the policy mapping exercise presented in this report. It details the systematic procedures followed to identify, collect, and code policy instruments across European, national, and regional levels, and explains how these were structured into a comprehensive dataset for analysis. By combining manual document analysis with AI-assisted validation and structured coding protocols, the methodology ensures both comparability across countries and governance levels and robustness in capturing the multidimensional nature of policy mixes related to labour-market adaptation under the twin transition.

3.1 Research Design

This deliverable presents the results of a systematic policy mapping exercise focusing on labour-market policies related to the twin green and digital transition. The objective of the mapping is to construct a structured dataset of policy instruments across governance levels that can serve as the empirical basis for subsequent analytical work within the project. The present report therefore focuses on the construction of the policy mapping dataset and on a descriptive analysis of the mapped policies (Hooper et al., 2024; Sewerin et al., 2023). More interpretive analytical approaches, including qualitative thematic analysis and the study of policy complexity, will be conducted in subsequent stages of the project.

3.2 Policy identification and document collection

The policy mapping exercise was conducted through a systematic process of policy identification and document collection aimed at compiling a comprehensive dataset of policy instruments relevant to labour market adaptation and skills development in the context of the twin transition. The process began with a structured search of policy documents in the official archives and repositories of relevant policy-making bodies at European, national, and regional levels. Key institutional sources included the official websites and archives of the European Commission, the European Parliament, and the Council of the European Union, as well as international organisations and national regional public authorities responsible for labour market, skills, industrial, and transition-related policies.

The identification of policies followed an iterative search strategy combining targeted keyword searches with snowball sampling techniques. Initial policy document was identified through institutional repositories and policy databases. These documents were then used as entry points to identify additional relevant policies referenced within strategic frameworks, legislative packages, implementation plans, and policy communications. This approach allowed the

mapping to capture not only core policy instruments but also related initiatives and supporting measures embedded within broader policy programmes.
To ensure the completeness and reliability of the mapping, as we aimed to policy from all European countries, the manual policy identification process was complemented by AI-assisted validation procedures. A large language model (LLM, like ChatGPT 5.4) was used to conduct parallel searches of policy databases and institutional archives using the same thematic scope and policy domains as the manual mapping. The results of the AI-assisted search were then compared with the same sample of the manually constructed dataset. The comparison revealed a similarity rated of approximately 98% between the two mappings, indicating a high degree of consistency between the manually collected policies and those identified and mapped by the AI-assisted search. This validation procedure provides additional confidence in the comprehensiveness of the dataset and supports the use of AI-assisted identification for countries whose official languages are not spoken by members of the research team.

3.2.1 Sources of policy documents

Policy documents included in the mapping were collected from a range of institutional sources corresponding to the different governance levels involved in labour market and transition-related policy making. At the European level, the primary sources included official policy documents, strategies, directives, regulations, communications, and funding programmes published by the European Commission, as well as legislative outputs and policy frameworks adopted by the European Parliament and the Council of the European Union. These documents provide the overarching policy architecture guiding the green and the digital transitions across the European Union.
In addition to EU institutions, relevant policy frameworks and guidance documents produced by international organisations were also considered where they play a role in shaping labour market governance and skills policy. In particular, documents from International Labour Organisation (ILO) and the Organisation for Economic Cooperation and Development (OECD) were included when they informed policy agendas related to skills development, labour market resilience, and transition governance.
At the national level, policy documents were collected from national ministries and governmental departments responsible for labour, education, industry, digitalisation, climate policy, and economic development. At the regional level, relevant policy instruments were identified from regional authorities and regional development agencies, particularly in regions where competencies for labour market policy, education, or economic development are partly decentralised. This multi-source approach ensures that the policy mapping captures the multi-level governance structures characteristic of labour market and transition policies in Europe.

3.2.2 Governance levels covered (EU, national, regional)

The policy mapping covers policy instruments operating across three main governance levels: European, national, and regional. This multi-level approach reflects the institutional reality of labour market governance in Europe, where competencies related to skills development, employment policy, industrial policy, and transition strategies are distributed across different administrative levels and often interact within complex governance arrangements.
At the European level, the mapping includes policy instruments adopted by EU institutions that provide strategic direction, regulatory frameworks, and financial instruments shaping member

states' responses to the green and digital transitions. In addition to formal EU legislation and strategies adopted by the European Commission, the European Parliament, and the Council of the European Union, this level also includes supranational and transnational policy frameworks and initiatives that apply to all EU Member States or to specific groups of countries, These may include multi-country policy programmes, strategic initiatives, or coordination frameworks designed to support policy alignment and cooperation across European territories.

At the national level, governments translate these broader European objectives into national policy strategies, legislative instruments, and implementation programmes targeting labour market transformation, skills development, and industrial restructuring. National ministries and governmental agencies therefore play a central role in adapting European policy priorities to domestic institutional arrangements, labour market conditions, and sectoral structures.

At the regional level, subnational authorities often play a key role in implementing policies, designing place-based interventions, and coordinating stakeholders in response to region-specific labour market dynamics. However, the administrative organisation of regional governance differs across European countries. In some cases, decision-making competencies are primarily located at the NUTS2 level, while in others they are concentrated at the NUTS3 level or other subnational administrative tiers. For the purpose of this mapping, the focus is placed on the regional administrative bodies that possess formal decision-making authority, rather than strictly adhering to a single statistical classification level. This approach allows the mapping to capture the relevant subnational institutions responsible for designing or implementing labour market and skills-related policies across diverse national governance systems.

By mapping policies across these three governance levels, the dataset captures the institutional layering, vertical coordination, and territorial diversity that characterise policy responses to the twin transition in Europe.

3.2.3 Time period covered

The policy mapping focuses on policy instruments adopted or implemented during the period 2010-2025. This timeframe captures the progressive consolidation of the green and digital transitions as central priorities in European policy agendas and allows the analysis to reflect both structural policy developments and responses to major economic and geopolitical shocks. Over this period, a series of macroeconomic events significantly influenced the design and implementation of labour market, industrial, and skills policies. In particular, the COVID-19 pandemic, the energy crisis associated with rising energy prices, and the geopolitical disruptions following the war in Ukraine prompted governments and European institutions to accelerate policy initiatives aimed at strengthening economic resilience, securing energy systems, supporting technological transformation, and protecting labour markets.

The selected timeframe also encompasses the emergence and implementation of several major European policy frameworks that structure transition-related policy development across governance levels. These include: (a) the European Green Deal, which established the objective of climate neutrality by 2050 and introduced a comprehensive agenda for decarbonisation and sustainable economic transformation, (b) the Digital Strategy for Europe, which seeks to enhance digital infrastructure, technological innovation, and digital capabilities across the EU economy, (c) and the Smart Specialisation Strategy (RIS3) framework, which promotes place-based innovation and regional economic transformation. Together with related initiatives such as the Just Transition Mechanism, NextGenerationEU, and national recovery and resilience plans, these

frameworks have stimulated a large number of policy instruments addressing skills development, labour market adjustment, and workforce resilience. As a result, the policy mapping captures not only long-term structural policy developments but also the intensified policy activity that emerged as European institutions and member states responded to both transition challenges and recent systemic shocks.

3.2.4 Inclusion and exclusion criteria

The inclusion of policy instruments in the mapping was guided by a set of criteria designed to ensure relevance to the objectives of the SkillResilience4EU project. At the European level, the mapping considered policy documents that address the green transition, the digital transition, the twin transition, and their implications for labour markets, skills development, and workforce adaptation. In addition to official EU institutional documents, the mapping also included indicative policy frameworks and guidance produced by other supranational organisations when these contribute to shaping European policy agendas in areas relevant to labour market transformation. Furthermore, supranational policy documents that refer to a specific EU Member State or a group of countries where also included when they provide policy direction or coordination mechanisms relevant to national labour market responses to the twin transition. Similar relevance criteria were applied in the identification of national-level policy documents, focusing on policies adopted by national authorities that address labour market dynamics, skills development, or structural transformation associated with green and digital transitions.

At the regional level, the inclusion of policy documents was guided by the identification of administrative bodies that hold formal decision-making authority in labour market, economic development, or transition-related policy areas. Because the institutional organisation of subnational governance differs across European countries, the mapping does not rely on a single territorial classification level. Instead, documents were included from the relevant administrative tiers where policy decisions are taken, which may correspond to NUTS2, NUTS3, or municipal levels, depending on the governance structure of each country. While the descriptive analysis presented in this report focuses primarily on the level at which formal policy decision-making occurs, the dataset itself includes policy documents from all relevant administrative levels in order to capture the full range of policy initiatives that shape labour market responses to the twin transition. This approach is particularly important for smaller countries, where significant policy competencies below the national level are often located at the municipal level, rather than at intermediate regional tiers.

3.3 Unit of analysis

The unit of analysis in this policy mapping exercise is the policy instrument, defined as an official policy document or formal policy measure adopted or issued by a public authority with decision-making competence at the European, national, or regional level. Policy instruments are commonly understood as the tools or mechanisms through which governments seek to achieve policy objectives and translate policy goals into implementation measures(Capano, 2024; Capano & Howlett, 2020; Howlett, 2019). In this sense, policy instruments constitute the operational components of policy design, linking policy formulation with implementation and enabling governments to influence social, economic, and institutional outcomes. Consistent with the policy design literature, which views policymaking as the process of connecting policy goals with specific tools intended to realise them, policy instruments represent the concrete

means through which public authorities intervene to address policy problems (Howlett, 2019; Howlett et al., 2015).

In the context of this study, a policy instrument includes legislative acts, strategic frameworks, programmes, action plans, funding schemes, or regulatory measures that establish objectives, priorities, or implementation mechanisms relevant to labour markets, skills development, or economic transformation associated with the green and digital transitions. Each policy instrument constitutes a single observation in the dataset and is recorded as an individual entry in the policy mapping masterfile. The definition includes both binding and non-binding policy instruments, provided that they originate from institutions with formal authority to shape policy agendas or implementation processes. Examples include regulations, directives, national laws, policy strategies, transition roadmaps, and publicly funded programmes targeting employment, training, innovation, or industrial transformation. Documents that merely analyse or comment on policy developments, such as academic studies, consultancy reports, or advisory papers without formal adoption by a competent authority, are excluded from the dataset. By focusing on formally adopted policy instruments, the mapping aims to capture the policy tools that have the potential to influence labour market dynamics and governance responses to the twin transition across different institutional levels.

3.4 Construction of the policy mapping dataset

The policy mapping dataset was constructed through the systematic compilation and coding of policy instruments identified during the document collection process (Figure 2). The resulting dataset is organised in a structured excel masterfile Policy mapping.xlsx, which functions as the central repository for all mapped policies included in the analysis. Each policy instrument identified during the mapping exercise is recorded as a separate entry in the dataset, while a set of predefined variables captures the key characteristics of the policy, including its governance level, policy domain, transition orientation, labour market relevance, target groups, and institutional context (Annex 2). This structured format enables the systematic comparison of policy instruments across countries, governance levels, and thematic policy areas (Hooper et al., 2024; Sewerin et al., 2023).

The dataset was designed to support descriptive analysis of the policy landscape related to the green and digital transitions and their implications for the labour markets and skills development. The coding framework (Annex 2) applied in the masterfile allows policies to be categorised according to multiple analytical dimensions, facilitating the identification of patterns in policy distribution, policy focus, and governance arrangements across the mapped territories. The dataset, therefore, serves both as a documentation tool for the policy mapping exercise and as the empirical basis for the descriptive analysis presented in this deliverable.

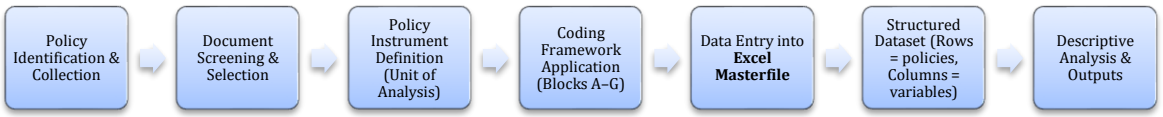

Figure 2: Workflow of Policy Mapping and Dataset Construction

3.4.1 Structure of the excel masterfile

The policy mapping dataset is organised in a single Excel masterfile Policy mapping.xlsx in which each row corresponds to one policy instrument identified during the mapping process (Figure 3).

The dataset includes policies operating across European, national, and regional governance levels and covers multiple countries and administrative territories included in the scope of the SkillResilience4EU project.

Each row contains the information necessary to identify and classify a policy instrument, including basic descriptive details such as the policy title, the responsible authority, the country or territorial unit concerned, and the year of adoption or implementation. Additional columns contain coded variables that capture the thematic focus and institutional characteristics of the policy. This tabular structure ensures that each policy instrument is represented as a discrete observation while enabling the systematic comparison of policies across multiple analytical dimensions.

The Excel masterfile therefore functions as a centralised policy inventory, allowing researchers to filter, sort, and analyse policies according to specific variables such as governance level, transition orientation, labour market focus, or target groups. This structure supports both transparency in the mapping process and reproducibility of the descriptive analysis presented in the report.

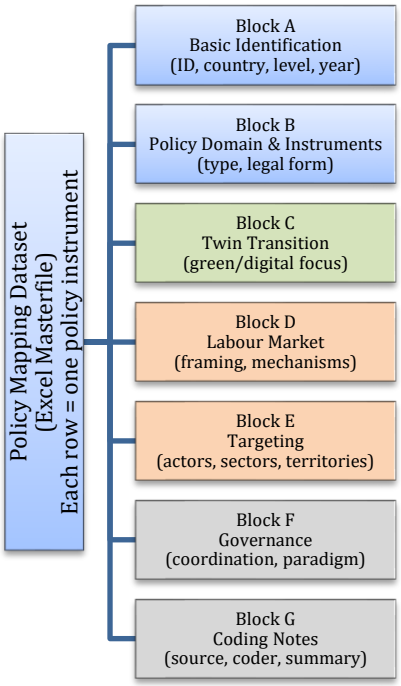

Figure 3: Dataset Structure and Coding Framework

3.4.2 Data organisation and variable groups

To enable systematic comparison and descriptive analysis, the variables in the policy mapping dataset are organised into seven analytical blocks, each capturing a different dimension of policy design, implementation and governance. This structure reflects insights from policy design research, which emphasises that policy instruments should be analysed not only in terms of their substantive objectives but also according to their institutional origin, implementation mechanisms, and governance arrangements (Capano & Howlett, 2020; Mukherjee et al., 2021). The coding framework therefore captures multiple characteristics of each policy instrument, allowing the dataset to reflect the multidimensional nature of policy mixes addressing labour market transformation under the green and digital transitions.

Basic identification (Block A – Annex 2) records the contextual attributes of each policy instrument, including its unique identifier, policy title, governance level, issuing authority, country and regional codes, territorial scope, and year of adoption. These variables situate each policy withing multi-level governance architecture of the European Union, where policy authority is distributed across supranational, national, regional, and local institutions (Bran et al., 2019; Hooghe & Marks, 2001). Additionally, these variables enable the mapping to reflect the territorial dimension of transition policies, which is increasingly recognised in European policy frameworks such as Smart Specialisation and place-based development strategies (Foray, 2014; Varga et al., 2020).

Policy domain, instrument logic, and legal and implementation strength (Block B – Annex 2) captures the substantive policy domain and the type of policy instrument used. Policy domains include labour market policy, education and training, industrial transformation, innovation, digitalisation, climate and energy policy, environmental policy, regional development, and social protection. Instrument variables classify policy tools according to widely used typologies distinguishing regulatory, economic, informational, and organisational instruments (Hood & Margetts, 2007; Howlett, 2023). Additional variables record the legal form of the policy and its implementation force, allowing the analysis to distinguish between aspirational strategies, coordination mechanisms, funding-linked measures, and legally binding instruments (Brans et al., 2017; Howlett, 2023; Howlett et al., 2015).

Twin transition (Block C – Annex 2) captures the relationship of each policy instrument to the green and digital transitions. Variables identify whether the policy focuses on environmental transformation, digital transformation, or the explicit twin transition, as well as the intensity and type of transition objectives pursued (e.g. decarbonisation, digital infrastructure, industrial upgrading, or enabling governance measures) (Fernando, 2025; Raza, 2024). Such categorisation reflects the growing emphasis on coordinated policy approaches to sustainability and technological transformation (Geels et al., 2023; Mazzucato, 2018).

Labour market (Block D – Annex 2) records how policy instruments address labour market dynamics. Variables capture the policy framing of labour market challenges (e.g. competitiveness, social protection, just transition, or inclusion), the specific labour market focus (such as upskilling, reskilling, lifelong learning, or labour mobility), and the mechanisms through which policies aim to influence employment outcomes, including training subsidies, hiring incentives, or skills partnerships (Di Carlo & Durazzi, 2023; Haapanala, 2023). This dimension reflects the increasing role of skills and labour market institutions in supporting economic adaptation to structural change (Busemeyer, 2014).

Targeting type (Block E – Annex 2) identifies the actors and territories targeted by policy instruments. Variables distinguish whether policies address individuals, firms, sectors, territories, or multi-actor governance systems, and whether interventions are universal, selective, place-based, or sector-specific. Recording targeting strategies allows the dataset to capture the growing importance of place-based and sector-specific policy approaches in managing regional disparities associated with economic transitions (Barca et al., 2012; McCann & Soete, 2020).

Governance (Block F – Annex 2) captures the institutional arrangements through which policy instruments are implemented, including coordination arenas (e.g. hierarchical state governance, social dialogue, public-private partnerships, or EU coordination mechanisms), governance paradigms (such as mission-oriented, place-based, or social investment approaches), and

linkages with broader policy mixes. Coding these elements enables the dataset to reflect the complex governance structures through which contemporary policy systems operate (Brans et al., 2017; Howlett, 2023).

Finally, ***coding notes*** (Block G – Annex 2) contains documentation variables including summary descriptions of policy documents, source links, coder identification, and coding dates. These variables ensure transparency and traceability in the policy mapping process and facilitate verification of the dataset.

3.4.3 Dataset architecture

The architecture of the dataset is designed to support both systematic documentation and descriptive analysis of policy instruments across governance levels and territorial contexts. By structuring the dataset as a flat table in which each row represents a policy instrument and each column represents a coded variable, the dataset allows for flexible filtering, grouping, and cross-tabulation of policies according to specific analytical dimensions.

This structure makes it possible to examine how policy instruments are distributed across governance levels, countries, policy domains, and labour-market objectives. It also allows for the identification of patterns in policy targeting, transition orientation, and institutional arrangements. The dataset architecture therefore supports the descriptive analytical strategy adopted in this deliverable, enabling the generation of frequency distributions and comparative summaries that reveal the main characteristics of the policy landscape related to the twin transition.

At the same time, the structured format of the masterfile ensures that the dataset can serve as a foundational empirical resource for subsequent stages of the SkillResilience4EU project, where more advanced analytical approaches may be applied to examine policy coordination, governance complexity, and the interaction of policy instruments across institutional levels.

3.5 Coding framework

Block A – Basic Identification
Policy ID: Each policy instrument in the dataset is assigned a unique identifier following the format XX_YYY_ZZZ_000. In this structure, XX indicates the ISO code of the country or supranational institution, YYY identifies the administrative level of the issuing body (e.g. SUP for supranational, NAT for national, REG for regional), ZZZ denotes the governance level at which the policy primarily applies, and 000 represents the sequential document number for that country.
Policy Name: Records the official title of the policy document as published by the issuing authority, reported either in the original language or, where available, in its official English translation.
Governance Level: Records the administrative level of the authority issuing the policy instrument, distinguishing between supranational, national, regional, and local levels. The classification follows the multi-level governance structure of the European policy system and incorporates the NUTS territorial framework for regional levels where applicable.
Country: Records the ISO country code corresponding to the country to which the policy instrument refers.

Region: Records the territorial unit to which the policy instrument applies at the subnational level. Where applicable, the coding follows the NUTS classification system (NUTS1-NUTS3), while local or municipal policies are identified by the corresponding locality name.
Territory Type: Identifies the spatial scope or territorial focus of the policy instrument. It distinguishes between policies that apply broadly to entire jurisdictions (EU-wide, national-wide, or regional-wide) and those that specifically target particular territorial contexts such as rural areas, urban regions, islands, peripheral territories, coal or industrial regions, or cross-border areas.
Issuing Body: Identifies the institutional authority responsible for issuing the policy instrument, such as a national ministry, a European Commission Directorate-General, or a regional or local administrative body.
Year: Indicates the year in which the policy instrument was adopted or formally issued by the responsible authority.

Block B - Policy domain, instrument logic, and legal and implementation strength
Policy Domain (primary and secondary): Identifies the thematic policy field addressed by each policy instrument. The primary policy domain records the main sector or policy area targeted by the policy, while the secondary policy domain captures additional domains when policies operate across multiple thematic areas. This distinction allows the dataset to reflect the cross-sectoral nature of many policy instruments related to the green and digital transitions, where interventions frequently combine labour-market, innovation, industrial, environmental, and regional development objectives (Brans et al., 2017; Howlett, 2023).
Instrument Family: Classifies policy instruments according to the main type of policy tool used to achieve policy objectives. The coding distinguishes between regulatory, economic/financial, informational/strategic, organisational/institutional, and mixed instrument packages. This classification reflects widely used typologies in policy design research that analyse how governments deploy different types of instruments to influence economic and social outcomes (Hood & Margetts, 2007; Howlett, 2019; Howlett et al., 2015).
Instrument Subtype (primary and secondary): Captures the specific operational mechanism through which a policy instrument is implemented. The primary subtype identifies the main intervention mechanism used by the policy, while the secondary subtype records additional mechanisms when policies combine multiple operational tools. This distinction allows the dataset to capture the diversity of policy instruments used to address labour-market transformation and the twin transition, ranging from financial incentives and regulatory measures to institutional coordination mechanisms and skills development programmes (Hood & Margetts, 2007; Howlett, 2019, 2023).
Legal Form: Identifies the formal institutional status of the policy instrument, distinguishing between binding legal acts, strategic policy documents, operational programmes, and soft governance instruments. Recording the legal form allows the dataset to capture differences in the formal authority and implementation mechanisms of policy instruments (Hood & Margetts, 2007; Howlett, 2019, 2023).
Implementation Force: Measures the strength of the policy instrument in terms of its implementation and enforceability. The coding distinguishes between aspirational policies without formal implementation mechanisms, soft coordination instruments relying on

monitoring or reporting, policies linked to financial conditionality, and legally binding instruments with enforceable obligation. This variable allows the analysis to capture differences in the degree of policy authority and implementation capacity across the mapped policy instruments (Hood & Margetts, 2007; Howlett et al., 2015).

Block C – Twin transition
Twin Focus: Identifies the orientation of each policy instrument in relation to the green and digital transitions. The coding distinguishes between policies focused exclusively on environmental objectives, policies addressing digital transformation, policies explicitly combining both dimensions of the twin transition, and policies that contribute indirectly to transition processes without explicitly framing them as such. This variable allows the dataset to capture how different policy instruments engage with the evolving policy agenda around the twin transition (Caloffi et al., 2024; Rogge & Reichardt, 2016).
Green Intensity and Digital Intensity: Measure the extent to which environmental and digital objectives are embedded in each policy instrument. Using a four-point scale ranging from "not mentioned" to "core purpose", these variables capture the relative importance of green and digital transition goals within policy design. This approach allows the analysis to distinguish between policies that only reference transition themes and those where environmental or digital transformation constitutes a central policy objective (Caloffi et al., 2024; Capano, 2024).
Transition Objective Type (primary and secondary): Identifies the specific transformation goals pursued by each policy instrument within the broader context of the green and digital transitions. The primary objective records the main transformation pathway targeted by the policy, while the secondary objective captures additional objectives when policies address multiple transition dimensions. This variable allows the dataset to distinguish between different types of transition-oriented interventions that support the broader transition process (Caloffi et al., 2024; Rogge & Reichardt, 2016).

Block D – Labour market
Labour Market Framing (primary and secondary): Identifies the main narrative through which labour-market challenges are conceptualised in each policy instrument. The primary framing captures the dominant rationale guiding the policy intervention, while the secondary framing records additional perspectives when multiple policy narratives are present. This variable allows the dataset to capture differences in how policymakers interpret labour market transformation and design policy responses to the twin transition (Bandelow & Hornung, 2019; Miedziński, 2018).
Labour Market Focus: Identifies the specific areas of labour-market intervention targeted by each policy instrument. As a multi-select variable, it captures the range of measures included in a policy, such as skills development, active labour-market policies, labour mobility, or job creation initiatives. This allows the dataset to reflect the diversity and combination of labour-market interventions used to support workforce adaptation under the twin transition (Rainone & Aloisi, 2021).
Labour Mechanism: Identifies the specific mechanisms through which policy instruments influence labour market-outcomes. As a multi-select variable, it captures the operational tools used to implement policy interventions, such as training subsidies, hiring incentives, social

dialogue mechanisms, or job-matching platforms. This variable allows the dataset to distinguish between different modes of policy delivery and to analyse how labour-market objectives are translated into concrete interventions (Card et al., 2018; Howlett, 2023).

Block E – Targeting type
Primary Target Level: Identifies the main category of actors targeted by each policy instrument, such as individuals, firms, sectors, regions, public institutions, or social partners. By distinguishing the primary beneficiaries of policy interventions, this variable allows the dataset to capture how policies are directed across different levels of the economy and society, including cases where policies adopt a multi-actor or systemic approach (Barca et al., 2012; Capano & Howlett, 2020).
Target Group Detail: Captures the specific categories of beneficiaries targeted by each policy instrument, including individual groups, firms, and institutional actors. As a multi-select variable, it allows the dataset to reflect the diversity and overlap of target groups addressed by policy interventions, providing a more detailed understanding of how policies are directed toward specific segments of the labour market and economy (Capano, 2024; Howlett, 2023).
Sectoral Targeting: Identifies whether policy instruments are directed toward specific economic sectors or apply across multiple sectors. By distinguishing between sector-specific and cross-sectoral policies, this variable allows the dataset to capture how policy interventions are tailored to sectoral dynamics and structural transformation processes in the context of the green and digital transitions (Capano, 2024; Howlett, 2023).
Territorial Targeting: Captures the spatial focus of policy instruments by identifying whether they target specific types of regions or apply broadly across territories. This variable enables the dataset to reflect the role of place-based and territorially differentiated policies in addressing regional disparities and supporting labour-market adaptation under the twin transition (Capano, 2024; Howlett, 2023).
Targeting Type: Identifies the strategic approach through which policy instruments define their scope of intervention, distinguishing between universal and targeted measures. It captures whether policies are directed broadly or focus on specific groups, sectors, territories, or firms, including cases where multiple targeting approaches are combined within a single policy instrument (Capano, 2024; Howlett, 2023).

Block F – Governance
Coordination Arena: Identifies the main governance setting through which policy instruments are coordinated and implemented. It distinguishes between hierarchical, decentralised, network-based, market-based, and EU-level coordination mechanisms, allowing the dataset to capture the diversity of governance arrangements through which policies addressing the twin transition are delivered (Capano, 2024; Howlett, 2023).
Primary Governance Paradigm: Identifies the dominant policy logic underlying each policy instrument, capturing broader strategic approaches such as mission-oriented policy, place-based development, just transition, or social investment. This enables the dataset to reflect differences in how policymakers conceptualise and govern the twin transition, linking policy design to wider governance paradigms and strategic orientations (Capano, 2024; Howlett, 2023).

Policy Mix Linkage: Identifies how each policy instrument relates to other policies within a broader policy mix, distinguishing between stand-alone measures and those embedded in wider policy frameworks or packages. This variable enables the dataset to capture the degree of policy coordination, layering, and integration, which are key features of contemporary policy design in the context of the twin transition (Flanagan et al., 2011; Rogge & Reichardt, 2016).
Budget Signal: Captures the presence and indicative scale of financial resources associated with each policy instrument. By distinguishing between policies without explicit funding, those with limited programme funding, and those linked to major or multiannual financial frameworks, this variable provides insight into the financial weight and strategic priority of policy interventions within the broader policy mix (Capano, 2024; Howlett, 2023).
Expected Labour Adjustment Mode: Identifies the main pathway through which policy instruments are expected to influence labour-market adjustment. By distinguishing between mechanisms such as skill upgrading, structural reallocation, job protection, and social cushioning, this variable allows the dataset to capture how policies aim to manage workforce transitions and support labour-market adaptation in the context of structural change (Card et al., 2018).

Block G – Coding Notes
This group of variables contains supporting metadata and qualitative annotations that ensure the transparency, traceability, and interpretability of the coding process. It complements the structured variables of the dataset by providing contextual information on each policy document and documenting key aspects of the coding procedure. Specifically, the block includes a summary or abstract of the policy document (Summary Notes), which captures the main objectives, measures, and scope of the policy in a concise narrative form. It includes a direct link to the original source (Document Link), ensuring traceability and enabling verification. Finally, it includes the initials of the coder (Coder), allowing for accountability and internal quality control, and the date of coding (Coding Date), which records when the entry was created or last updated. Together these elements enhance the reliability and reproducibility of the dataset and support both internal validation and external use of the policy mapping.

3.6 Coding procedures and validation

This section outlines the procedures followed to ensure the systematic, transparent, and reliable coding of policy instruments included in the dataset. Given the complexity and heterogeneity of policy documents across countries, governance levels, and policy domains, a structured coding approach was adopted, combining standardised coding protocols, iterative refinement of categories, and multiple quality assurance mechanisms. The objective was to maximise both internal consistency and cross-country comparability, while maintaining sensitivity to contextual differences in policy design and institutional setting.

3.6.1 Coding protocol

A standardised coding protocol was developed to guide the identification, interpretation, and classification of policy documents across all variables in the dataset. The protocol defined the unit of analysis (individual policy instruments), established clear coding rules for each variable, and provided detailed definitions and criteria for all categories included in the coding framework.

Coding was conducted through a systematic review of official policy documents, including texts, strategies, programmes, and institutional reports. Coders were instructed to base their decisions on explicit information contained in the documents, such as stated objectives, implementation mechanisms, target groups, and governance arrangements.
To ensure consistency, the coding protocol emphasised:

- The identification of the dominant policy objective or mechanism when multiple elements were present.
- The use of multi-select variables where policies explicitly combined multiple features.
- The prioritisation of explicit over inferred information.
- The consistent treatment of cross-country differences in terminology and institutional structures.

3.6.2 Iterative refinement of categories

The coding framework was developed through an iterative and adaptive process, allowing categories and definitions to be refined as the mapping progressed. Two initial coding rounds served as a pilot phase, during which coders tested the applicability of categories across different policy contexts and identified areas requiring clarification or adjustment.
Based on this process, the coding scheme was progressively refined to:

- Improve the clarity and mutual exclusivity of categories.
- Ensure comprehensive coverage of policy types and instruments encountered in the dataset.
- Better capture the cross-sectoral and multi-level nature of policy interventions, particularly in the context of the twin transition.

Regular exchanges among team members were used to discuss borderline cases, ambiguities, and emerging patterns, leading to incremental adjustments in definitions and coding rules. This iterative approach ensured that the final dataset reflects both conceptual robustness and empirical relevance.

3.6.3 Quality checks and consistency procedures

To ensure the reliability and validity of the dataset, a set of quality control and consistency procedures was implemented throughout the coding process.
First, internal consistency checks were conducted to verify that coding decisions were aligned with the established protocol across variables and observations. Particular attention was given to ensuring coherence between related variables (e.g. policy domain, instrument type, and labour-market focus).
Second, cross-validation exercises were performed within the research team, including the review of selected policy entries and comparison of coding decisions across coders. These checks aimed to identify and correct inconsistencies, reduce subjectivity, and enhance inter-coder reliability.
Third, an AI-assisted validation process was employed to complement manual coding. A subset of policy documents was re-coded using an AI model (like ChatGPT 5.4), and the results were compared with the manually coded dataset. The comparison shoed a high degree of similarity (approximately 98%), providing additional confidence in the robustness and consistency of the coding process. This approach was particularly valuable for validating entries in languages not spoken by members of the research team.

Together, these procedures ensure that the dataset is methodologically rigorous, internally consistent, and suitable for comparative analysis, while maintaining transparency in how policy instruments have been identified and classified.

3.7 Analytical strategy

The analytical strategy adopted in this deliverable is descriptive and exploratory, aiming to systematically characterise the landscape of policy instruments addressing labour-market transformation in the context of the green and digital transitions. Building on the structured dataset developed through the mapping exercise, the analysis focusses on identifying patterns, distributions, and relationships across policy characteristics, rather than testing causal hypotheses or applying inferential methods.

The analysis is organised around a set of key analytical dimensions derived from the coding framework, including governance levels, policy domains, instrument types, target groups, and transition orientations. Particular attention is given to examining how policies are distributed across multi-level governance structures (EU, national, regional), how different types of instruments (regulatory, financial, strategic) are combined, and how policy interventions target specific labour-market groups, sectors, and territories. The use of the corresponding variables enables a nuanced understanding of how policy instruments engage with the twin transition and support labour-market adaptation.

The analytical approach also considers the policy mix perspective, exploring how individual instruments relate to broader policy frameworks and governance paradigms. This includes assessing the extent to which policies operate as stand-alone measures or as part of coordinated policy packages, as well as how different governance logics (e.g. mission-oriented, place-based, social investment) are reflected in policy design.

Overall, the analytical strategy provides a comprehensive descriptive overview of the policy landscape, generating empirical insights that will inform subsequent stages of the project. While no causal or theory-testing analysis is conducted at this stage, the structured dataset and descriptive findings establish the basis for future analytical work.

3.8 Limitations of the mapping exercise

While the policy mapping provides a comprehensive and systematically constructed dataset, several limitations should be acknowledged.

First, the mapping is inherently constrained by the availability and accessibility of policy documents, which may vary across countries, governance levels, and policy domains. Despite efforts to ensure comprehensive coverage, some policies (particularly at the regional or local level) may be underrepresented due to limited documentation or accessibility.

Second, the coding process involves ad degree of interpretative judgment, particularly for variables capturing policy framing, governance paradigms, or expected labour market impacts. Although a standardised coding protocol and quality assurance procedures were applied, some level of subjectivity cannot be fully eliminated.

Third, the dataset captures policy design rather than implementation or outcomes. As such, it reflects the stated objectives, instruments, and intended mechanisms of policies, but does not assess their effectiveness, impact, or actual implementation in practice.

Fourth, the temporal scope of the dataset (2010-2025) captures a period of significant policy activity, particularly after 2019, but may underrepresent earlier policy developments or longer-term institutional trajectories.
Finally, the descriptive nature of the analysis means that the mapping does not yet engage in causal inference or explanatory modelling. However, these limitations are recognised as part of a staged research design, where the present deliverable provides a foundational empirical basis for more advanced analytical work in subsequent phases of the project.

4 Overview of the mapped policy dataset

This section provides an overview of the mapped policy dataset, which includes a total of 1857 policy instruments (documents) collected across all governance levels in EU and EFTA countries and their regions (Annex 1). The mapping aimed to ensure comprehensive coverage, including all relevant documents at the supranational level, at least 10 national instruments per country, and a minimum of 2 regional instruments, focusing on the levels where key policy decisions are made while also capturing additional subnational measures.

4.1 Distribution across governance levels

This section examines how policies relevant to the twin transition are distributed across different levels of governance, highlighting where strategic direction, coordination, and implementation are most concentrated. By mapping policy domains across EU, national, regional, and local levels, it provides an overview of how responsibilities and thematic priorities are structured within the multi-level governance system.

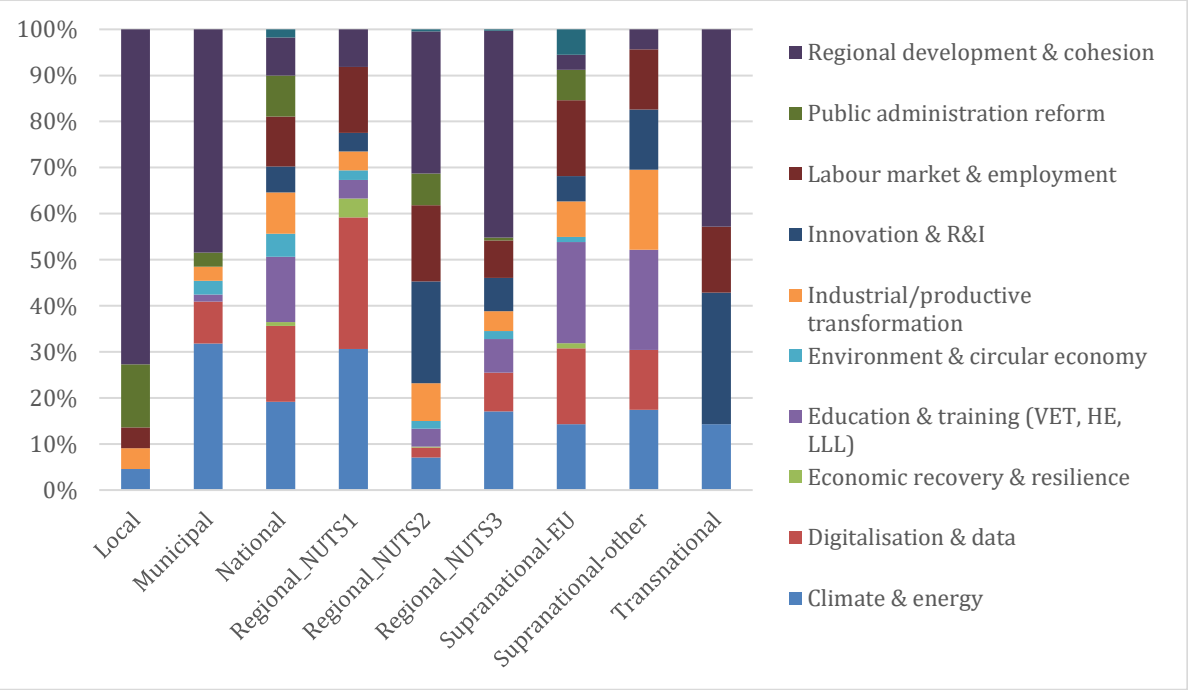

Figure 4: Relative distribution of policy domains across governance levels.

Figure 4 presents the distribution of substantive policy domains across governance levels, highlighting which policy areas dominate at each level. Overall, the policy landscape is concentrated at national and regional tiers, with regional development and cohesion emerging as the most prominent domain, particularly at local and regional levels. National policies display a

more balanced profile, with strong emphasis on climate and energy (143), digitalisation and data (123), and education and training (106), underscoring their strategic role in shaping the twin transition. At the regional level, especially NUTS2 and NUTS3, policies remain strongly cohesion-oriented, dominated by regional development (144 and 155 respectively), while also incorporating innovation, labour market, and digital priorities, reflecting a place-based and implementation-focused approach. In contrast, EU-level policies are more concentrated on education, labour market, and digital domains, pointing to a role centred on coordination and framework-setting, while local and municipal actions are comparatively limited and mainly aligned with cohesion and, to a lesser extent, climate-related objectives.

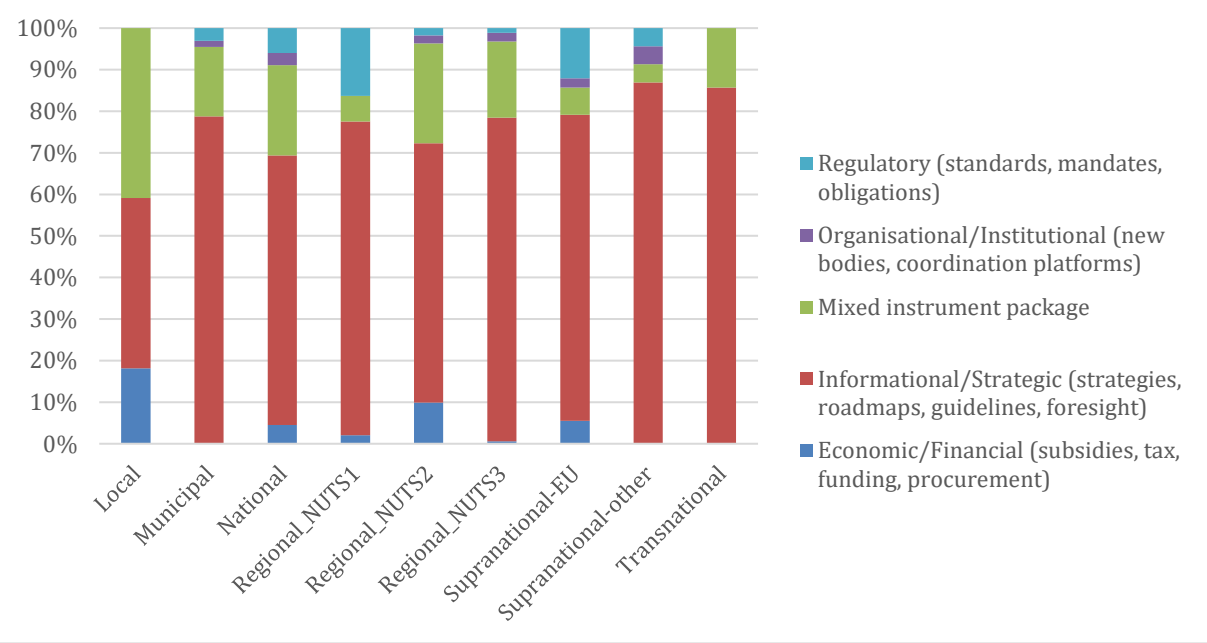

Figure 5: Distribution of policy instrument types across governance levels.

Figure 5 presents the distribution of policy instrument types across governance levels, illustrating how different tiers govern, whether through regulation, funding, strategies, or institutional arrangements. Across all levels, policy action is overwhelmingly dominated by informational and strategic instruments (e.g. strategies, roadmaps, and guidelines), particularly at national (489), regional NUTS2 (291), and NUTS3 (268) levels, indicating a strong reliance on direction-setting and coordination rather than binging or redistributive tools. Mixed instrument packages emerge as the second most common approach, especially at national (164) and regional NUTS2 (112) levels, suggesting that policies often combine multiple tools. Economic and financial instruments are present but comparatively limited, with some prominence at regional NUTS2 (46) and national (34) levels. Regulatory instruments remain modest overall, though more visible at national (45) and EU (11) levels, reflecting their stronger legal competences, while organisational and institutional tools are the least used, indicating that the creation of new governance structures is not a primary policy response.

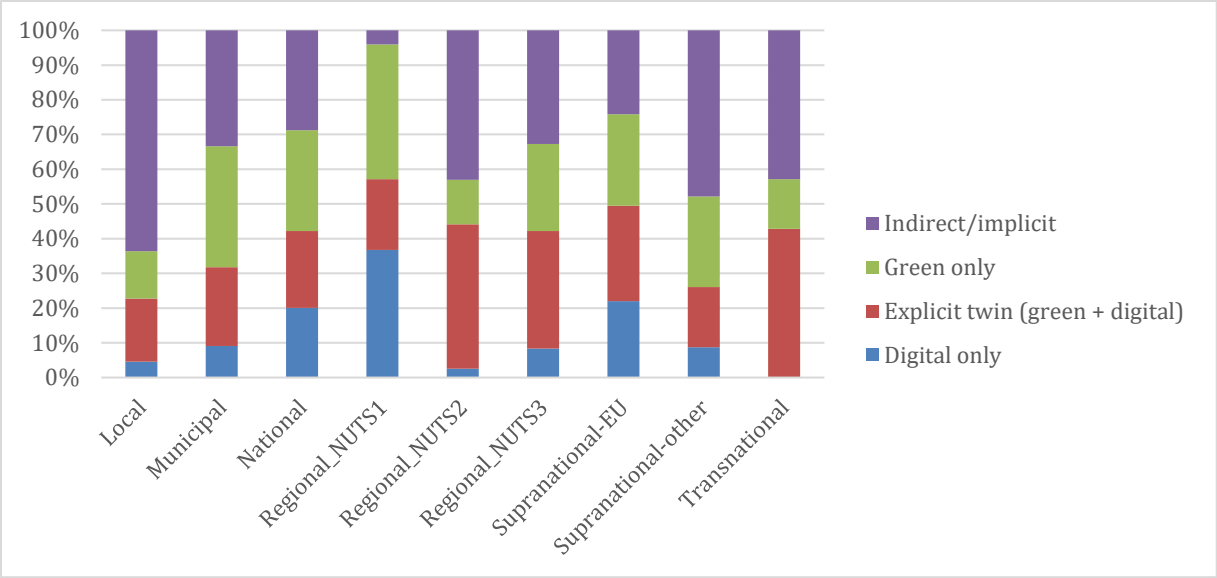

Figure 6: Distribution of policy focus across governance levels, distinguishing between digital-only, green-only, explicit twin (green and digital), and indirect/implicit approaches.

Figure 6 presents the transition orientation of policies across governance levels, examining how directly they engage with the twin transition and whether the focus is green, digital, or both. Overall, the distribution is dominated by indirect/implicit and explicit twin-transition policies, indicating that while many policies support labour-market adaptation without explicitly framing it as "twin transition", there is a growing integration of green and digital agendas. This is particularly visible at regional levels: at NUTS2, indirect/implicit (201) and explicit twin (194) clearly dominate, and a similar pattern appears at NUTS3, where explicit twin (118) and indirect/implicit (114) are most prominent, suggesting that transition objectives are often embedded in broader territorial strategies. At the national level, the picture is more balanced, with green-only (219) and indirect/implicit (217) policies slightly exceeding explicit twin (167) and digital only (151), reflecting a strong climate policy base alongside integrated approaches. At the EU level, all orientations are relatively evenly distributed, pointing to a balanced framing, while at municipal level policies are more green-oriented, with green-only (23) and indirect/implicit (22) dominating. Across all levels, digital-only policies remain comparatively limited and unevenly distributed.

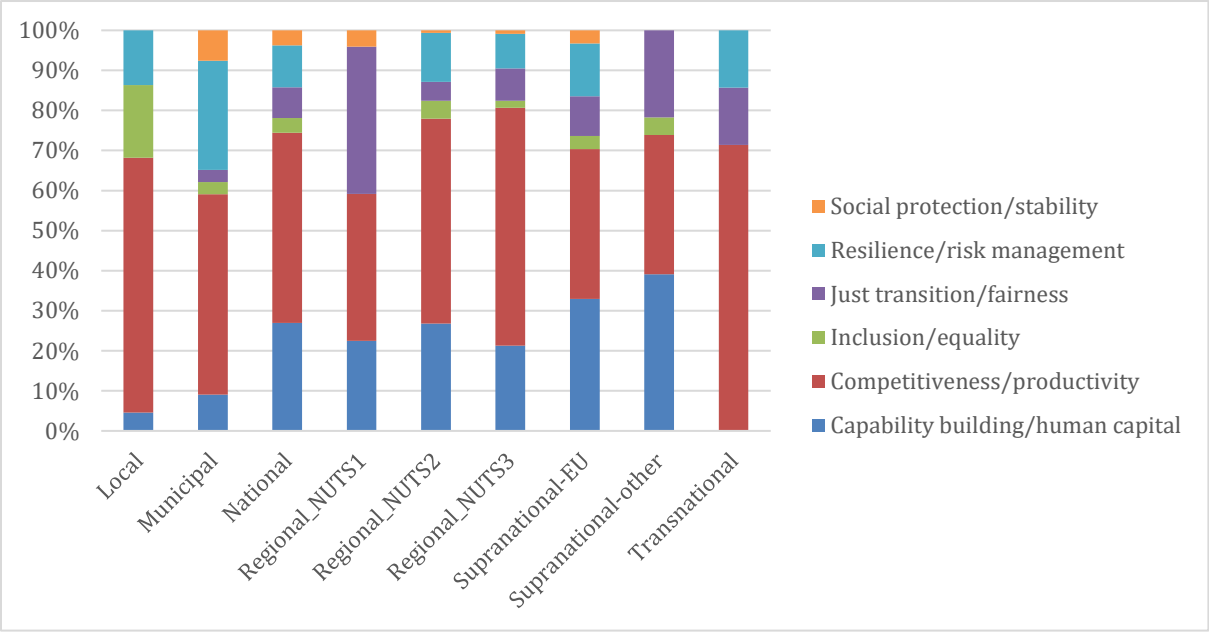

Figure 7: Distribution of policy objectives across governance levels.

Figure 7 presents the policy narrative underpinning labour-market adaptation across governance levels, highlighting the main rationales driving intervention. Overall, competitiveness and productivity clearly dominate across all levels, particularly at national (358), regional NUTS2 (239), and NUTS3 (206) levels, indicating that labour-market adaptation is primarily framed as an economic performance issue. Capability building and human capital emerge as the second most important objective, especially at national (203) and regional NUTS2(125) levels, reflecting a strong emphasis on skills development for the twin transition. Other objectives, including resilience, just transition, inclusion, and social protection, remain comparatively secondary. Notable variations include the regional NUTS1 level, where competitiveness and just transition/fairness are equally prominent (18 each), suggesting a stronger visibility of fairness concerns in some contexts, and the EU level, where competitiveness (34) and capability building (30) are more balanced. Overall, inclusion/equality and social protection/stability remain relatively weak framings across the policy landscape.

4.2 Distribution across countries

This section examines how policies related to the twin transition are distributed across countries, highlighting geographical patterns and variations in policy activity. It provides insight into which territories are most active and how national contexts shape the design and focus of labour-market adaptation measures.

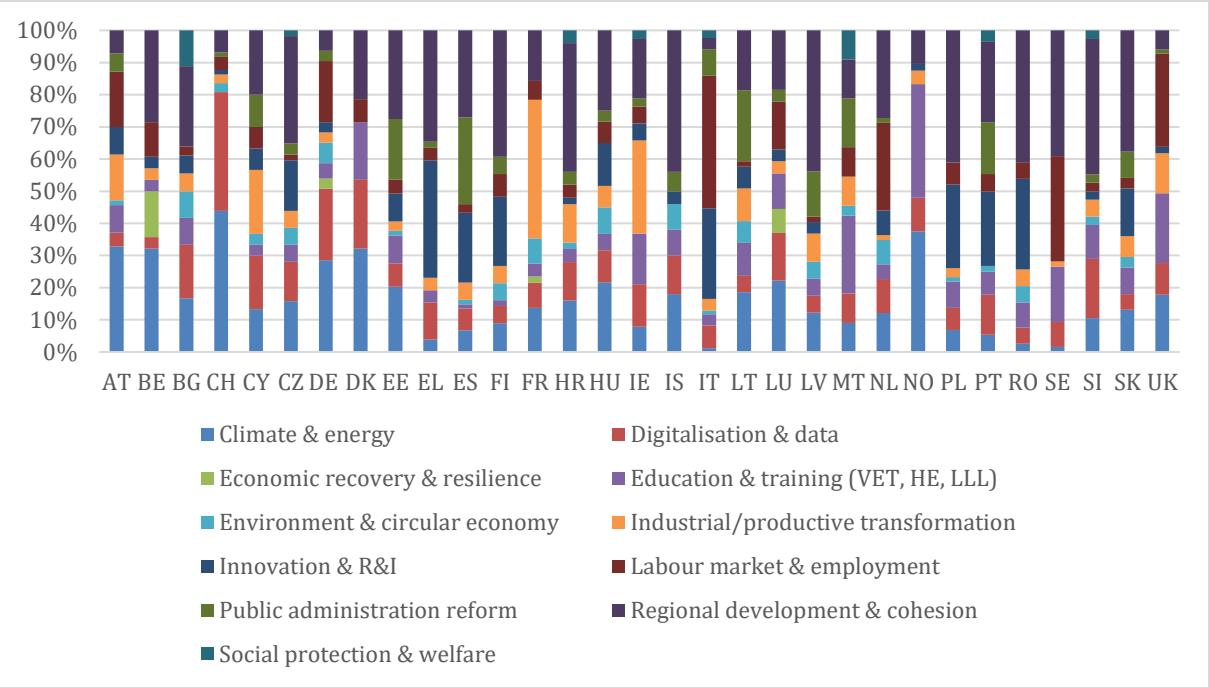

Figure 8: Distribution of policy domains across EU/EFTA countries.

Figure 8 provides a country-by-country mapping of policy domains, showing how different thematic areas, such as climate, digitalisation, innovation, labour market, and cohesion, are distributed across national contexts. Overall, there is substantial variation in policy priorities, although some common patterns emerge. Regional development and cohesion are the most widespread domain across countries, followed by climate and energy, indicating that the twin transition is often addressed through territorial development frameworks rather than narrowly defined labour-market instruments. Several countries, such as Poland (30), Latvia (25), Sweden (25), Slovakia (23), Finland (22), and Iceland (22), show particularly strong cohesion-oriented profiles, while climate and energy are especially prominent in Switzerland (32), the United Kingdom (27), Austria (23), Germany (18), and Norway (18). At the same time, some countries display more specialised policy mixes: Italy stands out in labour market and employment (35) and innovation (24), France in industrial transformation (22), and the United Kingdom in education and training (33) and labour market policies (44). Others, such as Spain and Greece, show more balanced or mixed profiles across domains. Overall, the figure highlights the unevenness of policy approaches across Europe reflecting diverse national strategies, institutional settings, and economic priorities in addressing the twin transition.

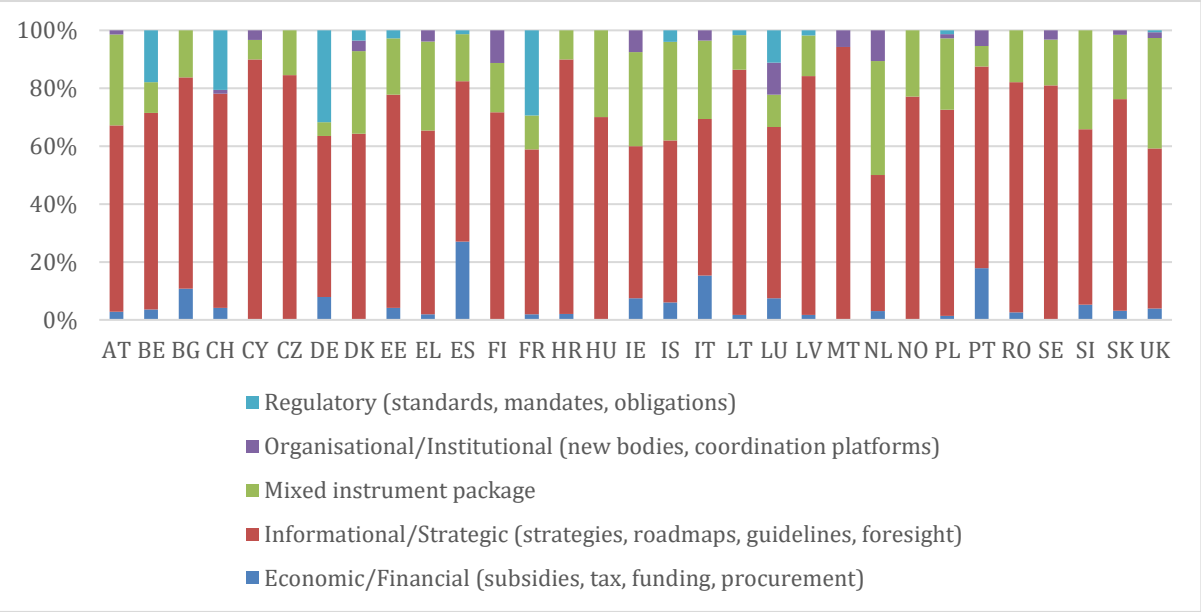

Figure 9: Distribution of policy instrument types across EU/EFTA countries.

Figure 9 examines how countries govern the twin transition, focusing on the types of policy instruments they use rather than the domains they target. Across all countries, informational and strategic instruments clearly dominate, confirming a shared governance style in which policies are primarily articulated through strategies, plans, and roadmaps. This pattern is especially pronounced in countries such as the United Kingdom (84), Switzerland (54), Estonia (53), Poland (52), Sweden (51), and Lithuania (50). Mixed instrument packages emerge as the second most common approach, particularly in the United Kingdom (58), the Netherlands (26), Italy (23), and Austria (22), indicating that many policies combine multiple tools. In contrast, economic and financial instruments are more selective, through visible in countries like Spain (20), Italy (13), and Portugal (10), while regulatory instruments remain limited overall, with some relative prominence in Germany (20), Switzerland and France (15 each). Organisational and institutional tools are rare across the board, appearing only marginally in a few cases.

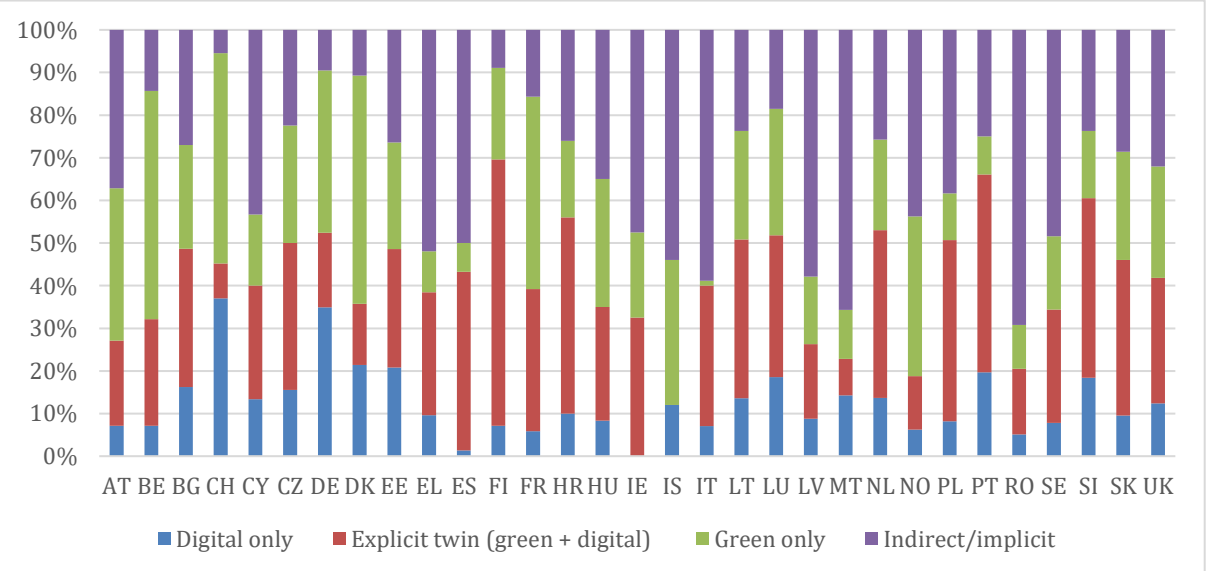

Figure 10: Distribution of policy orientation across EU/EFTA countries, distinguishing between digital-only, green-only, explicit twin (green and digital), and indirect/implicit approaches

Figure 10 examines national differences in transition focus, showing how countries position their policies in relation to the green and digital transition. Overall, policies are predominantly framed as either indirect/implicit or explicit twin-transition measures, indicating both a growing integration of green and digital agendas and a continued reliance on broader, non-explicit policy framing. However, country profiles are heterogeneous: many combine explicit twin, green-only, and indirect approaches, while digital-only policies are rarely dominant. High shares of indirect/implicit policies, such as in Italy (50), the United Kingdom (49), Spain (37), Latvia (33), and Sweden (31), suggest that labour-market adaptation is often embedded in wider policy frameworks. At the same time, strong explicit twin-transition profiles are visible in countries like the United Kingdom (45), Finland (35), Spain (31), Poland (31), and Italy (28), pointing to more integrated policy narratives. Several countries remain more green-oriented, including Switzerland (36), the United Kingdom (40), Austria (25), Germany (24), and France (23), while digital-only policies are comparatively limited, though somewhat more present in Switzerland (27) and Germany (22). Overall, the figure highlights that transition narratives across Europe remain uneven, with some countries advancing integrated approaches and other addressing green and digital priorities separately or indirectly.

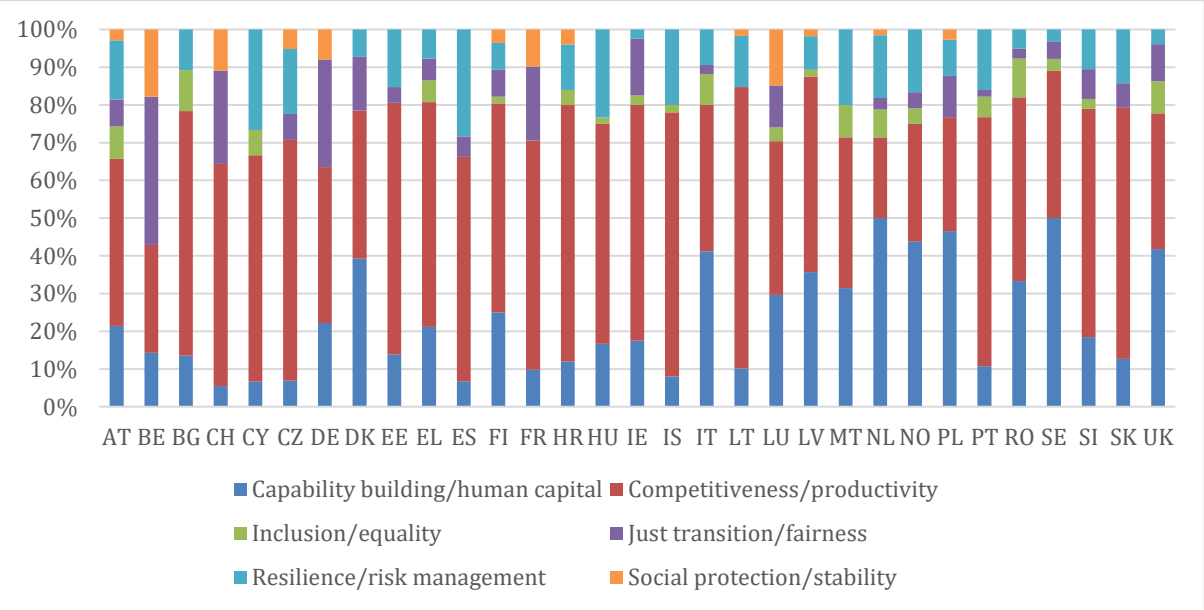

Figure 11: Distribution of labour-market policy narratives across EU/EFTA countries

Figure 11 examines cross-country differences in labour-market discourse, focusing on how policies frame adaptation to the twin transition, whether as a competitiveness, skills, fairness, or resilience issue. Across countries, competitiveness and productivity clearly remain the dominant framing, particularly in cases such as the United Kingdom (55), Estonia (48), Spain (44), Lithuania (44), Switzerland (43), and Slovakia (42), confirming the strong economic orientation of labour-market policies. At the same time, capability building and human capital emerge as a key secondary narrative and, and in some countries, including the United Kingdom (64), Italy (35), the Netherlands (33), Poland (34), and Sweden (32), even surpass competitiveness, highlighting a significant focus on skills and workforce development. Other narratives remain less central: just transition/fairness is visible but secondary, notably in Switzerland (18), Germany (18), and the United Kingdom (15), while resilience appears selectively in countries such as Spain (21), Hungary (14), and Austria and Norway (11 each). Inclusion and social protection are consistently the least prominent framings. Overall, the figure shows as broadly shared but uneven policy

discourse across Europe, combining a dominant economic rationale with a strong, though variable, emphasis on skills.

4.3 Temporal distribution of policies

This section examines the temporal distribution of policies related to the twin transition, highlighting how policy activity has evolved over time. It provides insight into key periods of increased policy attention and helps identify trends in how labour-market adaptation has developed in response to changing economic and political priorities.

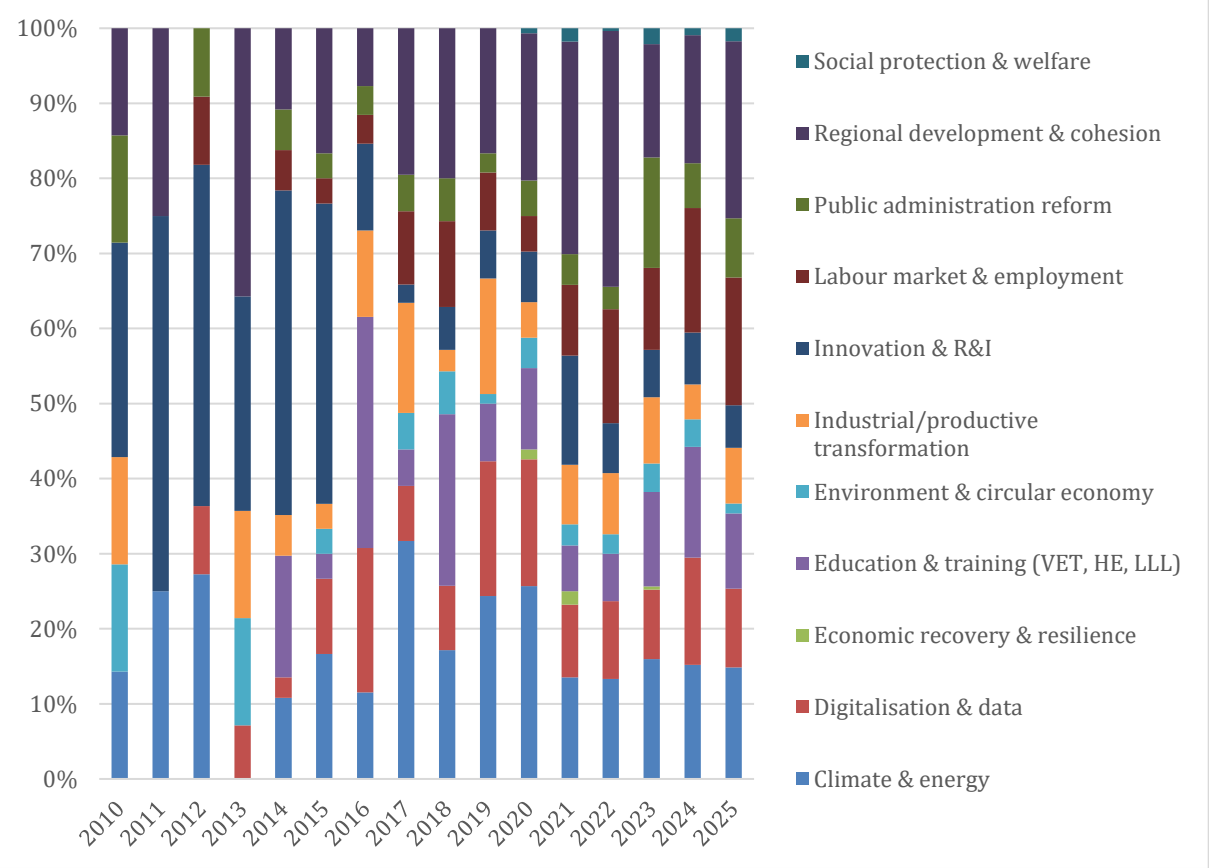

Figure 12: Temporal distribution of policy domains (2010–2025), showing the evolving share of thematic areas.

Figure 12 illustrates the temporal evolution of policy domains between 2010 and 2025, showing how attention to different thematic areas within the twin transition has shifted over time. In the early years, the policy mix is strongly dominated by innovation and R&I and climate and energy, with innovation particularly prominent, indicating a more technology and sector-driven approach. Over time, the policy landscape becomes more diversified, with increasing visibility of digitalisation and data, labour market and employment, and education and training, reflecting a broadening towards skills and workforce adaptation. In recent years, the mix appears more balanced and systemic, with a stronger role for regional development and cohesion and economic recovery and resilience, while domains such as public administration reform and social protection remain comparatively limited. Overall, the figure points to a gradual transition from a narrow innovation-led focus to a more integrated and labour-market-oriented policy approach.

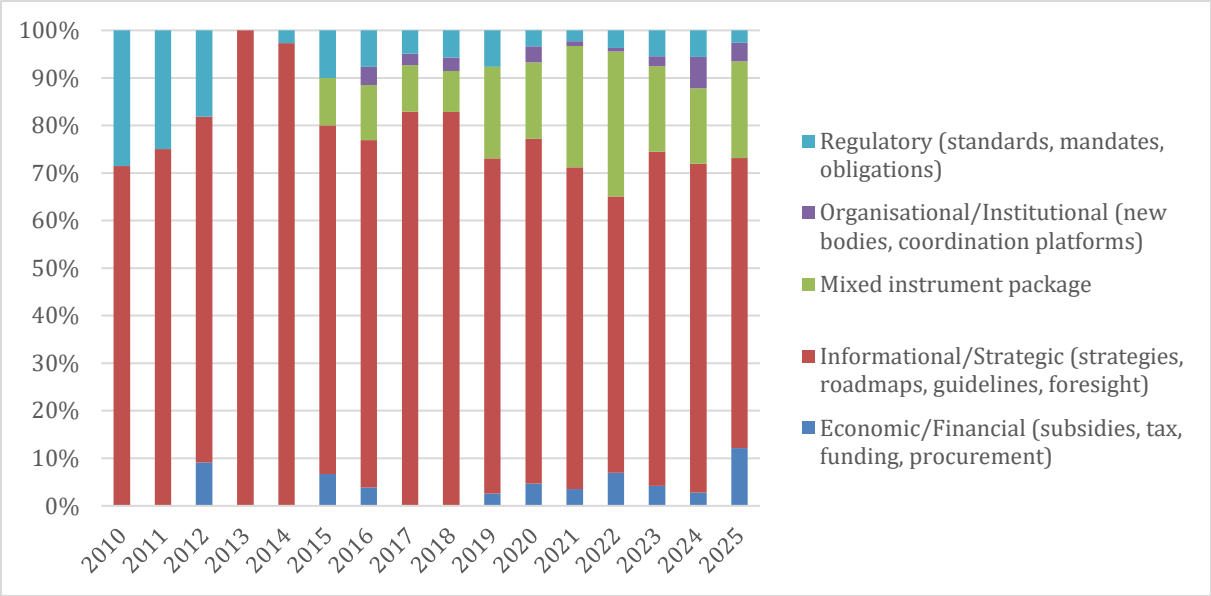

Figure 13: Temporal distribution of policy instrument types (2010–2025).

Figure 13 illustrates how the mix of policy instrument families has evolved over the period 2010-2025, highlighting whether the twin transition is governed primarily through strategies, funding tools, regulation, or combinations of instruments. Throughout the entire period, informational and strategic instruments clearly dominate, especially in the early years, confirming that policy action is mainly steered through strategies, roadmaps, and guidelines rather than binging or financial tools. Over time, however, the instrument mix becomes somewhat more diversified, with a visible increase in mixed instrument packages and, to a lesser extent, economic and financial instruments, particularly after 2018. Despite this gradual shift, regulatory and organisational instruments remain consistently limited. Overall, the figure points to a stable reliance on soft governance approaches, with only modest but notable diversification in recent years.

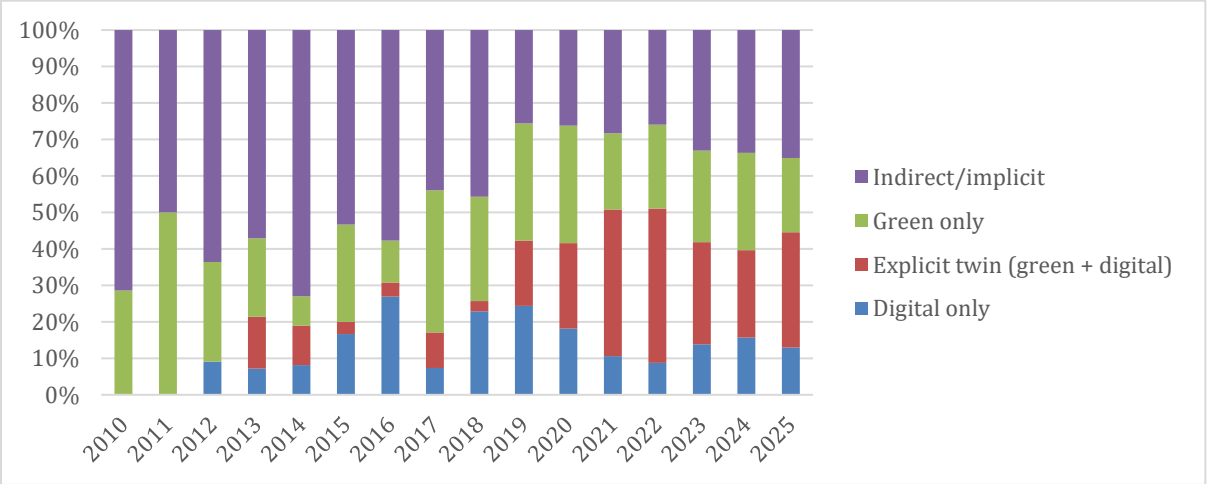

Figure 14: Temporal evolution of policy orientation (2010–2025), showing the share of digital-only, green-only, explicit twin (green and digital), and indirect/implicit policies.

Figure 14 illustrates the evolution of policy orientation between 2010 and 2025, showing how policies engage with the green, digital, and twin transition over time. In the early years, most policies are either indirect/implicit or focused on single domains, particularly green-only

approaches, with very limited presence of digital-only or explicitly integrated strategies. Over time, however, there is a clear shift toward greater integration, with explicit twin-transition policies increasing significantly from around 2018 onwards. While indirect approaches decline, they remain a notable share of the policy landscape. Digital-only policies continue to be comparatively limited throughout, indicating that the transition is increasingly framed as a combined green and digital agenda rather than as separate policy tracks.

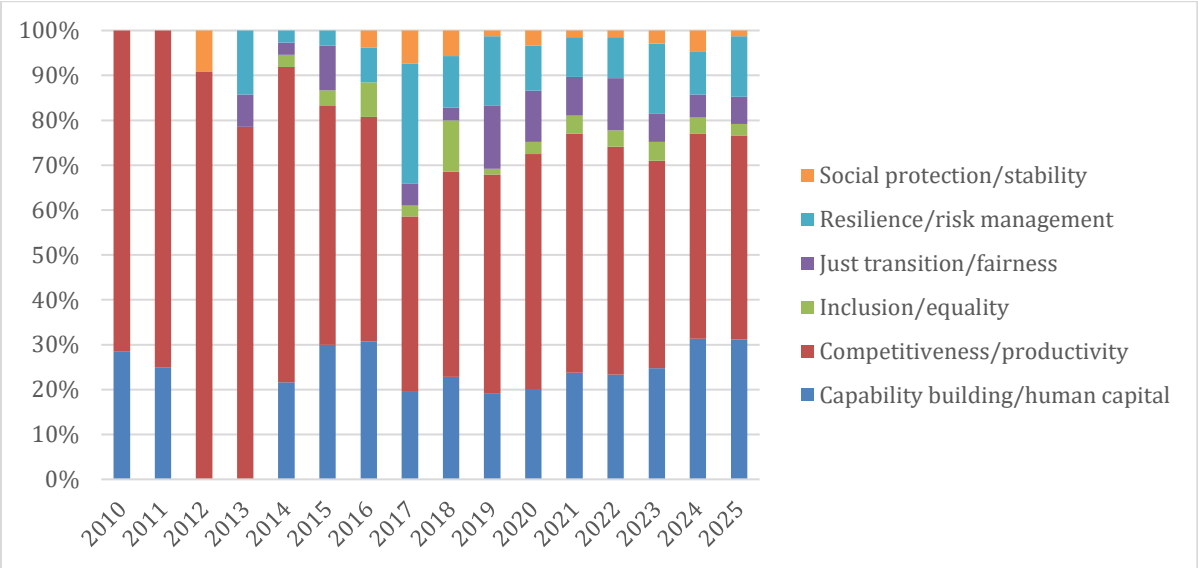

Figure 15: Temporal evolution of labour-market policy narratives (2010–2025).

Figure 15 illustrates how labour-market policies are framed within the twin transition over the period 2010-2025, focusing on underlying policy rationales such as competitiveness, skills, fairness, resilience, and social protection. Throughout the entire period, competitiveness and productivity dominate, with capability building and human capital consistently emerging as the second most prominent framing, especially in earlier years, indicating that labour-market adaptation is primarily justified in terms of economic performance and skills development. Over time, the policy narrative becomes somewhat more diversified, with increasing attention to resilience, inclusion, and just transition considerations, particularly after 2017. However, these remain secondary to the dominant economic and skills-oriented perspectives, while social protection continues to play a comparatively marginal role.

5 Descriptive analysis of mapped policies

This section provides a descriptive overview of the policy mix captured in the dataset examining how labour-market adaptation to the twin transition is shaped across domains, instruments, target groups, governance arrangements, and transition orientations. By tracing patterns across these dimensions, the analysis identifies the main priorities, operational logics, and implementation structures that characterise current policy responses, and highlights how different approaches to green, digital, and labour-market transformation are combined across European contexts.

5.1 Policy domains and instrument types

This subsection examines the main policy domains and instrument types represented in the dataset, providing insight into what policy areas are most prominent and how interventions are

designed. It highlights the thematic focus of policies alongside the tools used to implement them, offering a clearer picture of how labour-market adaptation to the twin transition is being governed across different contexts.

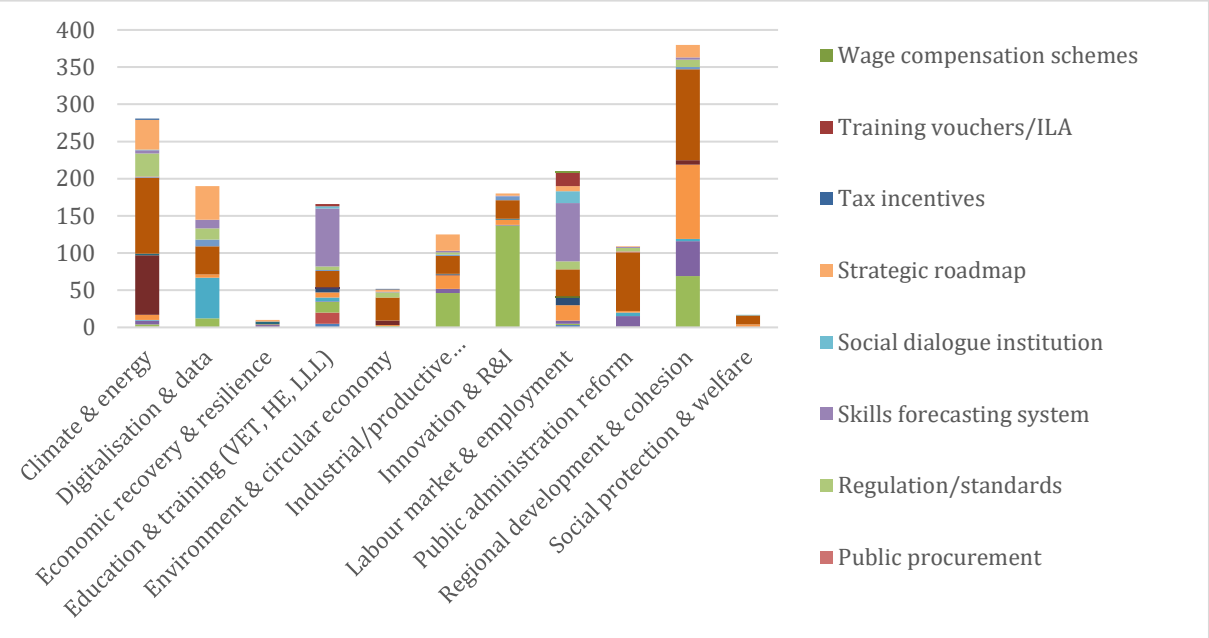

Figure 16: Distribution of policy instruments across thematic areas (domains).

Figure 16 examines policy instrument patterns across the main policy domains, asking which tools are most frequently used in areas such as climate, digitalisation, labour markets, innovation, education, and regional cohesion, and where the dominant operational logics of intervention tend to cluster. A clear overarching pattern emerges: the policy mix is concentrated around a relatively small set of recurring instruments. Monitoring and reporting obligations dominate by a large margin (491), followed by cluster or platform creation (286), skills forecasting systems (180), direct grants or subsidies (172), and strategic roadmaps (140). This concentration suggests that policy design across domains relies heavily on coordination mechanisms, knowledge and intelligence systems, and strategic steering, complemented by more targeted investment tools rather than a wide diversification of instruments.

At the same time, the figure highlights important domain-specific variation in how these core tools are deployed. Climate and energy policy combines compliance mechanisms, infrastructure investment, and long-term direction-setting, while digitalisation policies focus more strongly on infrastructure roll-out supported by strategic planning. Education and training, as well as labour-market policy , are both strongly centred on skills forecasting systems, though the latter also integrates more direct support instruments such as grants and training vouchers. Innovation and R&I stand out for their strong emphasis on cluster and platform creation, reflecting a network and ecosystem-oriented approach. Similarly, industrial transformation policies blend coordination tools, strategic roadmaps, and selective financial support. Regional development and cohesion policies exhibit the most balanced mix, combining monitoring obligations, substantial direct funding, cluster, based coordination, and conditional funding mechanisms, pointing to a comprehensive approach that integrates financial support with governance and territorial coordination.

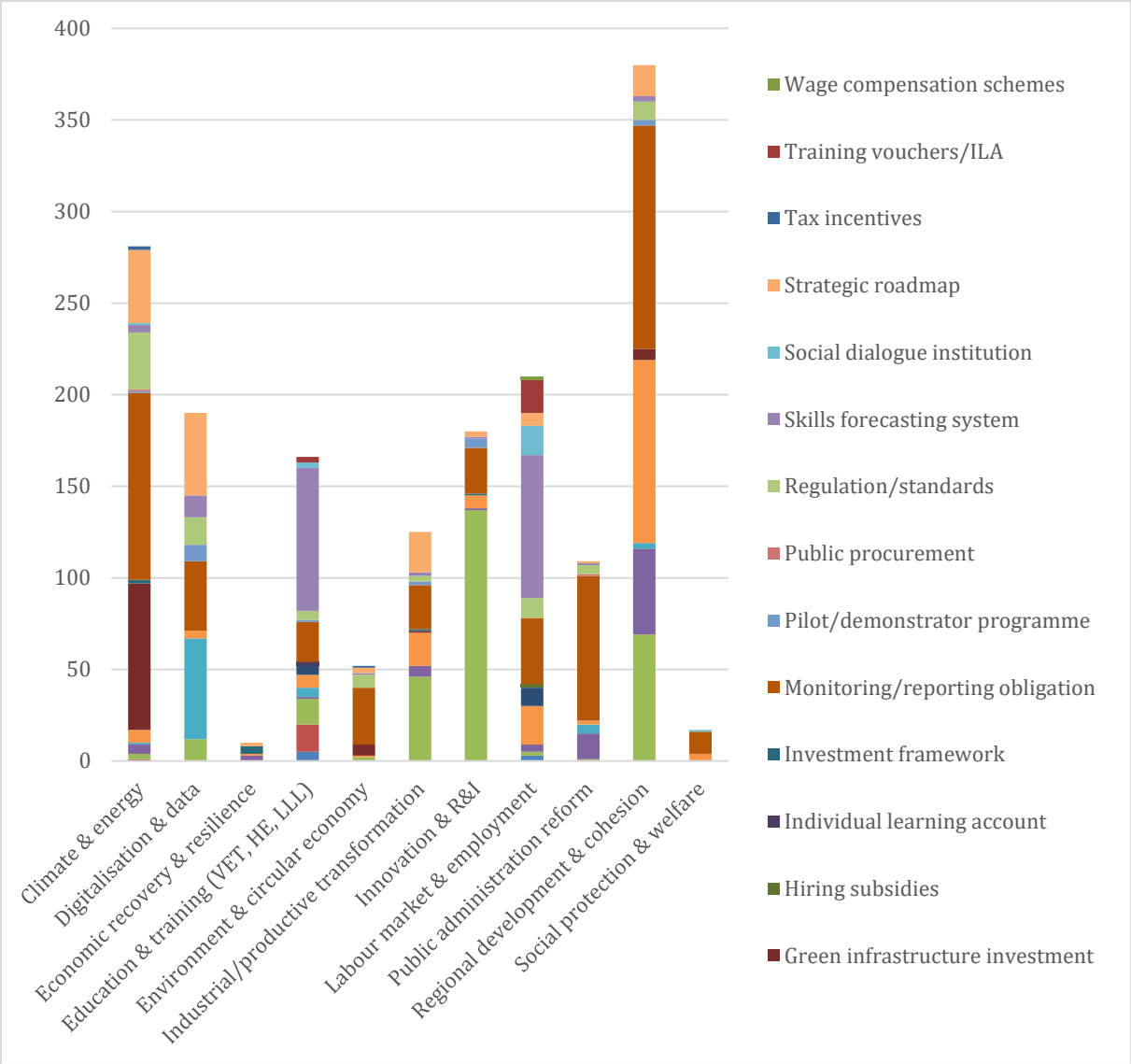

Figure 17: Primary instrument mix across key policy domains.

Figure 17 examines the leading primary policy instrument subtypes across key policy domains, focusing on which concrete tools are most frequently associated with each area and what this reveal about the operational design of the policy mix. As reflected in the chart, a wide range of instruments, such as monitoring obligations, strategic roadmaps, skill systems, and financial incentives, are distributed unevenly across domains. Regional development and cohesion and climate and energy display the highest overall concentration of instruments, with monitoring/reporting requirements and investment-related tools particularly prominent, while domains like economic recovery and resilience and social protection and welfare show more limited and less diversifies mixes. Notably, Figure 15 reproduces the same underlying data structure as Figure 14, confirming that the policy landscape is shaped by a consistent core set of instruments.

Across all domains, monitoring and reporting obligations emerge as the most frequent primary subtype, followed by cluster or platform creation, skills forecasting systems, direct grants or subsidies, and strategic roadmaps. This reinforces the view that the policy mix is strongly oriented toward coordination, knowledge generation, and strategic steering, complemented by targeted financial support. At the domain level, distinct operational logics become visible: climate and

energy policies are driven by compliance mechanisms and green infrastructure investment; digitalisation policies prioritise digital infrastructure alongside strategic guidance; and both education and labour-market policies rely heavily on skills forecasting systems, highlighting the centrality of labour-market intelligence. Innovation and R&I are dominated by cluster or platform creation, pointing to an ecosystem-based approach, while regional development and cohesion combine monitoring, grants, and conditional funding, reflecting a comprehensive model that integrates financial support with governance and territorial coordination.

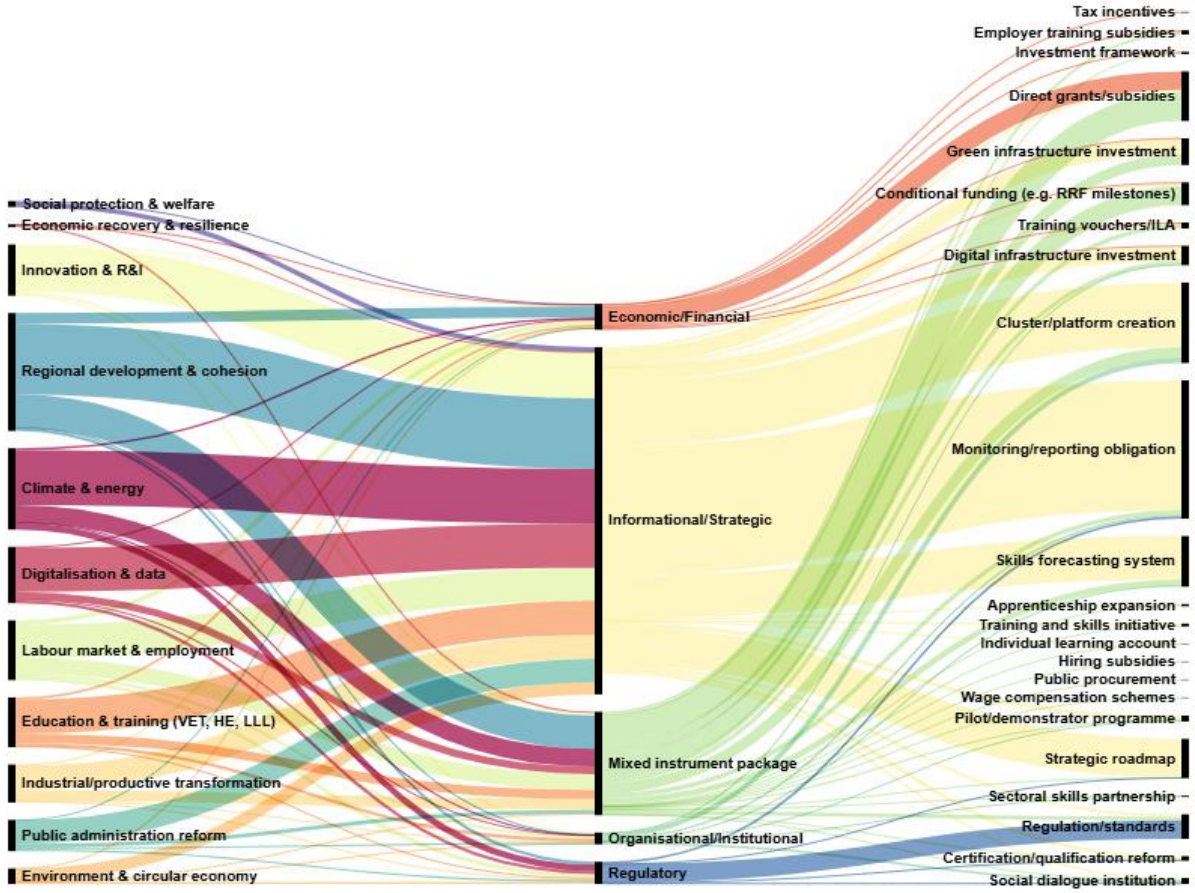

Figure 18: Flows from policy domains to instrument types and specific policy tools.

Figure 18 visualises the flows from policy domains to instrument families, and further to specific operational subtypes, offering an integrated view of how the broader transition policy mix is structured. The figure is designed to identify the dominant pathways through which policy domains connect to concrete interventions and where the overall mix is most concentrated. A clear overarching pattern is the central role of informational and strategic instruments, which act as the main hub linking most domains to specific tools. Within this category, monitoring and reporting obligations appear as the most prominent subtype, followed by cluster/platform creation and skills forecasting systems. This suggests that the policy mix is strongly oriented toward coordination, knowledge generation, and strategic steering, rather than relying primarily on purely financial or regulatory mechanisms.

At the domain level, distinct pathways can be observed in how different sectors connect to instrument families and subtypes. Regional development & cohesion and climate & energy generate the largest flows, reflecting their reliance on a combination of strategic coordination and financial support instruments. Innovation and R&I is closely associated with cluster and platform creation, pointing to an ecosystem-based approach, while labour-market and education policies

are strongly linked to skills forecasting systems and training-related tools, highlighting the importance of labour market intelligence and human capital development. Digitalisation policies show strong connections to digital infrastructure investment and strategic roadmaps, whereas economic and financial instruments, such as grants, conditional funding, and tax incentives, play a complementary but cross-cutting role across several domains. However, it is important to note than the in the current draft, the figure is presented without an embedded, readable source table, meaning that these patterns cannot yet be quantitatively verified and should be interpreted as indicative rather than definitive.

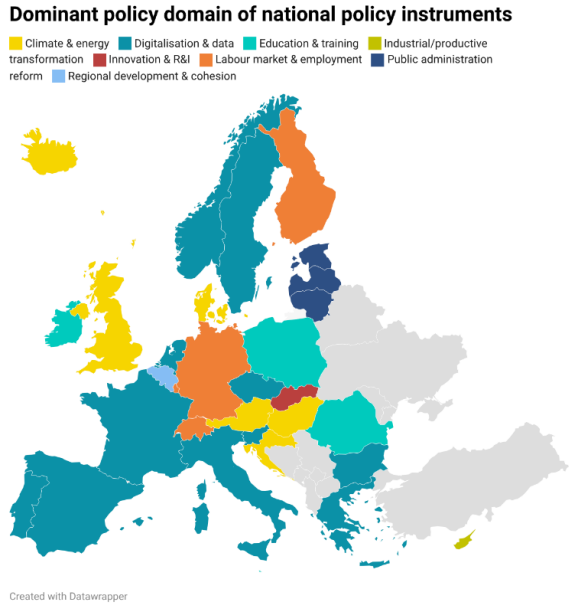

Figure 19: Dominant policy domains of national policy instruments across European countries

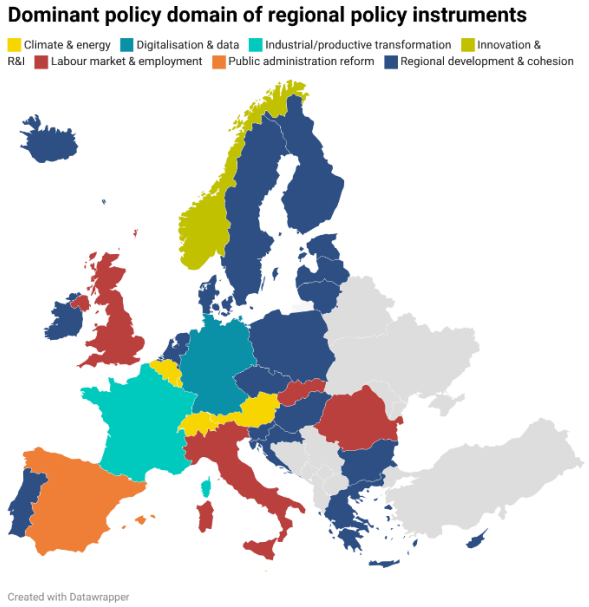

Figure 20: Dominant policy domains of regional policy instruments across European countries

Figures 19 and 20 map the dominant policy domains of national regional policy instruments across European countries, revealing both shared priorities and important differences in hoe policy focus is distributed across governance levels. At the national level, the landscape is relatively diverse, with climate & energy, digitalisation & data, and labour market & employment frequently emerging as dominant domains across different parts of Europe. Western and Southern European countries show a stronger emphasis on digitalisation & data, while climate features prominently in Central Europe, UK and two Nordic countries. Labour market policies are particularly visible in Central Europe, and education & training appears as a key priority in some Eastern and Central European countries. Overall, national policy mixes reflect broad strategic agendas linked to green and digital transitions, as well as labour market adaptation, with innovation and industrial transformation appearing more selectively.

At the regional instrument level, however, the pattern becomes more concentrated and territorially oriented. Regional development & cohesion clearly emerges as the most widespread dominant domain, especially across Northern, Central and Eastern Europe, highlighting the importance of addressing territorial disparities and supporting balanced regional growth. Labour market & employment policies also play a stronger and more geographically clustered role at the regional instrument level, particularly in Southern and Eastern Europe. Compared to national policies, domains such as climate & energy and digitalisation are less uniformly dominant regional and ted to appear in more specific contexts. The comparison suggests a division of policy roles across governance levels: national policies are more oriented toward overarching transition

priorities (green, digital, and systemic reforms), while regional policies are more focused on implementation, territorial cohesion, and labour market outcomes.

5.2 Twin transition orientation

This section examines the orientation of policy instruments in relation to the twin transition, distinguishing between green, digital, and explicitly integrated (twin transition) approaches. It explores how strongly policies prioritise each dimension and the extent to which environmental and digital objectives are addressed separately or in a coordinated manner.

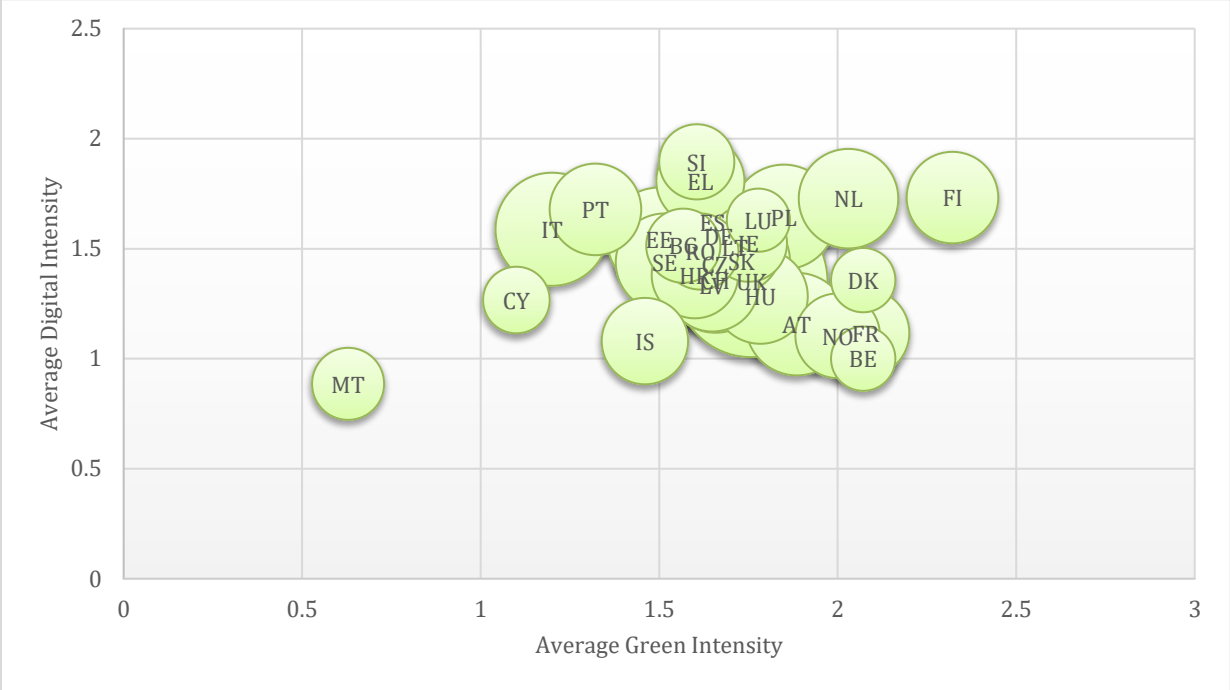

Figure 21: Distribution of countries by average green and digital policy intensity

Figure 21 maps European countries according to the average intensity of green and digital policy objectives within their national and regional policy mixes. Most countries are clustered in the mid-to-high range on both axes, indicating that both green and digital priorities are widely embedded across the policy landscape. This suggests a general alignment with the twin transition agenda, where environmental and digital objectives are pursued in parallel. However, the distribution is not perfectly balanced, with many countries positioned slightly further along the green axis than the digital one, pointing to a somewhat stronger emphasis on environmental priorities overall.

At the same time, the figure highlights variation in how countries combine these two dimensions. A number of countries, such as Finland and the Netherlands, appear in the upper-right area of the chart, reflecting relatively high intensity on both green and digital fronts. Others show a more uneven profile, combining strong green intensity with more moderate digital engagement, while a smaller number of countries are positioned closer to the lower end of the one or both axes. Overall, the pattern indicates a broadly shared commitment to the twin transition across Europe, but with differing degrees of balance and intensity in how green and digital objectives are integrated into national policy frameworks.

	Green Intensity			
	0	**1**	**2**	**3**
Digital only	208	31		

	Digital Intensity			
	0	**1**	**2**	**3**
Digital only		1	34	204

Explicit twin (green + digital)		12	416	112	**Explicit twin (green + digital)**		21	454	65
Green only			61	381	**Green only**	279	163		
Indirect/implicit	117	387	90	12	**Indirect/implicit**	54	434	103	15

Figure 22:Policy instrument distribution by green and digital intensity and twin orientation

Figure 22 analyses how policy instrument categories, digital-only, green-only, explicit twin, and indirect/implicit, align with their respective green and digital intensity levels. A clear overall pattern is the strong internal consistency between policy labels and coded intensity. Digital-only instruments show high digital but minimal green intensity, while green-only instruments display the opposite. Explicit twin-transition policies cluster at medium-to-high intensity on both dimensions, indicating integrated approaches, whereas indirect or implicit instruments are concentrated at lower intensity levels, reflecting more diffuse engagement with transition objectives.

Looking across both dimensions, a consistent asymmetry emerges. Green-only instruments are strongly concentrated at the highest green intensity levels, while digital-only instruments peak at the highest digital intensity levels, confirming their specialised focus. Explicit twin policies occupy mainly mid-to-high intensity ranges for both green and digital dimensions, suggesting that integration typically occurs at an operational rather than fully dominant level. Indirect policies, by contrast, are concentrated at low-to-moderate intensity levels in both cases, indicating widespread but less central inclusion of transition objectives. Overall, the comparison highlights a policy mix where green priorities are more deeply embedded, while digital elements are increasingly integrated but more unevenly distributed across policy types.

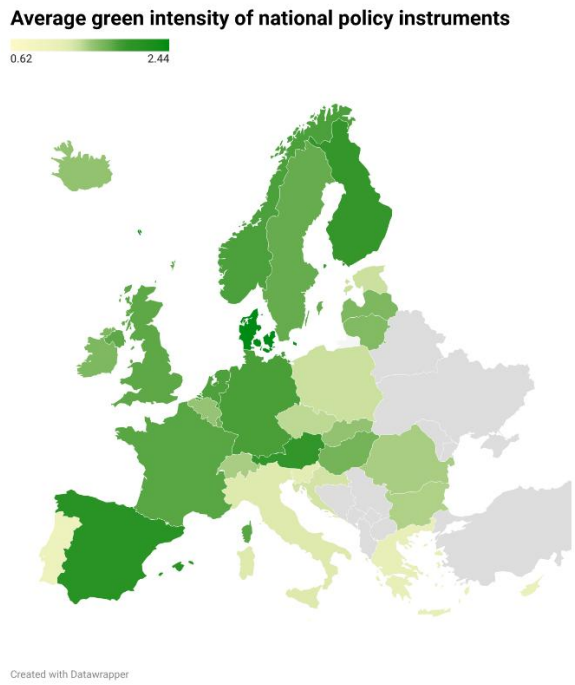

Figure 23: Average green policy intensity of national policy instruments across European countries

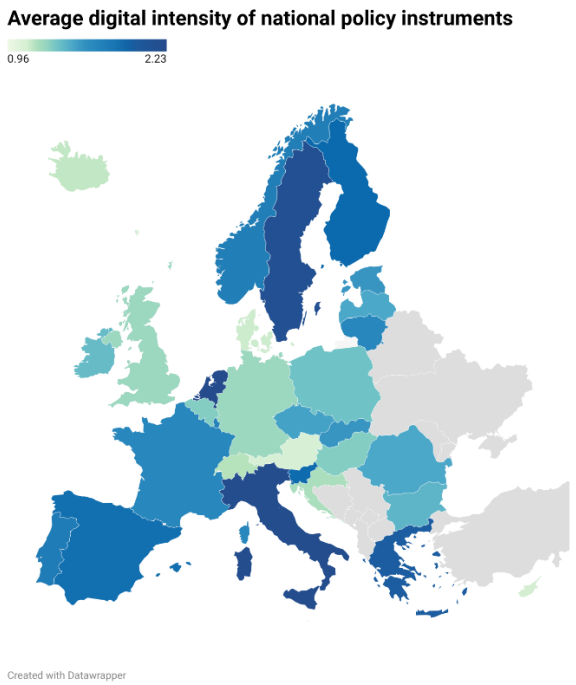

Figure 24: Average digital policy intensity of national policy instruments across European countries

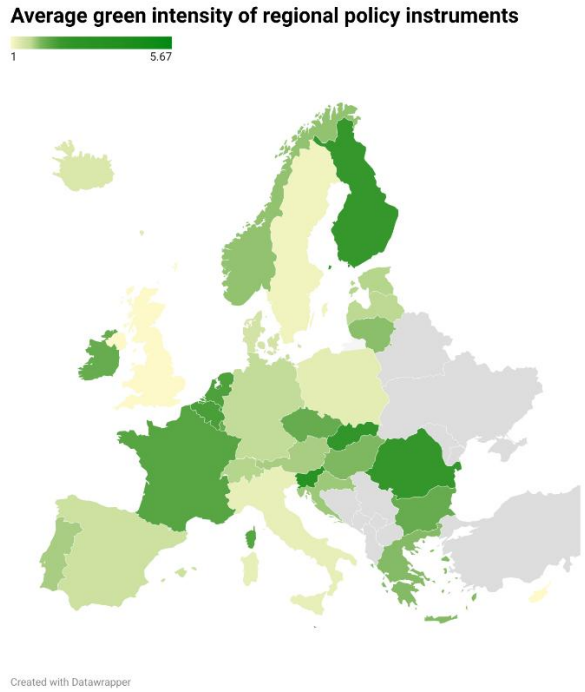

Figure 25: Average green policy intensity of regional policy instruments across European countries

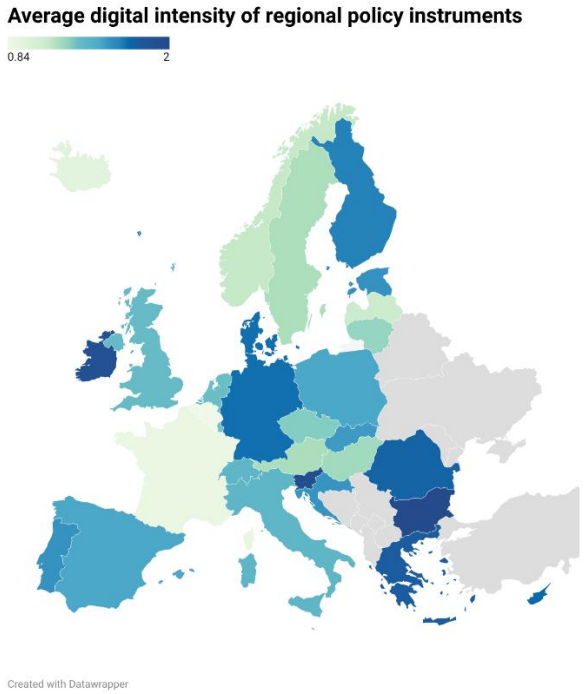

Figure 26:Average digital policy intensity of regional policy instruments across European countries

Taken together, the four figures (Figures 23-26) provide a comparative view of how green and digital policy intensity is distributed across Europe at both national and regional policy instrument levels. Ath the national policy instrument level, green intensity appears relatively strong and widespread, particularly in Western and Northern Europe, indicating a broad and consistent integration of environmental objective into national policy frameworks. Digital intensity is also widely present but shows a more differentiated pattern, with stronger concentrations in Northern and parts of Southern Europe, and more variation across Central and Eastern countries. Overall,

national policy mixes suggest a relatively balanced engagement with the twin transition albeit with a slightly stronger emphasis on green priorities.

At the regional policy instrument level, the patterns become more uneven and territorially differentiated. Green intensity is notably higher in several countries in Eastern and South-Eastern Europe, suggesting that regional policy plays a key role in delivering environmental objectives in these contexts, potentially linked to cohesion policy and investment frameworks. In contrast, parts of Western and Northern Europe show more strongly embedded at the national. A similar pattern emerges for digital intensity: higher regional digital intensity is concentrated in Central, Eastern, and South-Eastern Europe, while Northern and Western countries tend to exhibit more moderate levels, again pointing to differences in how policy responsibilities are distributed across governance levels.

Comparing across levels, a clear division of roles emerges. National policies tend to provide a more consistent and balanced embedding of both green and digital objectives, reflecting overarching strategic priorities. Regional policies, by contrast, appear more variable and context-specific, with stronger intensity in countries where territorial development and cohesion instruments are more prominent. This suggests that while the twin transition is broadly pursued across Europe, its implementation is shaped by multi-level governance dynamics, with national frameworks setting direction and regional instruments playing a more targeted , and sometimes more intensive, role in specific geographic contexts.

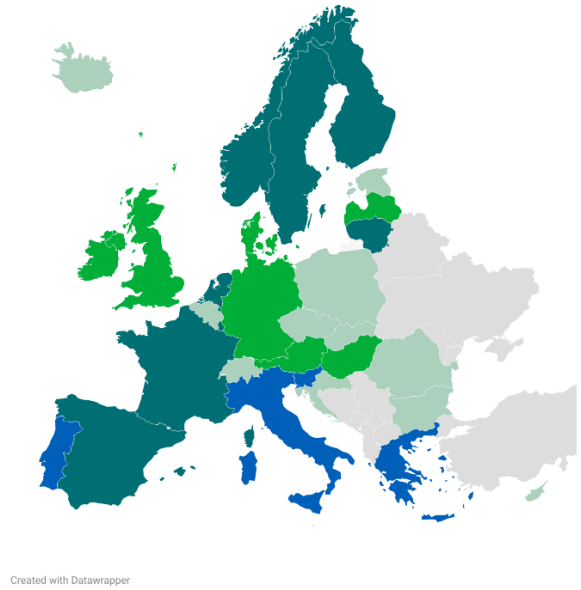

Figure 27: Typology of national policy instruments by combined green and digital intensity

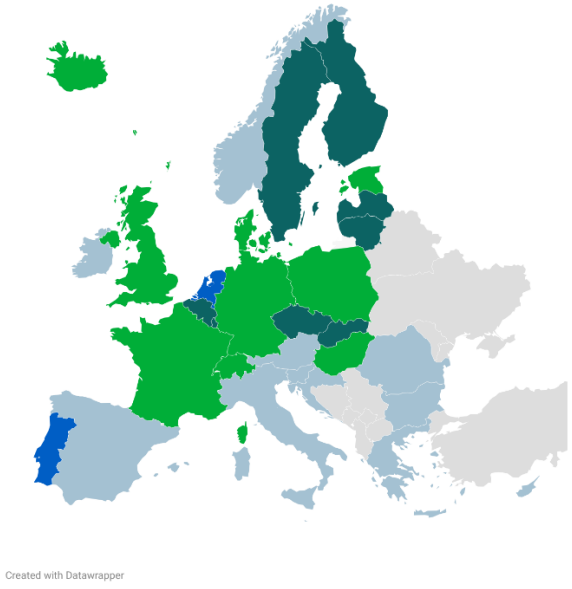

Figure 28: Typology of national policy instruments by transition focus (green, digital, twin, or indirect)

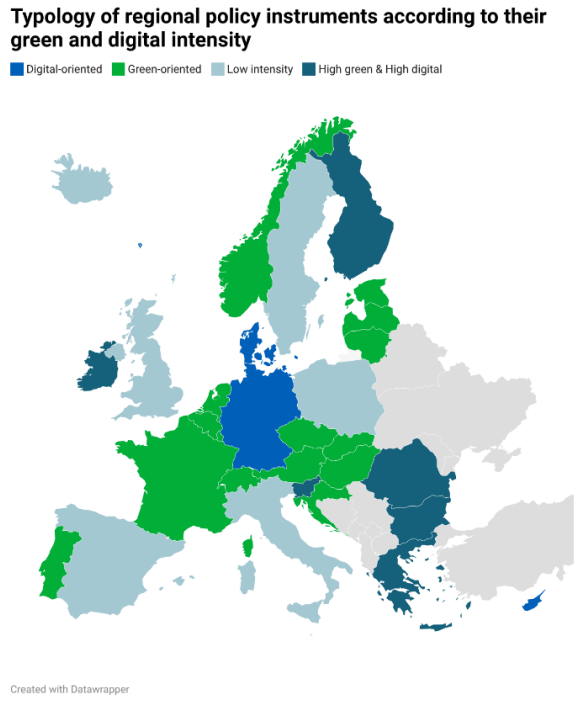

Figure 29: Typology of regional policy instruments by combined green and digital intensity

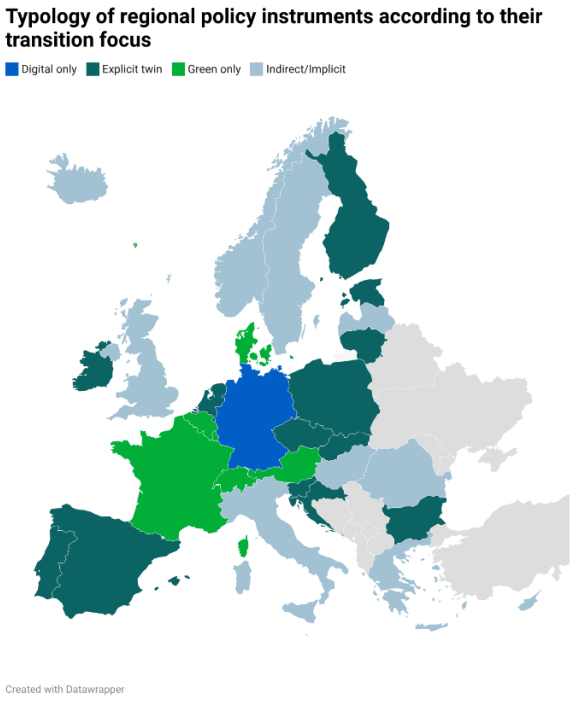

Figure 30: Typology of regional policy instruments by transition focus (green, digital, twin, or indirect)

Taken together, the four figures (Figures 27-30) provide a comparative overview of how national and regional policy instruments are oriented in terms of both combined green-digital intensity and explicit transition focus across Europe. At the national policy level, a clear pattern emerges of relatively strong integration of green and digital objectives in several Northern and Western European countries, which are classified as “high green & high digital”. At the same time, a large share of countries, particularly in Central Europe, remain predominantly green-oriented,

indicating that environmental priorities continue to dominate national policy mixes. This is reinforced by the transition-focus typology, where green-only profiles are widespread, while explicit twin-transition approaches are more concentrated in Northern Europe and digital-only profiles remain relatively rare.

At the regional policy level, the picture becomes more heterogeneous and territorially differentiated. While some countries, particularly in Eastern and South-Eastern Europe, show "high green & high digital" profiles, indication strong integration of both dimensions at the regional level, many others fall into green-oriented or low-intensity categories. This suggests that regional policy instruments often play a more variable role in embedding transition objectives.

The transition-focus typology further highlights that explicit twin-transition approaches are present across both Western and Eastern Europe but coexist with a significant number of indirect or implicit profiles, especially in Northern and South-Eastern regions, pointing to less explicit framing of transition goals in regional policies.

Comparing across governance levels, a clear division of roles can be observed. National policy instruments tend to show more structured and coherent orientations, either strongly green-focused or, in some cases, fully integrated across green and digital dimensions, reflecting overarching strategic priorities. In contrast, regional policy instruments display greater diversity, with a mix of integrated, specialised, and indirect approaches depending on national context and institutional arrangements. Overall, the analysis suggests that while the twin transition is widely present across Europe, its articulation differs by level: national policies provide clearer strategic direction, while regional policies reflect more context-specific implementation patterns, with varying degrees of integration between green and digital objectives.

5.3 Labour market focus

This section examines the extent to which policy instruments across Europe incorporate a labour market focus, including employment support, skills development, and workforce adaptation. It explores how labour market objectives are embedded within broader policy agendas and the role they play in supporting economic transformation and the twin transition.

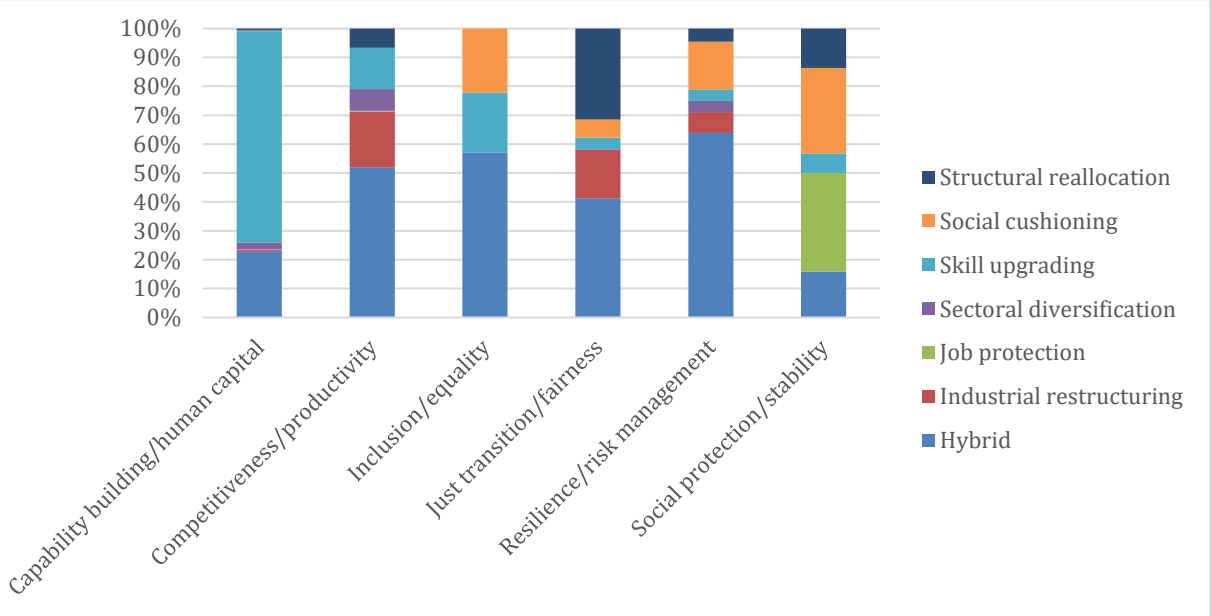

Figure 31: Distribution of policy instruments across key labour market and socio-economic objectives (percentage share)

Figure 31 examines labour-market framing and expected adjustment pathways by showing how different policy objectives map onto distinct labour-adjustment modes for workers, firms, and territories. A clear overall pattern emerges: hybrid adjustment and skill upgrading dominate the dataset, with hybrid adjustment being the largest mode (770), followed by skill upgrading (491) and industrial restructuring (209). The distribution across objectives highlights differentiated policy logics. Capability-building (human capital) policies show the clearest one-to-one relationship, being overwhelmingly driven by skill upgrading (335), confirming a strong prioritisation of training and reskilling. In contrast, competitiveness/productivity framing is characterised by a broad and diversified mix, dominated by hybrid adjustment (466) but also including significant share of industrial restructuring (172), skill upgrading (128), and sectoral diversification (67), reflecting a comprehensive economic adaptation strategy rather than a narrow skills focus. Inclusion/equality follows a similar but smaller-scale mixed pattern, led by hybrid adjustment with complementary roles for social cushioning and skill upgrading. Just transition/fairness stands out for its emphasis on structural change, combining hybrid adjustment (59) with a notable role for structural reallocation (45) and some industrial restructuring, indicating that fairness-oriented policies are more about managing transformation pathways than preserving existing jobs. Resilience/risk management is likewise dominated by hybrid approaches (97), complemented by social cushioning (25), suggesting integrated responses to shocks. Finally, social protection/stability is distinct in its protection-oriented profile, being the only framing where job protection (15) and social cushioning (13) become relatively prominent. Overall, while hybrid approaches underpin most policy areas, each framing aligns with a specific adjustment logic, highlighting the need to tailor policy mixes to different socio-economic objectives.

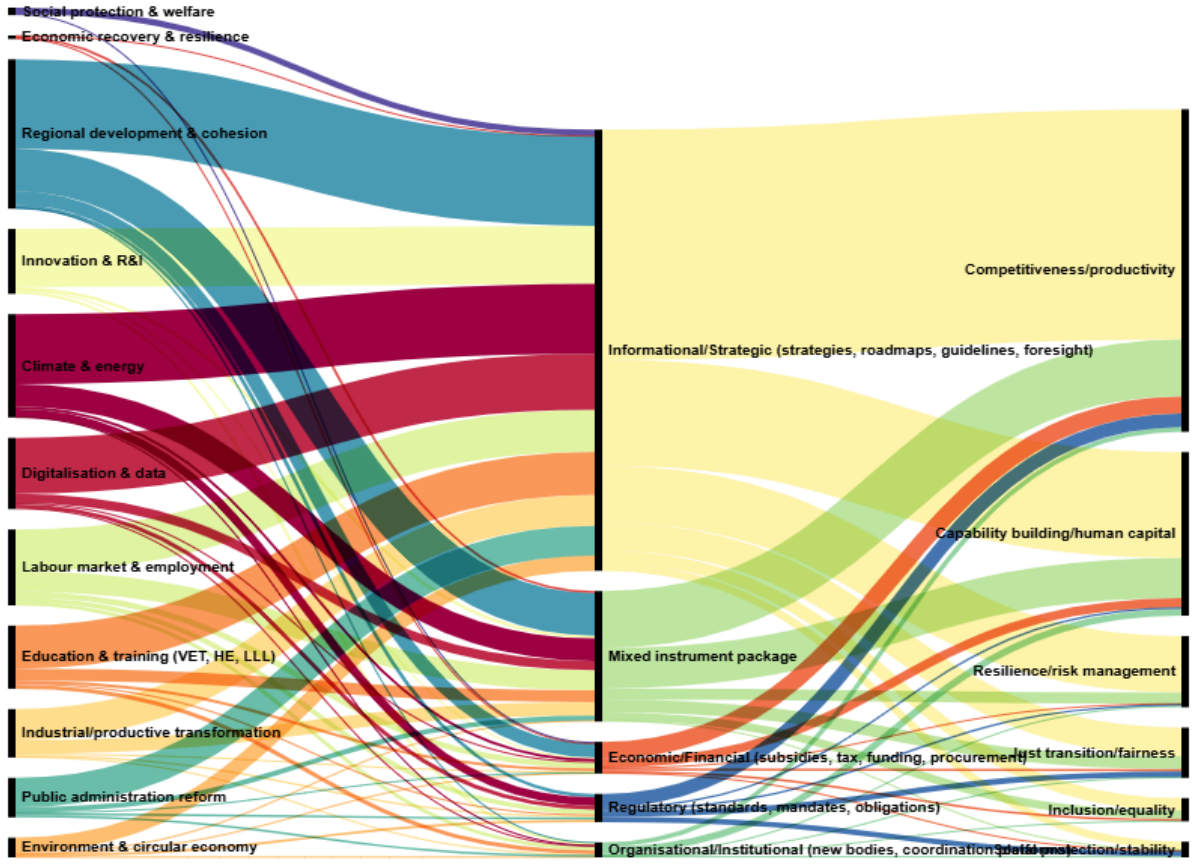

Figure 32: Flows from policy domains through instrument types to socio-economic objectives

Figure 32 maps the flows from policy domains through instrument families to labour-market framings, showing how policy actions are translated into the narratives used to justify transition-related interventions. A clear pattern is the dominance of informational/strategic instruments and mixed packages as the main connectors across the system. Competitiveness/productivity emerges as the central framing, receiving the largest and most diverse inflows, particularly from regional development, climate & energy, and digitalisation, indicating reliance on broad coordinated policy mixes. Capability building/human capital forms a second key pathway, closely linked to education, training, and labour market policies, and mainly channelled through mixed and financial instruments. More moderate but structured flows connect to resilience/risk management and just transition/fairness, reflecting integrated approaches to structural change. In contrast, inclusion/equality and social protection/stability receive thinner, more targeted flows, relying relatively more on economic and regulatory tools. Overall, the figure highlights how policy domains and instruments align with distinct labour-market narratives, though the current image-only format limits detailed quantitative interpretation.

5.4 Target groups

This section focuses on target groups, highlighting who policies are designed to support across workers, firms, sectors, and territories. Analysing target groups strengthens the overall assessment by revealing how interventions are distributed, identifying potential gaps or overlaps, and clarifying whether policy mixes are effectively aligned with the needs of those most affected by socio-economic transitions.

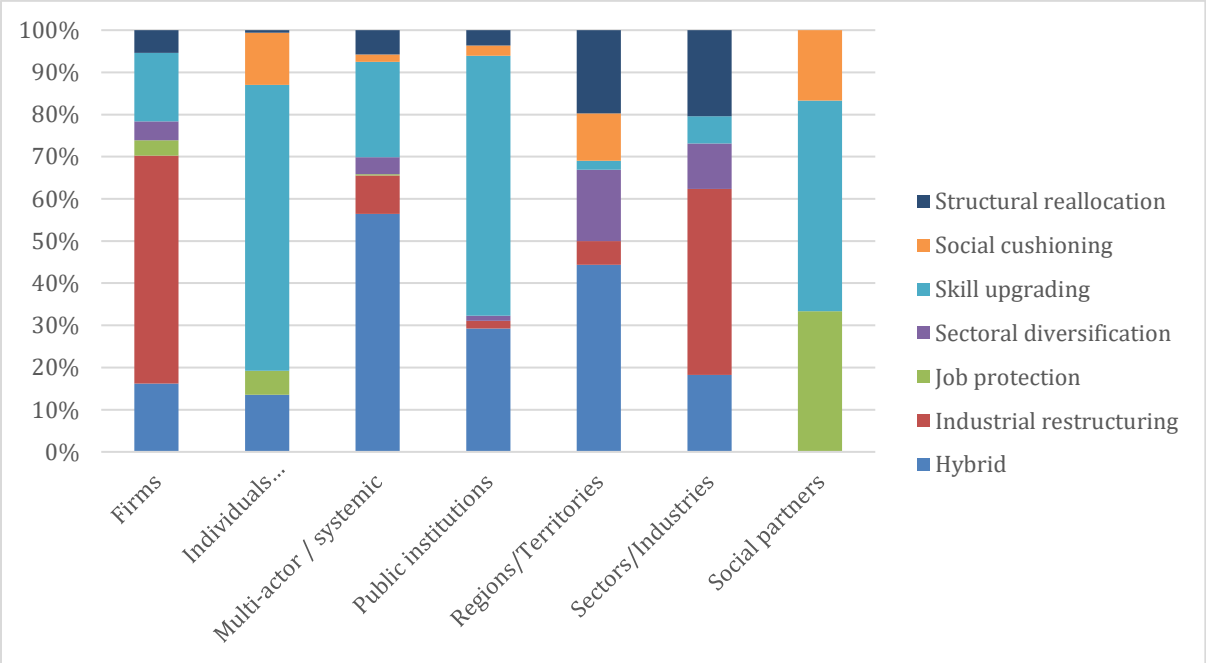

Figure 33: Distribution of labour-adjustment modes across policy target groups (percentage share)

Figure 33 shows how expected labour-market adjustments vary across different target groups, capturing the types of changes anticipated for each actor. Overall, skill upgrading and hybrid approaches emerge as dominant, alongside the widespread role of structural reallocation, particularly for public institutions, regions/territories, and multi-actor/systemic levels, indicating a strong focus on systemic transformation and workforce adaptation. The type of adjustment varies clearly by target group. Individuals and public institutions are strongly associated with skill

upgrading, reflecting an emphasis on reskilling and capacity building, while social partners combine skill upgrading with job protection and social cushioning, highlighting their dual role in workforce development and employment protection. In contrast, firms and sectors/industries are more closely linked to industrial restructuring, with sectors also showing a notable role for structural reallocation, pointing to broader economic transformation processes. Multi-actor/systemic and territorial interventions display more balanced and complex policy mixes, where hybrid approaches and sectoral diversification are more prominent, reflecting the need to coordinate across multiple actors and levels. Social cushioning appears across groups but remains secondary overall. Taken together, the figure shows that policy targeting aligns closely with the nature of adjustment required: skills-focused for individuals and institutions, restructuring-oriented for firms and industries, and more integrated, system-level approaches for territorial and multi-actor contexts.

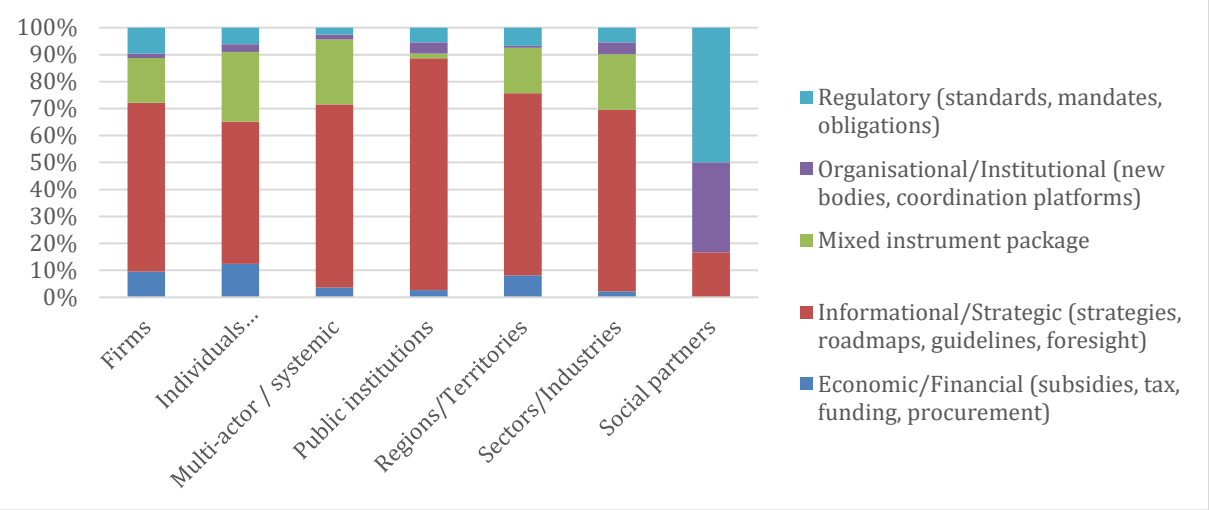

Figure 34: Distribution of policy instrument types across target groups (percentage share)

Figure 34 shows how different policy instrument families are distributed across target groups, highlighting how governance approaches vary depending on the actor being addressed. A clear overall pattern is the dominance of informational/strategic instruments across almost all target levels, particularly for public institutions, indicating that engagement with these actors is primarily driven through strategies, roadmaps, and coordination frameworks. Mixed instrument packages represent the second most important category, especially in system-level and sectoral contexts, reflecting the need for combined tools in more complex or cross-cutting interventions. More variation emerges for specific groups: individuals and firms show a relatively stronger presence of economic/financial and mixed instruments, pointing to more direct and targeted support mechanisms, while social partners stand out for a higher share of organisational/institutional instruments and a comparatively stronger use of regulatory tools, making their instrument mix more balanced than for other groups. Overall, regulatory instruments remain limited across most target levels, reinforcing the broader pattern of a policy system oriented towards strategic coordination rather than direct regulation, while more complex or collective actors require a more diversified and governance-intensive mix of instruments.

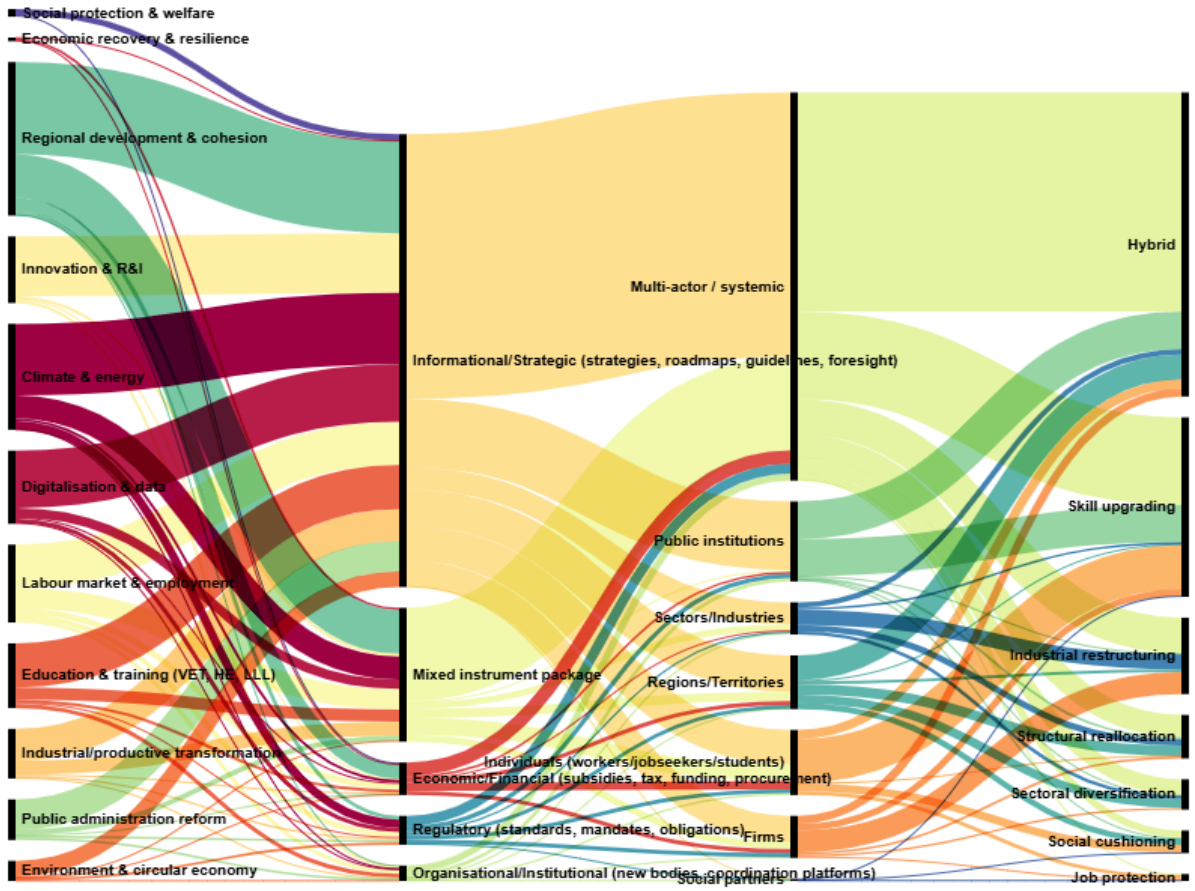

Figure 35: Flows from policy domains through instruments and target groups to labour-adjustment modes

Figure 35 provides a system-level view of how policy domains, instrument families, target groups, and expected labour-market adjustments are interconnected, tracing the full pathway from policy design to anticipated outcomes. A dominant pattern emerges: key domains, particularly regional development & cohesion, innovation & R&I, and climate & energy, flow primarily through informational/strategic instruments and mixed packages towards multi-actors/systemic, institutional, sectoral targets. This highlights a policy architecture strongly oriented towards coordination, strategic guidance, and integrated governance, rather than isolated interventions.
On the outcomes side, these pathways most frequently lead to hybrid adjustment and skill upgrading, confirming that policies are primarily designed to support combined adaptation processes and workforce reskilling. At the same time, industrial restructuring and structural reallocation are more closely associated with flows targeting firms, sectors, and regions, reflecting a focus on broader economic transformation. In contrast, social cushioning and job protection remain comparatively limited, linked to more specific pathways involving individuals or social partners. Overall, the figure underscores a policy mix centred on transformation and adaptation rather than protection, where domains, instruments, and targets interact to produce differentiated but predominantly hybrid adjustment trajectories.

5.5 Governance arrangements

This section examines governance arrangement, focusing on how policies are coordinated, implemented, and managed across actors and levels. Analysing governance helps to clarify the roles of institutions, the degree of coordination and integration, and the effectiveness of policy

delivery, thereby strengthening the understanding of how different policy components translate into actual labour-market outcomes.

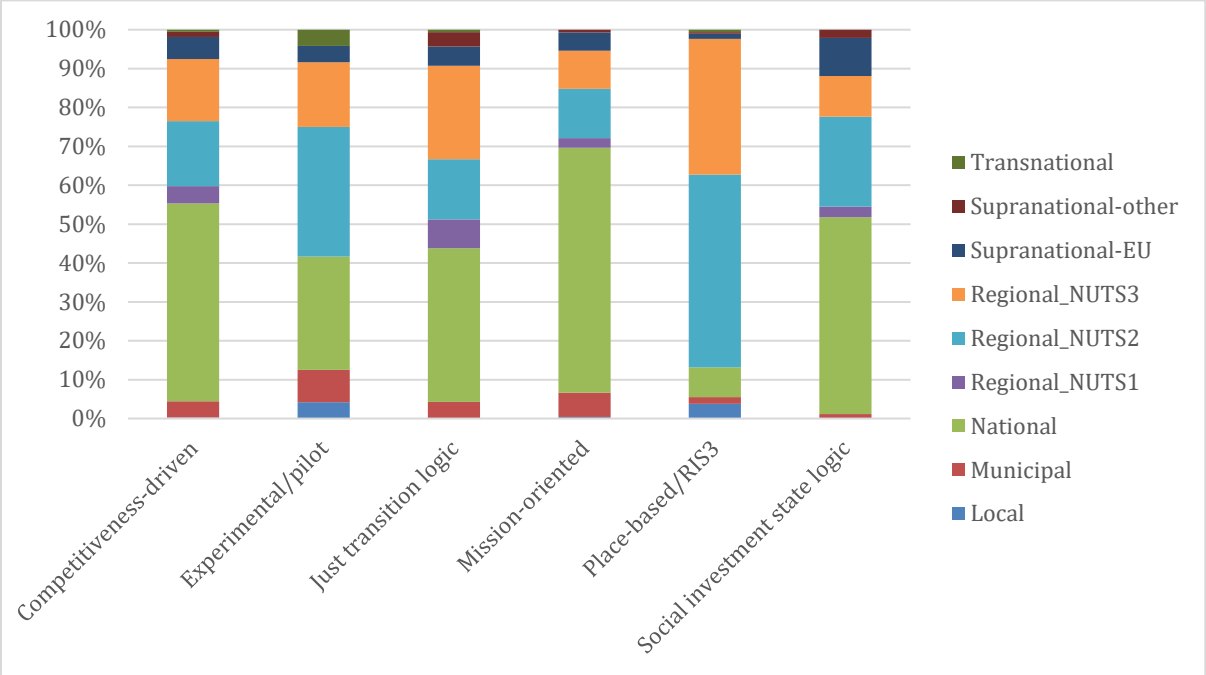

Figure 36: Distribution of governance levels across policy approaches (percentage share)

Figure 36 analyses how governance levels and policy paradigms interact, showing how different policy logics are distributed across EU, national, and regional scales. A clear overall pattern is the dominance of three paradigms, place-based/RIS3 (472), mission-oriented (448), and competitiveness-driven (383), with national-level governance playing a central role, particularly through mission-oriented (282) and competitiveness-driven (195) approaches, alongside social investment and just transition logics. In contrast, regional governance, especially at NUTS2 (234) and NUTS3 (165), is strongly associated with place-based/RIS3 approaches, highlighting the importance of territorial adaptation and regional implementation. This reflects ad clear division of labour, where national policy is more strategic and mission-led, while regional policy is more place-based and context-specific. At the same time, social investment state logic (336) plays a cross-cutting role, while just transition (162) remains more limited and experimental/pilot approaches (24) are clearly marginal. Supranational (EU) governance shows a more balanced mix, led by social investment, competitiveness, and mission-oriented logics, while local and municipal levels remain comparatively limited, with local governance aligned mainly with place-based approaches and municipal levels showing some mission-oriented and competitiveness elements. Overall, the figure highlights a multi-level but national anchored governance system, where regional levels are crucial for tailoring and implementation, and different paradigms align with distinct territorial roles within the transition policy mix.

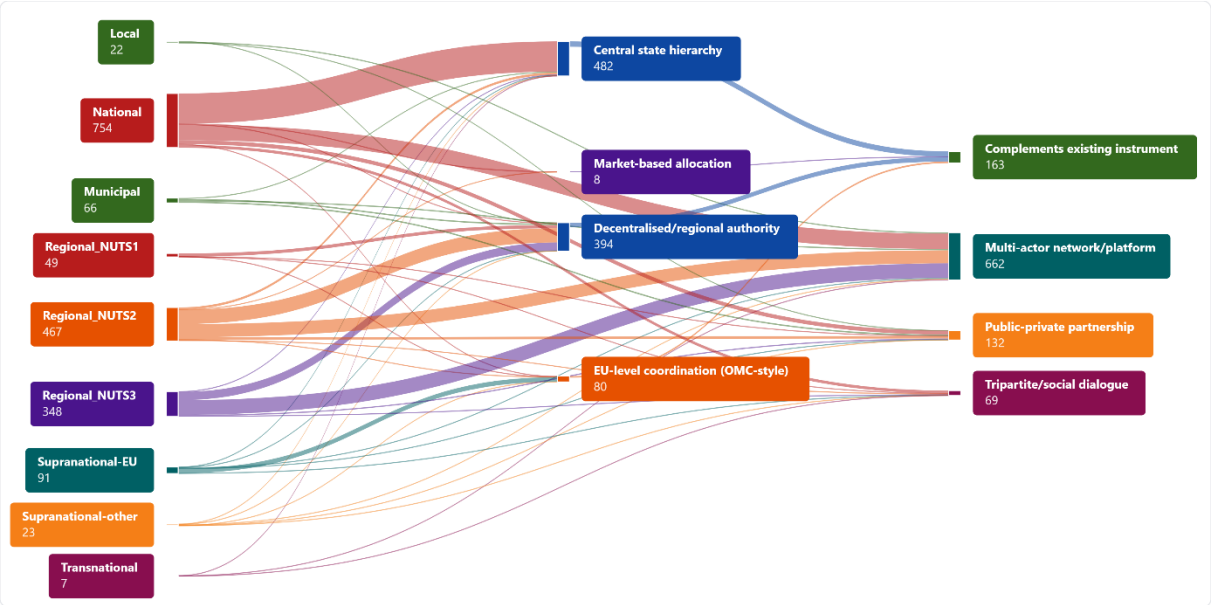

Figure 37: Flows from governance levels through coordination modes to implementation arrangements

Figure 37 maps how governance levels connect to coordination arenas and implementation arrangements, showing how policy mixes are structured and delivered across the system. A clear overall pattern is the dominance of national-level governance, which feeds primarily into a central state hierarchy and, to a lesser extent, decentralised/regional authority, confirming a largely state-centred governance architecture. At the same time, regional levels, especially NUTS2 and NUTS3, are strongly linked to decentralised coordination, acting as key channels into multi-actor networks/platforms, the most prominent implementation mode. This highlights the importance of collaborative and network-based delivery, where policies are often embedded within broader coordination frameworks rather than implemented as stand-alone measures. Supporting this, complementing existing instruments and public-private partnerships also play significant roles, pointing to a layered policy mix built around linked instruments and institutional cooperation, while tripartite/social dialogue remains more targeted. In contrast, EU-level coordination and market-based allocation are relatively limited, and flows from local and supranational levels remain small. Overall, the figure shows that the policy landscape is neither purely hierarchical nor fully decentralised, but rather a hybrid system combining strong national steering with regional coordination and extensive use of networked and layered policy arrangements.

	Competitiveness-driven	Experimental/pilot	Just transition logic	Mission-oriented	Place-based/ RIS3	Social investment state logic
Local	1	1		2	18	
Municipal	16	2	7	28	8	4
National	195	7	64	282	36	170
Regional_NUTS1	17		12	11		9
Regional_NUTS2	65	8	25	57	234	78
Regional_NUTS3	61	4	39	44	165	35
Supranational-EU	22	1	8	21	6	33
Supranational-other	5		6	3	2	7
Transnational	2	1	1		3	

Figure 38: Distribution of governance paradigms across governance levels (number of cases)

Figure 38 reveals clear alignment between governance levels and policy paradigms, with place-based/RIS3, mission-oriented, and competitiveness-driven approaches dominating overall, while experimental approaches remain marginal. National governance is strongly mission- and competitiveness-driven, confirming its strategic role in shaping policy direction, whereas regional levels (especially NUTS2 and NUTS3) are predominantly place-based, highlighting their function in territorial implementation and adaptation. Supranational (EU) governance shows a more balanced mix of paradigms, while local and municipal levels play a more limited but distinct role, with local actors aligned with place-based approaches and municipalities combining mission-oriented and competitiveness logics. Overall, the pattern reflects a clear division of labour, with national levels leading strategy and regional/local levels focusing on place-based delivery.

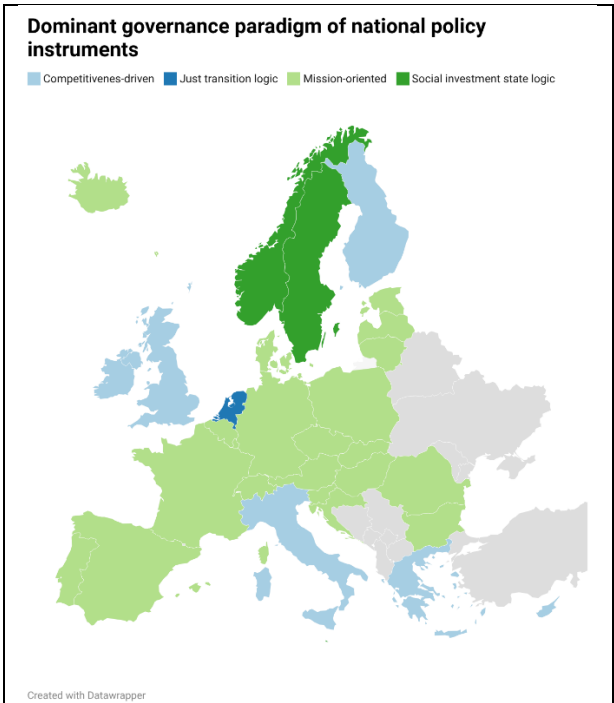

Figure 39: Dominant governance paradigms of national policy instruments across European countries

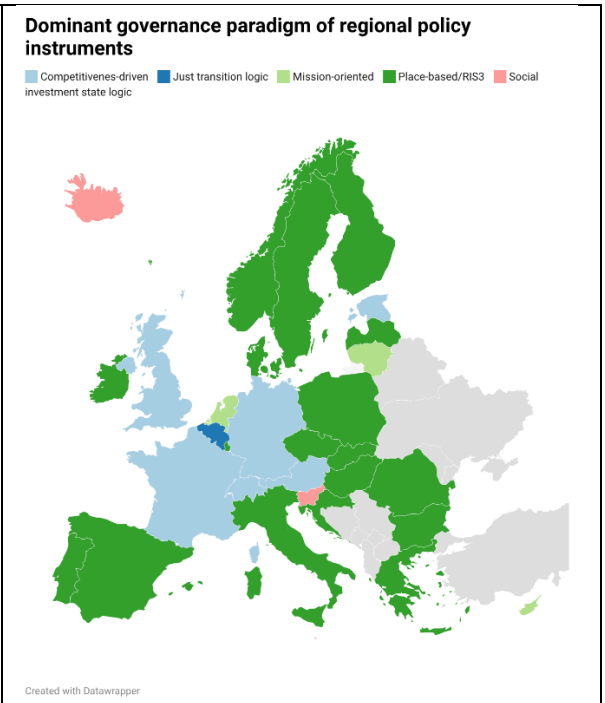

Figure 40: Dominant governance paradigms of regional policy instruments across European countries

Taken together, the two figures (Figures 39 and 40) highlight a clear shift in governance paradigms between national and regional levels across Europe. At the national level, policy is primarily shaped by mission-oriented and social investment state logics, complemented by competitiveness-driven approaches. This reflects a strong emphasis on strategic direction, long-term transformation, and welfare-oriented investment, with national governments playing a central role in setting overarching policy priorities. By contrast, at the regional level, the landscape becomes much more homogeneous and territorially grounded, with place-based/RIS3 approaches dominating across most countries, indicating that regional policy is largely focused on adapting interventions to local economic structures, innovation systems, and development needs.

This contrast points to a clear multi-level division of labour in governance. National policies tend to define broad strategic and mission-led frameworks, while regional policies operationalise these strategies through context-specific, place-based approaches. Other paradigms, such as competitiveness-driven, mission-oriented, or just transition logics, appear more selectively at regional level, reinforcing their secondary role compared to the dominance of territorial

approaches. Overall, the comparison underscores a governance system where strategy is centralised, but implementation is decentralised, combining national-level direction with regionally tailored delivery.

5.6 Key patterns emerging from the mapping

The policy mapping and its descriptive analysis reveals a strong convergence around a core set of policy instruments and domains, with European policy mixes consistently centred on coordination, knowledge generation, and strategic steering. Across domain such as climate & energy digitalisation, labour markets, and regional development, informational/strategic tools, monitoring systems, and coordination platforms dominate, complemented by more targeted financial instruments. This indicates that policy design prioritises guidance, system alignment, and long-term direction-setting, rather than relying primarily on direct regulation or broad financial redistribution.

A second key trend is the growing integration of green and digital objectives, reflecting a widespread commitment to the twin transition. While most countries show relatively balanced engagement with both dimensions, green priorities tend to be more deeply embedded, with digital components integrated more unevenly. At the same time, explicitly "twin" policies are present but often operate at mid-to-high levels of intensity, suggesting that integration is advancing but not yet fully consolidated across all policy areas or countries.

The analysis also highlights a clear labour-market orientation centred on adaptation rather than protection. Across objectives, target groups, and policy flows, hybrid adjustment and skill upgrading dominate, indicating that policies are primarily designed to support workforce reskilling and systemic transformation. Structural change, through industrial restructuring and reallocation, is also prominent, particularly for firms and regions, while protective measures such as job protection and social cushioning remain comparatively limited and targeted.

Finally, a consistent multi-level governance pattern emerges, characterised by a division of labour between national and regional levels. National policies tend to be strategic and mission-oriented, setting overarching priorities, while regional policies are more place-based and implementation-focused, adapting intervention to territorial contexts. This is complemented by a hybrid governance model, combining strong national steering with decentralised coordination and widespread use of multi-actor networks and layered policy instruments. Together, these trends point to a European policy landscape that is strategically coordinated, territorially differentiated, and oriented towards long-term transformation and adaptation.

6 Future research directions

Building on the policy mapping and descriptive analysis, the future research of SkillResilience4EU should move beyond identifying patterns toward evaluating the effectiveness, coherence, and impact of policy mixes in supporting labour-market adaptation to the twin transition. In particular, further work is needed to examine how different combinations of instruments, governance arrangements, and target groups translate into actual outcomes for workers, firms, and regions, and under what conditions policy complementarities enhance or hinder effectiveness. Comparative and longitudinal analyses could provide deeper insight into how policy mixes evolve over time and across contexts, while more fine-grained, case-based studies could help uncover the mechanisms through which policies interact in practice. Overall, advancing this research

agenda will be essential for developing more integrated, adaptive, and evidence-based policy frameworks capable of addressing complex socio-economic transformations.

6.1 Inductive LLM-assisted qualitative analysis of policy narratives

In order to utilise the policy mapping conducted, SkillResilience4EU aims to apply an adapted Gioia methodology to the analysis of policy documents, combining inductive qualitative research principles with large-scale computational processing. The Gioia methodology is widely used in policy and organisational research to systematically move from informant-centric concepts to higher-order theoretical insights, ensuring transparency and traceability in theory building (Gioia et al., 2013). Its relevance for this project lies in its ability to structure complex and heterogeneous policy narratives, such as those related to labour market adaptation and the twin transition, into analytically coherent categories while maintaining close alignment with the original policy language. By integrating this approach with large language models (LLMs), the study will be able to scale inductive analysis across a large corpus of policy documents, while preserving methodological rigour and interpretive depth.

LLMs play a key supporting role through the Gioia methodology process by enhancing the efficiency, consistency, and scalability of qualitative analysis. Built on transformer architectures (Vaswani et al., 2017) and trained large textual corpora (Bommasani et al., 2021; Brown et al., 2020), LLMs are particularly suited to extracting and organising patterns from unstructured policy texts. In our study, they will support systematic concept extraction, clustering, and comparison across documents, helping to surface recurring patterns and relationships that may not be immediately visible through manual coding alone (Bail, 2024). At the same time, their use is carefully constrained: LLMs function as analytical aids rather than epistemic authorities, with all interpretive steps validated by researchers to ensure alignment with qualitative research principles. This combined approach enhances both the rigour and reproducibility of inductive policy analysis while preserving the core logic of grounded theorising.

6.2 Deductive analysis of policy complexity

In addition to the inductive analysis of policy narratives, SkillResilience4EU will apply a deductive analytical lens focused on policy and institutional complexity, enabling a more structured examination of how policy mixes function as integrated systems. Contemporary policy research increasingly recognises that transition challenges, such as climate change, digitalisation, and labour-market transformation, are “complex” or “wicked” problems, characterised by interdependencies, uncertainty and non-linear dynamics (Christensen & Lægreid, 2024). As a result, policy effectiveness depends not only on individual instruments but on how multiple instruments interact, reinforce, or conflict within broader policy mixes (Rogge & Reichardt, 2016). A deductive approach allows the analysis to move beyond description and systematically assess patterns of coordination, complementarities, and tensions across domains, governance levels, and instruments.

This perspective is particularly relevant for understanding policy complementarities, defined as the extent to which different instruments or institutional arrangements mutually reinforce each other in achieving policy goals (AM Vermeulen et al., 2016). For SkillResilience4EU, this approach provides critical added value by enabling a system-level understanding of policy coherence and effectiveness. While inductive analysis captures how policies are framed and narrated, the deductive analysis reveals how policies actually work together (or fail to do so) in practice. This

particularly important in the context of the twin transition, where achieving labour-market adaptation requires coordinated action across domains, instruments, and governance levels. By identifying complementarities, overlaps, and gaps, SkillResilience4EU will contribute to more evidence-based policy design, supporting the development of integrated and resilient policy mixes capable of addressing complex socio-economic transformations.

7 Conclusions

The analysis presented in this deliverable highlights the central role of policy frameworks in shaping labour market adaptation to the twin green and digital transition. By systematically mapping policy instruments across governance levels, domains, and target groups, the report demonstrates that labour market resilience is not driven by isolated interventions but emerges from the interaction of complex and multi-level policy mixes. The findings underline both the diversity and fragmentation of existing policy approaches, as well as the importance of coordination, complementarities, and alignment across institutional contexts. In doing so, the deliverable provides a structured empirical foundation that connects broader structural labour market transformations with the policy mechanisms designed to address them.

Overall, the report reinforces the need for more integrated, adaptive, and evidence-based policy design to effectively respond to the challenges of the twin transition. It contributes to advancing both the empirical and conceptual understanding of how policies support reskilling, upskilling, and workforce transitions, while also identifying key areas where policy coherence and effectiveness can be strengthened. As such, Deliverable 5.1 serves not only as a descriptive mapping exercise but as a critical stepping stone for future analytical work, policy evaluation, and the development of practical tools and recommendations within the SkillResilience4EU project.

7.1 Implications for understanding policy mixes under the twin transition

The descriptive analysis of the policy mapping highlights that policy mixes addressing the twin green and digital transition are inherently multi-level, multi-domain, and instrument-diverse, reflecting the complexity of governing structural transformation in European labour markets. Rather than relying on single policy tools, governments deploy combinations of regulatory, financial, strategic, and organisational instruments, often layered across European, national, and regional levels. This confirms that policy responses to the twin transition are not isolated interventions but interdependent configurations of instruments, where strategic frameworks, funding programmes, and implementation mechanisms interact to shape labour-market outcomes.

A key implication concerns the increasing integration of policy domains and objectives within these policy mixes. The mapping shows that labour market, skills, industrial, digital, and climate policies are frequently combined within single instruments or coordinated through broader frameworks. This reflects a shift towards more holistic and cross-sectoral policy design, where skills development and workforce adaptation are embedded within wider transition strategies rather than treated as standalone policy areas. At the same time, the coexistence of multiple governance logics—such as mission-oriented approaches at the EU level, place-based strategies at the regional level, and social investment perspectives in labour-market policies, suggests that policy mixes are shaped by diverse and sometimes overlapping paradigms.

Finally, the findings point to important challenges related to coordination, coherence, and targeting within policy mixes. While the diversity of instruments and governance arrangements

enables flexibility and context sensitivity, it also increases the risk of fragmentation and uneven implementation across territories. The prominence of targeted and place-based interventions indicates a growing recognition of territorial disparities in the transition process, yet it also underscores the need for stronger vertical and horizontal coordination mechanisms. Overall, the descriptive evidence suggests that understanding policy mixes under the twin transition requires moving beyond individual instruments to analyse how combinations of policies, governance arrangements, and targeting strategies jointly structure labour-market adaptation and resilience.

7.2 Relevance for future analytical work in SkillResilience4EU project

The descriptive analysis provides a crucial empirical foundation that directly informs the next stages of analytical work within the SkillResilience4EU project. By systematically mapping policy instruments across governance levels, domains, and target groups, the dataset enables the transition from descriptive mapping to more theory-driven and methodologically advanced analyses, including both inductive and deductive approaches. In particular, it supports the application of LLM-assisted qualitative methods (e.g. Gioia methodology) to uncover how policy narratives frame labour market adaptation, as well as more structured assessments of policy complexity, complementarities, and coordination within policy mixes.

Furthermore, the mapping aligns closely with the broader objectives of the SkillResilience4EU proposal, which emphasise the development of a comprehensive conceptual framework and evidence-based tools to understand and manage labour market resilience under the twin transition. The structured policy dataset can be integrated with other project components, such as job-skill matrices, regional typologies, and mismatch analyses, to enable multi-dimensional investigation of how policy mixes interact with structural labour market dynamics. This creates opportunities for comparative, cross-regional, and multi-level analyses, as well as for linking policy configurations to observed patterns of skill demand, job creation, and vulnerability across sectors and territories.

Finally, the findings are highly relevant for the project's ambition to generate actionable outputs, including policy recommendations and decision-support tools. By identifying patterns, gaps, and overlaps in existing policy mixes, future analytical work can move towards evaluating the effectiveness, coherence, and targeting of policies, thereby informing the design of more tailored and resilient interventions. In this sense, the descriptive analysis not only structures the empirical basis for further research but also supports the project's broader goal of contributing to evidence-based, integrated policy design and improved governance of labour market transitions under the twin transition.

8 References

Abbott, C., & Fitjar, R. D. (2025). Missions, conditions and the policy transfer of Smart Specialisation in the European Union. *Regional studies*, *59*(1), 2377679.

Alexandri, E., Antón, J.-I., & Lewney, R. (2024). The impact of climate change mitigation policies on European labour markets. *Ecological economics*, *216*, 108022.

Alexopoulos, A., Kostarakos, I., Mylonakis, C., & Varthalitis, P. (2025). The heterogeneous causal effects of the EU's Cohesion Fund. *arXiv preprint arXiv:2504.13223*.

Aloisi, A. (2024). Integrating the EU twin (green and digital) transition? Synergies, tensions and pathways for the future of work. *Colum. J. Eur. L.*, *30*, 326.

AM Vermeulen, P., Zietsma, C., Greenwood, R., & Langley, A. (2016). Strategic responses to institutional complexity. *Strategic Organization*, *14*(4), 277–286.

Ansell, C., & Torfing, J. (2022). *Handbook on theories of governance*. Edward Elgar Publishing.

Bachmann, R., Frattini, F. F., Hauret, L., Kirov, V., Lewandowski, P., Martin, L., Nguyen, U., Storm, E., & Zierahn-Weilage, U. (2024). Skills gaps skill and labour shortages and mismatch—existing evidence. *Institute for Employment Research (IAB), Working Paper or Research Report*.

Bail, C. A. (2024). Can generative AI improve social science? *Proceedings of the national academy of sciences*, *121*(21), e2314021121.

Bandelow, N. C., & Hornung, J. (2019). One discourse to rule them all? Narrating the agenda for labor market policies in France and Germany. *Policy and Society*, *38*(3), 408–428.

Barca, F., McCann, P., & Rodríguez-Pose, A. (2012). The case for regional development intervention: place-based versus place-neutral approaches. *Journal of Regional Science*, *52*(1), 134–152.

Bianchini, S., Damioli, G., & Ghisetti, C. (2023). The environmental effects of the "twin" green and digital transition in European regions. *Environmental and Resource Economics*, *84*(4), 877–918.

Bommasani, R., Hudson, D. A., Adeli, E., Altman, R., Arora, S., von Arx, S., Bernstein, M. S., Bohg, J., Bosselut, A., & Brunskill, E. (2021). On the opportunities and risks of foundation models. *arXiv preprint arXiv:2108.07258*.

Bran, F., Bodislav, D. A., & Rădulescu, C. V. (2019). European multi-level governance. *European Journal of Sustainable Development*, *8*(5), 66–66.

Brans, M., Geva-May, I., & Howlett, M. (2017). *Routledge handbook of comparative policy analysis*. Routledge London.

Brown, T., Mann, B., Ryder, N., Subbiah, M., Kaplan, J. D., Dhariwal, P., Neelakantan, A., Shyam, P., Sastry, G., & Askell, A. (2020). Language models are few-shot learners. *Advances in neural information processing systems*, *33*, 1877–1901.

Busemeyer, M. R. (2014). *Skills and inequality: Partisan politics and the political economy of education reforms in western welfare states*. Cambridge University Press.

Cairney, P. (2025). Why perfect policy coherence is unattainable (and may be ill-advised). *Policy Sciences*, *58*(3), 619–642.

Caloffi, A., Lodi, L., & Biggeri, M. (2024). Conceptualizing "SPES" policy mix (es) for just twin transitions: Policy mapping on Science, Technology, and Innovation initiatives in Europe and other countries.

Capano, G. (2024). Policy instruments. In *Encyclopedia of public policy* (pp. 1–6). Springer.

Capano, G., & Howlett, M. (2020). The knowns and unknowns of policy instrument analysis: Policy tools and the current research agenda on policy mixes. *Sage Open*, *10*(1), 2158244019900568.

Card, D., Kluve, J., & Weber, A. (2018). What works? A meta analysis of recent active labor market program evaluations. *Journal of the European Economic Association*, *16*(3), 894–931.

Cedefop. (2023). *Skills in transition. The way to 2035*.

Cejudo, G. M., & Michel, C. L. (2021). Instruments for policy integration: How policy mixes work together. *Sage Open*, *11*(3), 21582440211032161.

Chhibber, S., Rajkumar, S., & Dassanayake, S. (2025). Will artificial intelligence reshape the global workforce by 2030? A cross-sectoral analysis of job displacement and transformation. *Blockchain, Artificial Intelligence, and Future Research*, *1*(1), 35–51.

Christensen, T., & Lægreid, P. (2024). Complexity in Public Policy. In *Encyclopedia of public policy* (pp. 1–8). Springer.

Di Carlo, D., & Durazzi, N. (2023). Skill formation: part of and complement to the labour market policy mix? *Handbook of Labour Market Policy in Advanced Democracies*, 327–342.

Edmondson, D. L., Kern, F., & Rogge, K. S. (2019). The co-evolution of policy mixes and socio-technical systems: Towards a conceptual framework of policy mix feedback in sustainability transitions. *Research Policy*, *48*(10), 103555.

Fernando, R. N. (2025). Governing the Green Transition: Policy Instruments for Environmental Sustainability.

Flanagan, K., Uyarra, E., & Laranja, M. (2011). Reconceptualising the 'policy mix'for innovation. *Research Policy*, *40*(5), 702–713.

Foray, D. (2014). *Smart specialisation: Opportunities and challenges for regional innovation policy*. Routledge.

Gao, X. (2025). The EU's twin transitions towards sustainability and digital leadership: a coherent or fragmented policy field? *Regional studies*, *59*(1), 2360053.

Geels, F. W., Kern, F., & Clark, W. C. (2023). System transitions research and sustainable development: Challenges, progress, and prospects. *Proceedings of the national academy of sciences*, *120*(47), e2206230120.

Gioia, D. A., Corley, K. G., & Hamilton, A. L. (2013). Seeking qualitative rigor in inductive research: Notes on the Gioia methodology. *Organizational research methods*, *16*(1), 15–31.

Grillitsch, M., Coenen, L., & Morgan, K. (2025). Directionality and subsidiarity: sustainability challenges in regional development policy. *Regional studies*, *59*(1), 2492171.

Haapanala, H. (2023). Effective and fair labour markets: more and focused active labour market policy? *Welfare States in a Turbulent Era*, 180–194.

Halpern, C. (2014). Urban mobility: what role for the European Union? explaining dynamics of European Union policy design since 1995. *European Planning Studies*, *22*(12), 2526–2541.

Hood, C., & Margetts, H. (2007). *The tools of government in the digital age*. Bloomsbury Publishing.

Hooghe, L., & Marks, G. (2001). *Multi-level governance and European integration*. Bloomsbury Publishing PLC.

Hooghe, L., Marks, G., Schakel, A. H., Osterkatz, S. C., Niedzwiecki, S., & Shair-Rosenfield, S. (2016). *Measuring regional authority: A postfunctionalist theory of governance, Volume I*. Oxford University Press.

Hooper, R., Goyal, N., Blok, K., & Scholten, L. (2024). A semi-automated approach to policy-relevant evidence synthesis: combining natural language processing, causal mapping, and graph analytics for public policy. *Policy Sciences*, *57*(4), 875–900.

Howlett, M. (2019). *The policy design primer: Choosing the right tools for the job*. Routledge.

Howlett, M. (2023). *Designing public policies: Principles and instruments*. Routledge.

Howlett, M., Mukherjee, I., & Woo, J. J. (2015). From tools to toolkits in policy design studies: The new design orientation towards policy formulation research. *Policy & Politics*, *43*(2), 291–311.

Kern, F., Rogge, K. S., & Howlett, M. (2019). Policy mixes for sustainability transitions: New approaches and insights through bridging innovation and policy studies. *Research Policy*, *48*(10), 103832.

Kleider, H. (2020). Multilevel governance: Identity, political contestation, and policy. *The British Journal of Politics and International Relations*, *22*(4), 792–799.

Kovacic, Z., García Casañas, C., Argüelles, L., Yáñez Serrano, P., Ribera-Fumaz, R., Prause, L., & March, H. (2024). The twin green and digital transition: High-level policy or science fiction? *Environment and Planning E: Nature and Space*, *7*(6), 2251–2278.

Lambros, C., & Melo, E. (2025). Welfare at Risk: Distributional impact of policy interventions. *arXiv preprint arXiv:2512.20918*.

Liesbet, H., & Gary, M. (2003). Unraveling the central state, but how? Types of multi-level governance. *American political science review*, *97*(2), 233–243.

Lindberg, M. B., Markard, J., & Andersen, A. D. (2019). Policies, actors and sustainability transition pathways: A study of the EU's energy policy mix. *Research Policy*, *48*(10), 103668.

Maggetti, M., & Trein, P. (2019). Multilevel governance and problem-solving: Towards a dynamic theory of multilevel policy-making? *Public Administration*, *97*(2), 355–369.

Magro, E., & Wilson, J. R. (2019). Policy-mix evaluation: Governance challenges from new place-based innovation policies. *Research Policy*, *48*(10), 103612.

Marks, G., Hooghe, L., & Blank, K. (1996). European integration from the 1980s: State-centric v. multi-level governance. *JCMS: Journal of Common Market Studies*, *34*(3), 341–378.

Mazzucato, M. (2018). Mission-oriented innovation policies: challenges and opportunities. *Industrial and corporate change*, *27*(5), 803–815.

McCann, P., & Soete, L. (2020). Place-based innovation for sustainability. *Publications Office of the European Union*.

Miedziński, M. (2018). Do policy makers tell good stories? Towards a multi-layered framework for mapping and analysing policy narratives embracing futures. *Futures*, *101*, 10–25.

Moghadam-Saman, S., Coenen, L., & Uyarra, E. (2026). Transformations need resilient policy designs: a multi-level analysis of policy mix coherence and regional resilience during the COVID-19 crisis in Western Norway. In *The New Role of the State for Transformative Innovation* (pp. 396–412). Edward Elgar Publishing.

Mukherjee, I., Coban, M. K., & Bali, A. S. (2021). Policy capacities and effective policy design: A review. *Policy Sciences*, *54*(2), 243–268.

Muñoz de Bustillo Llorente, R. (2024). A critical review of the digital and green twin transitions: Implications, synergies and trade-offs.

Noferini, A., Berzi, M., Camonita, F., & Durà, A. (2020). Cross-border cooperation in the EU: Euroregions amid multilevel governance and re-territorialization. *European Planning Studies*, *28*(1), 35–56.

OECD. (2023). *OECD Skills Outlook 2023: Skills for a Resilient Green and Digital Transition*.

Petit, M., Sirenko, M., Obersteiner, P. M., & Le Merle, K. (2024). Expected labour market effects of the Green Deal Industrial Plan: The potential of labour policy for just transition regions.

Piattoni, S. (2010). *The theory of multi-level governance: Conceptual, empirical, and normative challenges*. Oxford University Press.

Rainone, S., & Aloisi, A. (2021). Time to deliver?: assessing the action plan on the European pillar of social rights.

Raza, W. (2024). *Towards a progressive industrial policy for the twin transformation in the European Union: Synthesis report*.

Rodríguez-Pose, A., & Bartalucci, F. (2024). The green transition and its potential territorial discontents. *Cambridge Journal of Regions, Economy and Society*, *17*(2), 339–358.

Rogge, K. S., & Reichardt, K. (2016). Policy mixes for sustainability transitions: An extended concept and framework for analysis. *Research Policy*, *45*(8), 1620–1635. https://doi.org/10.1016/j.respol.2016.04.004

Samaan, D., Ernst, E., Horne, R., Kühn, S., & Gomis, R. (2023). World employment and social outlook: trends 2023. *ILO, Geneva*.

Sewerin, S., Kaack, L. H., Küttel, J., Sigurdsson, F., Martikainen, O., Esshaki, A., & Hafner, F. (2023). Towards understanding policy design through text-as-data approaches: The policy design annotations (POLIANNA) dataset. *Scientific Data*, *10*(1), 896.

Stephenson, P. (2013). Twenty years of multi-level governance:'Where does it come from? What is it? Where is it going?'. *Journal of European public policy*, *20*(6), 817–837.

Thunqvist, D. P., Gustavsson, M., & Lundqvist, A. H. (2023). The role of VET in a green transition of industry: A literature review. *International Journal for Research in Vocational Education and Training (IJRVET)*, *10*(3), 361–382.

Tödtling, F., & Trippl, M. (2005). One size fits all?: Towards a differentiated regional innovation policy approach. *Research Policy*, *34*(8), 1203–1219.

Vandeplas, A., Vanyolos, I., Vigani, M., & Vogel, L. (2022). *The possible implications of the green transition for the EU labour market*. Publications Office of the European Union Luxembourg.

Varga, A., Szabó, N., & Sebestyén, T. (2020). Economic impact modelling of smart specialization policy: Which industries should prioritization target? *Papers in regional science*, *99*(5), 1367–1389.

Vaswani, A., Shazeer, N., Parmar, N., Uszkoreit, J., Jones, L., Gomez, A. N., Kaiser, Ł., & Polosukhin, I. (2017). Attention is all you need. *Advances in neural information processing systems*, *30*.

Vona, F., Marin, G., & Consoli, D. (2018). Green employment: What, where and how much?

Annex 1: Supranational, national and European policy instrument sample

	Main subnational decision-making level(s)	NUTS level correspondence	National	Subnational	Supranational	Total
EU/EFTA					70	**70**
AT	Länder (federal states)	NUTS2	35	34	1	**70**
BE	Regions / Communities	NUTS1-2	9	19		**28**
BG	Municipalities (main), Regions (limited)	NUTS3 (municipal) / NUTS2 (regions)	31	6		**37**
CH	Cantons	NUTS2 (equivalent)	16	57		**73**
CY	Municipalities	Below NUTS3	22	7	1	**30**
CZ	Regions (kraje)	NUTS3	35	23		**58**
DE	Länder (federal states)	NUTS1	20	43		**63**
DK	Regions + Municipalities	NUTS2 (regions) / Local	17	10	1	**28**
EE	Municipalities	Below NUTS3	48	23	1	**72**
EL	Regions (peripheries)	NUTS2	12	33	7	**52**
ES	Autonomous Communities	NUTS2	21	53		**74**
FI	Wellbeing regions + Municipalities	NUTS3 (regions)	17	38	2	**57**
FR	Regions + Departments	NUTS2 (regions) / NUTS3 (departments)	15	36		**51**
HR	Counties (županije)	NUTS3	25	25		**50**
HU	Counties + Municipalities	NUTS3 (counties)	30	30		**60**
IE	Local authorities	NUTS3 (regions for stats) / Local below NUTS3	27	11	2	**40**
IS	Municipalities	Below NUTS3	25	22	3	**50**
IT	Regions (primary)	NUTS2	15	65	5	**85**
LT	Municipalities	Below NUTS3	34	23	2	**59**
LU	Municipalities	Below NUTS3	21	6		**27**
LV	Municipalities	Below NUTS3	28	25	4	**57**
MT	Local councils	Below NUTS3	26	9		**35**
NL	Provinces + Municipalities	NUTS2 (provinces)	20	44	2	**66**
NO	Counties (fylker) + Municipalities	NUTS3 (counties)	11	36	1	**48**
PL	Voivodeships + Powiats	NUTS2 (voivodeships) / NUTS3	15	51	7	**73**

PT	Regions (Azores/Madeira) + Municipalities	NUTS2 (regions)	26	28	3	**57**
RO	Counties (județe)	NUTS3	11	25	3	**39**
SE	Regions + Municipalities	NUTS3 (regions)	11	51	2	**64**
SI	Municipalities	Below NUTS3	24	14		**38**
SK	Regions	NUTS3	28	33	2	**63**
UK	Devolved administrations (Scotland, Wales, NI) + Local authorities	NUTS1 (devolved) / NUTS2–3 (regions)	79	72	2	**153**
Total			**754**	**952**	**121**	**1827**

Annex 2: Masterfile variable structure

Block	Column Name	Format	Description
A. Basic identification	Policy_ID	Text	Unique ID of the form XX_YYY_ZZZ_000 (e.g., EU_SUP_SUP_001, DE_NAT_ NAT_002, NO_SUP_REG_001)
	Policy_Name	Text	Official title of the policy document in the language of origin or in English
	Governance_Level	Dropdown	Supranational-EU; Supranational-other; National; Regional_NUTS1; Regional_NUTS2; Regional_NUTS3; Local; Municipal; Transnational
	Country	Dropdown	ISO 3166-1 alpha-2 country code. Blank when is supranational
	Region	Text	Eurostat NUTS territorial classification (NUTS1, NUTS2, or NUTS3), municipality name, blank when national or supranational
	Territory_Type	Dropdown	EU-wide; National-wide; Regional-wide; Rural; Urban; Island; Peripheral; Coal region; Industrial region; Cross-border
	Issuing_Body	Text	Name of the institution issuing the policy (Ministry / EC DG / Region etc)
	Year	Numeric	YYYY
B. Policy domain & Instrument logic & Legal and Implementation Strength	Policy_Domain_(primary)	Dropdown	Labour market & employment; Education & training (VET, HE, LLL); Industrial/productive transformation; Innovation & R&I; Digitalisation & data; Climate & energy; Environment & circular economy; Regional development & cohesion; Social protection & welfare; Public administration reform; Economic recovery & resilience
	Policy_Domain_(secondary)	Dropdown	The same policy domains as above. Only if applicable
	Instrument_Family	Dropdown	Regulatory (standards, mandates, obligations); Economic/Financial (subsidies, tax, funding, procurement); Informational/Strategic (strategies, roadmaps, guidelines, foresight); Organisational/Institutional (new bodies, coordination platforms); Mixed instrument package
	Instrument_Subtype_(primary)	Dropdown	Direct grants/subsidies; Tax incentives; Conditional funding (e.g. RRF milestones); Public procurement; Training vouchers/ILA; Employer training subsidies; Hiring subsidies; Wage compensation schemes; Apprenticeship expansion; Regulation/standards; Skills forecasting system; Digital infrastructure investment; Green infrastructure investment; Cluster/platform creation; Social dialogue institution; Pilot/demonstrator programme; Monitoring/reporting obligation; Certification/qualification reform; Individual learning account; Loans; Strategic roadmap; Investment framework; Training and skills initiative; Sectoral skills partnership
	Instrument_Subtype_(secondary)	Dropdown	The same instrument subtypes as above. Only if applicable
	Legal_Form	Dropdown	Law/Act; Regulation/Directive/Decision; Strategy/White Paper; Programme/Operational Programme; Action Plan/Roadmap; Agreement (tripartite/social partner); Recommendation/Guidance; Funding Call

	Implementation_Force	Dropdown	0 = Aspirational (no formal implementation mechanism); 1 = Soft coordination (monitoring/reporting); 2 = Linked to funding/conditionality; 3 = Legally binding with enforceable obligations
C. Twin Transition	Twin_Focus	Dropdown	Green only; Digital only; Explicit twin (green + digital); Indirect/implicit
	Green_Intensity	0-3	0 = Not mentioned; 1 = Mentioned; 2 = Operational objective; 3 = Core purpose
	Digital_Intensity	0-3	0 = Not mentioned; 1 = Mentioned; 2 = Operational objective; 3 = Core purpose
	Transition_Objective_Type_ (primary)	Dropdown	Decarbonisation/mitigation; Climate adaptation/resilience; Energy transition; Circular economy; Biodiversity/environment; Digital infrastructure; Digital skills; Data governance/sovereignty; Industrial upgrading; Enabling (skills, finance, governance reform); Green transition; Digital transformation
	Transition_Objective_Type_ (secondary)	Dropdown	The same transition objective types as above. Only if applicable
D. Labour Market	Labour_Market_Framing_(primary)	Dropdown	Competitiveness/productivity; Social protection/stability; Capability building/human capital; Just transition/fairness; Resilience/risk management; Inclusion/equality
	Labour_Market_Framing_(secondary)	Dropdown	The same labour market framings as above. Only if applicable
	Labour_Market_Focus	Multi-select	Upskilling; Reskilling; Initial education reform; Lifelong learning; Skills intelligence/forecasting; Active labour market policy; Employment protection reform; Wage setting/industrial relations; Labour mobility/migration; Public employment services reform; Inclusion of vulnerable groups; Green job creation; Digital job creation
	Labour_Mechanism	Multi-select	Training subsidy; Individual learning account; Hiring subsidy; Wage compensation; Transition assistance; Social dialogue mechanism; Sectoral skills partnership; Certification/qualification reform; Matching platform/digital PES; Industrial upgrading linked to employment
E. Targeting Type	Primary_Target_Level	Dropdown	Individuals (workers/jobseekers/students); Firms; Sectors/Industries; Regions/Territories; Public institutions; Social partners; Multi-actor / systemic
	Target_Group_Detail	Multi-select	**Individual-Level Categories:** Unemployed; Long-term unemployed; Youth; NEET; Women; Migrants; Older workers (50+); Low-skilled workers; High-skilled workers; Workers in transition (at risk of displacement); Students; VET learners; Higher education students **Firm-Level Categories:** SMEs; Start-ups; Large firms; Industrial firms; Digital firms; Green firms; Firms in transition sectors; Clusters/platform members **Public employment services:** Education providers; Universities; Training providers; Regional development agencies
	Sectoral_Targeting	Dropdown	Energy; Manufacturing; ICT; Construction; Transport; Agriculture/food; Public sector; Creative industries; Cross-sectoral

	Territorial_Targeting	Dropdown	National-wide; Region-wide; Lagging regions; Coal/carbon-intensive regions; Rural areas; Urban/metropolitan areas; Peripheral regions; Islands; Border regions
	Targeting_Type	Dropdown	Universal (applies broadly); Selective (specific groups); Place-based; Sector-based; Firm-based; Combined
F. Governance	Coordination_Arena	Dropdown	Central state hierarchy; Decentralised/regional authority; Tripartite/social dialogue; Public-private partnership; Multi-actor network/platform; Market-based allocation; EU-level coordination (OMC-style)
F. Governance	Primary_Governance_Paradigm	Dropdown	Mission-oriented; Place-based/RIS3; Just transition logic; Experimental/pilot; Competitiveness-driven; Social investment state logic
F. Governance	Policy_Mix_Linkage	Dropdown	Stand-alone policy; Implements higher-level strategy; Complements existing instrument; Replaces previous instrument; Part of broader package
F. Governance	Budget_Signal	Dropdown	No explicit budget; Minor programme funding; Major structural funding; Multiannual funding envelope; RRF/ESF+/Cohesion linked
F. Governance	Expected_Labour_Adjustment_Mode	Dropdown	Skill upgrading; Structural reallocation; Job protection; Sectoral diversification; Industrial restructuring; Social cushioning; Hybrid
G. Coding Notes	Summary_Notes	Text	Summary/abstract of the policy document
G. Coding Notes	Document_Link	URL	link to the corresponding pdf or webpage
G. Coding Notes	Coder	Text	Initials of the coder
G. Coding Notes	Coding_Date	DD/MM/YYYY	Date of coding

Annex 3: The Consortium

Short name	Full name	Homepage	Logo
HVL	Western Norway University of Applied Sciences	https://www.hvl.no/en/	
BOKU	BOKU University	https://boku.ac.at/en/	
LSE	London School of Economics	https://www.lse.ac.uk/	
UoC	University of Crete	https://www.uoc.gr/en/	
UW	University of Warsaw	https://en.uw.edu.pl/	
UU	University of Utrecht	https://www.uu.nl/en	
FHNW	University of Applied Sciences and Arts Northwestern Switzerland	https://www.fhnw.ch/en/	
BFI	Berufsförderungsinstitut Wien	https://www.bfi.wien/	
Simplon	Simplon.co	https://www.simplon.co/	
MOP	Municipality of Platanias	https://www.platanias.gr/en/	

Annex 4: Project Summary

SkillResilience4EU - Resilience through re-skilling and upskilling for European labour markets in transition.

The twin transition (defined as the coexistence and interplay of the green and digital transitions) has enormous impacts on European labour markets. Because the green and digital transformations can feed into, facilitate, or hinder each other, it has been difficult to predict how labour markets will absorb and respond to changes and disruptions in employment conditions, skill needs and job availability and mobility. Other ongoing global challenges and macro-economic events, like the COVID-19 pandemic, also contribute to a profound reshaping of labour markets in Europe. New sectors emerge, existing sectors need to adapt and transform. New skills need to be developed or need to be transferred from other industries. Regions and sectors need to narrow labour market and skill mismatches to minimise the costs and to maximise the benefits of job destruction and job creation processes.

Different sectors and regions are affected in varying ways and intensities, either by green or digital transitions, or the combined impact of the twin transition. This inequal distribution of job creation and destruction processes may favour or leave behind places, sectors, and socio-economic groups and may threaten social cohesion and inclusion. The institutional and policy context needs to become more flexible and responsive to cope with the ongoing transformations and narrow down the labour market mismatches. Tailored and cost-effective policies and programmes for reskilling and upskilling, in particular for the most vulnerable and left-behind socio-demographic groups and places, need to be developed together with policy makers, VET providers, unions, public authorities, and other decision makers.

Funded by Horizon Europe, the European Union's Framework Programme for Research and Innovation, SkillResilience4EU will introduce a novel conceptual framework to describe and understand the impacts of the twin transition on European labour markets and will investigate the complex mechanisms, dynamics, and challenges that regions and institutions undergo by exploring selected sectors (tourism, food, transport, agriculture, and energy). The project will develop a management tool for policy makers to support them in managing labour markets in transition with recommendations for policy scenarios. SkillResilience4EU will also map and evaluate educational and training programmes for upskilling and re-skilling and will deliver recommendations and practical resources to support individuals and employers with specific focus on career guidance and development.

To achieve this ambition, the SkillResilience4EU consortium unites higher educational institutions (Western Norway University of Applied Sciences, Utrecht University, London School of Economics, University of Warsaw, University of Natural Resources and Life Sciences in Vienna, University of Crete, North-Western Switzerland University of Applied Sciences) one vocational training institute (BFI), one private training organization (Simplon.co) and a local public authority (Municipality of Platanias). The partners cover a whole range of expertise: economic geography, innovation studies, regional development, sustainability transitions, qualitative research, institutional research, policy research, labour and behavioural economics, education, arts and design, social inclusion, VET and lifelong learning. Coordinated by Western Norway University of Applied Sciences, the project was launched on 1st January 2025 and will run for 3 years.