UNIVERSITÀ DI TRENTO
Department of Sociology and Social Research

nextUP

C2S2 Center for Computational Social Science and Human Dynamics

The future of skills: ~~is digital the answer?~~ Beyond the Digital Question

AI isn't the problem – it's just one piece of a much larger puzzle.

The real challenge is adapting skills to a changing labor market

Funded by the European Union

The main aims of the WP4

To identify key skill transformations over the next decade and assess the alignment between formal education and evolving labour market demands

How is the world of work changing?

Which jobs will grow or shrink, and which skills will drive future demand?

How well does formal education respond to changing skill demands?

To what extent does it drive the skills mismatch?

Imbalances between the skills workers possess (supply) and the skills employers need (demand).

Highlight strategies and tools to mitigate skill shortages, gaps, and mismatches between educational outcomes and employability

Shortages occur when firms cannot find candidates for vacancies.
Gaps are internal, where current employees lack skills needed for their roles.
Mismatch is a broad term for when worker skills differ from job requirements.

To improve understanding of young people's post-COVID conditions as they transition to adulthood and enter the labour market, using social media data and digital behaviours.

Provide evidence-based recommendations for educational and employment policies aimed at improving youth transitions into the workforce

Data and Methodology

Data Overview

Lightcast

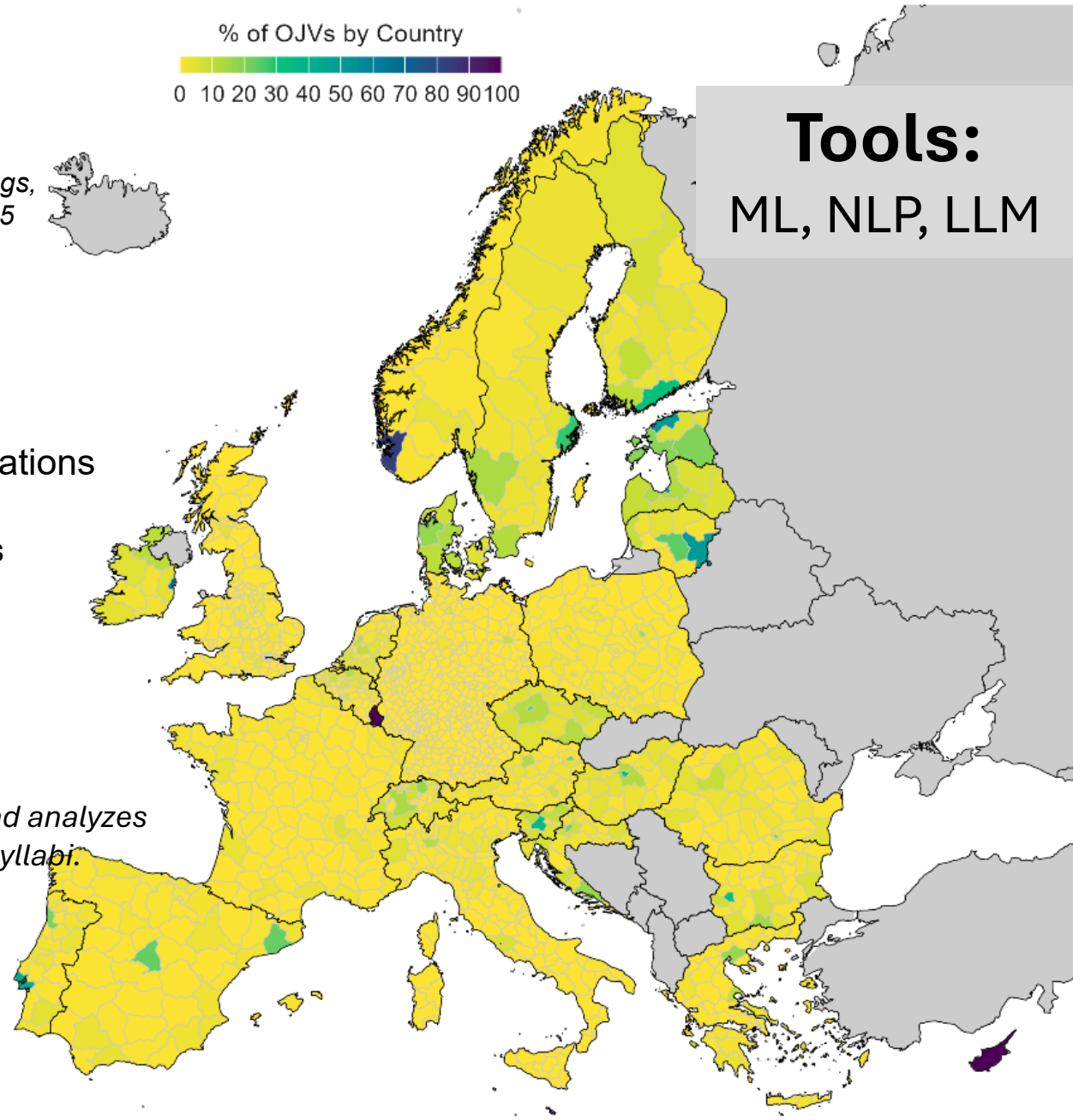
Lightcast has compiled *market data points, including job postings, career profiles, and compensation data, into a compounded knowledge asset. Covers 165 countries, representing markets that make up 99% of the world's GDP.*

- **Source**: +300 million online job vacancies (OJVs)
- **Period**: 2019–2024.
- **Geographical Coverage**: 29 European countries.
- **Classifications**:
  European Skills, Competences, Qualifications and Occupations (**ESCO**): Occupations (3039) and skills (13994);
  O*Net: 1,016 occ. titles; over 2,500 detailed work activities
  Territorial units based on NUTS 2021.
- **Regional Focus**: Analysis at the NUTS 3 territorial unit level.

Open Syllabus Project

Open Syllabus Project (OSP) is an online open-source platform that catalogs and analyzes millions of college syllabi. Mapping the college curriculum across 27.6 million syllabi.

- **Source:** 1.5 million syllabi
- **Period:** 2018-2024
- **Geographical Coverage**: 30 European countries
- **Regional Focus**: Analysis at the NUTS 1 territorial unit level.

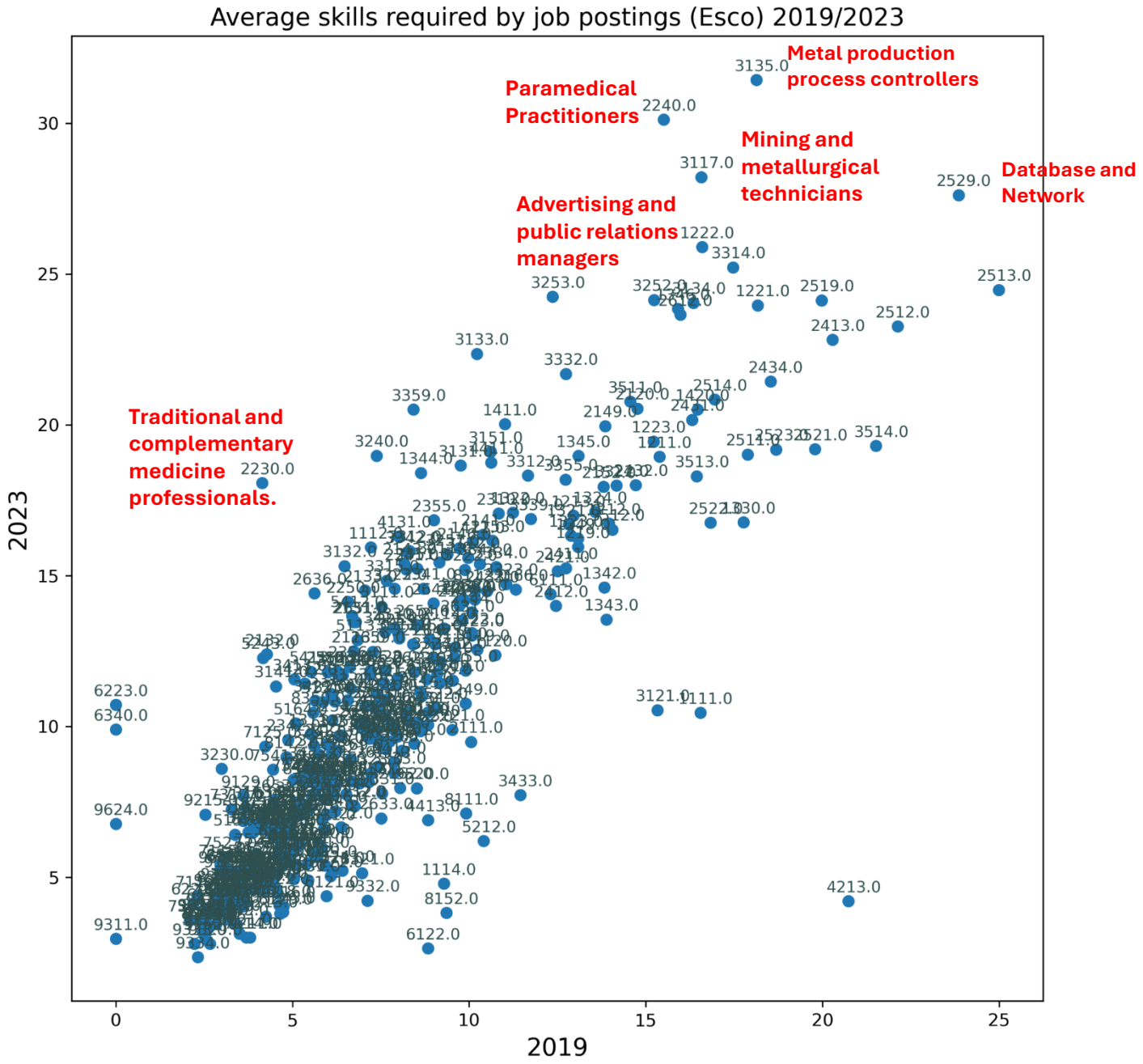


Tools:
ML, NLP, LLM

Skill trends

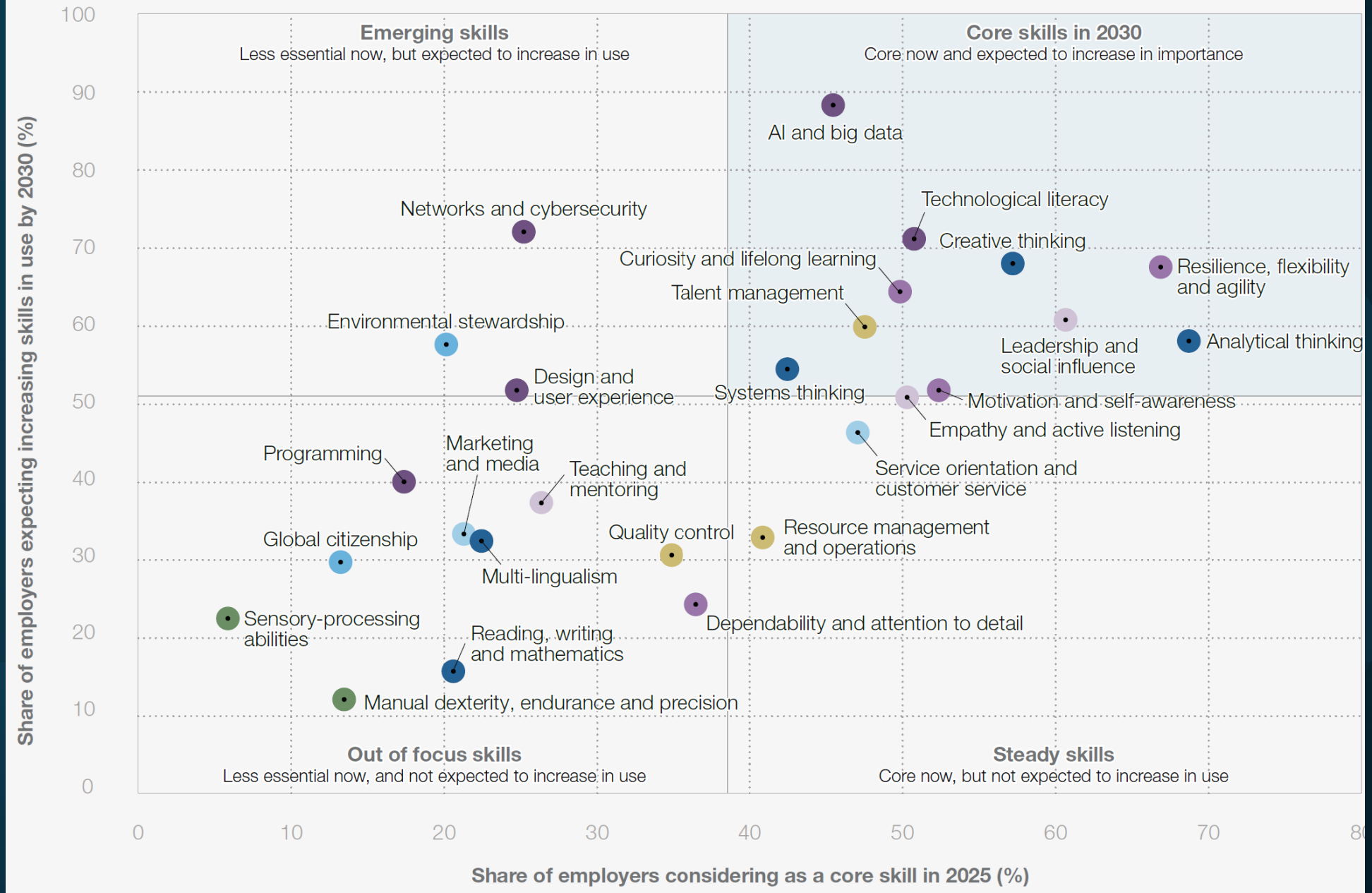
Skill trends

- The average number of skills is increasing over time.
  Managers (code 1), Professional (code 2), and Technicians and Associate Professionals (code 3)
- Greater job complexity and specialization.



Core skills in 2030

Share of employers considering skills to be a core skill in 2025 and share of employers expecting skills to increase in importance by 2030.



Source
World Economic Forum, Future of Jobs Survey 2024.
Note
The Future of Jobs Survey uses the World Economic Forum's Global Skills Taxonomy.
Bold lines represent the median values across all skills.

Why this matters in practice or policy terms?

EDUCATION & Training

Continuous learning and skills adaptability
Modular learning, micro-credentials, re-skilling incentives

The most valuable skills today are not static technical competencies but transversal abilities such as problem-solving, creativity, teamwork, and digital literacy.

Education systems must evolve from linear pathways to modular, cumulative, and portable learning models, enabling workers to navigate transitions across sectors and careers

How should transversal (soft skills) be taught?

CEDEFOP
European Centre for the Development of Vocational Training

Terminology of European education and training policy

Transversal skills and competences are not exclusively related to a particular context (job, occupation, academic discipline, civic or community engagement, occupational sector, group of occupational sectors, etc.);

The question is:

Is the critical thinking used by an engineer the same as that used by a social scientist?

https://www.cedefop.europa.eu/en/tools/vet-glossary/glossary/transversale-faehigkeiten-und-kompetenzen
https://www.cedefop.europa.eu/en/tools/european-skills-index
https://www.cedefop.europa.eu/en/online-tools

Why Domain Competencies Come First

Transversal skills cannot be developed in a vacuum.
They must be grounded in solid disciplinary knowledge.

THE FALLACY OF GENERIC SKILL TRAINING

What the research tells us about decontextualised soft-skills programmes

✗ The Decontextualised Approach

- Generic critical thinking workshops with no domain anchor
- Creativity courses taught as universal techniques
- Communication training divorced from professional context
- Problem-solving modules based on abstract puzzles
- ***Outcome: rhetorical fluency without cognitive substance***

✓ The Domain-Anchored Approach

- Critical thinking embedded in discipline-specific case analyses
- Creativity cultivated through design-challenge sprints
- Communication developed in discipline-specific contexts
- Problem-solving built on real domain constraints
- ***Outcome: genuine competence that transfers across contexts***

Perkins & Salomon (1989) · Willingham (2007) · Bransford, Brown & Cocking (2000)

Initial findings (patterns/mechanisms identified)

If we are to predict the future of skills, a holistic and multidisciplinary approach is indispensable.

Megatrends: Understanding the Driving Forces

Four interconnected megatreneds reshaping our world

1. Techno-Economic Transformation

Digitalization, AI, and automation are reshaping industries, skills, and consumption

Labor Restructuring

Technological change drives shifts in work tasks & demants new skills

2. Socio-Demographic Dynamics and Inequality

Population aging, low birth rates, and migration patterns are shaping labor and society

Population Aging

Demographic changes led to mobility shifts and increasing inequality

Health Challenges

(including aging and epidêmiogical transitions)

3. Environmental and Resource Constraints

Resource scarcity, climate change, and ecological pressures are straining our environment

Resource Pressure

Biophysical constraints increase need for adaptation and conflict resolution

4. Geopolitical and Governance Transformation

Global power shifts, institutional changes, and security challenges are reshaping governance.

New Health Challenges

(biosecurity, pandemics, transnational governance)

Why this matters in practice or policy terms?

Policies that focus on one area without accounting for cascading effects on others risk producing unintended consequences or suboptimal outcomes.

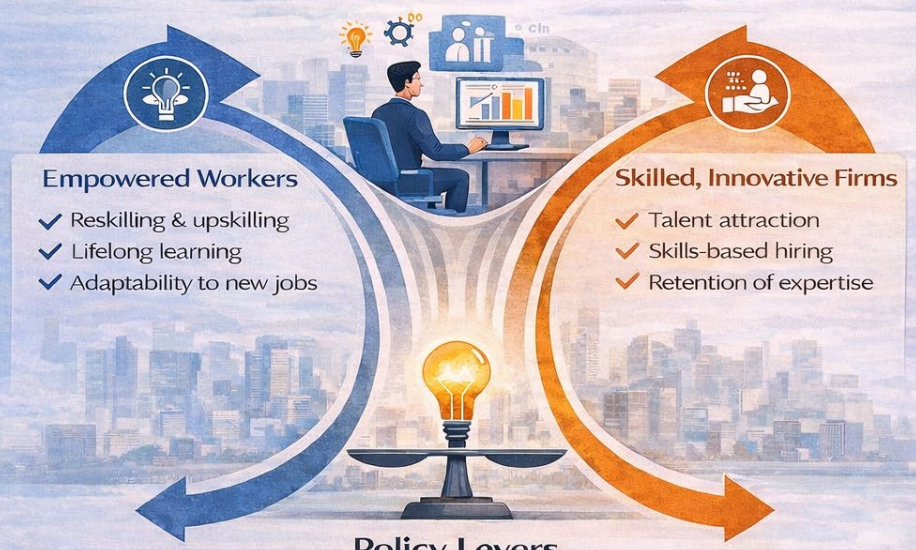
Skills in Rapidly Changing Labor Markets

Worker adaptation and firm capability jointly shape productivity and inequality outcomes.

Workers **must continuously acquire** and **update skills.**

Firms must access and retain talent to translate skills into **productivity.**

The interaction between these two forces determines whether skill change leads to **inclusive growth** or **widening inequality.**



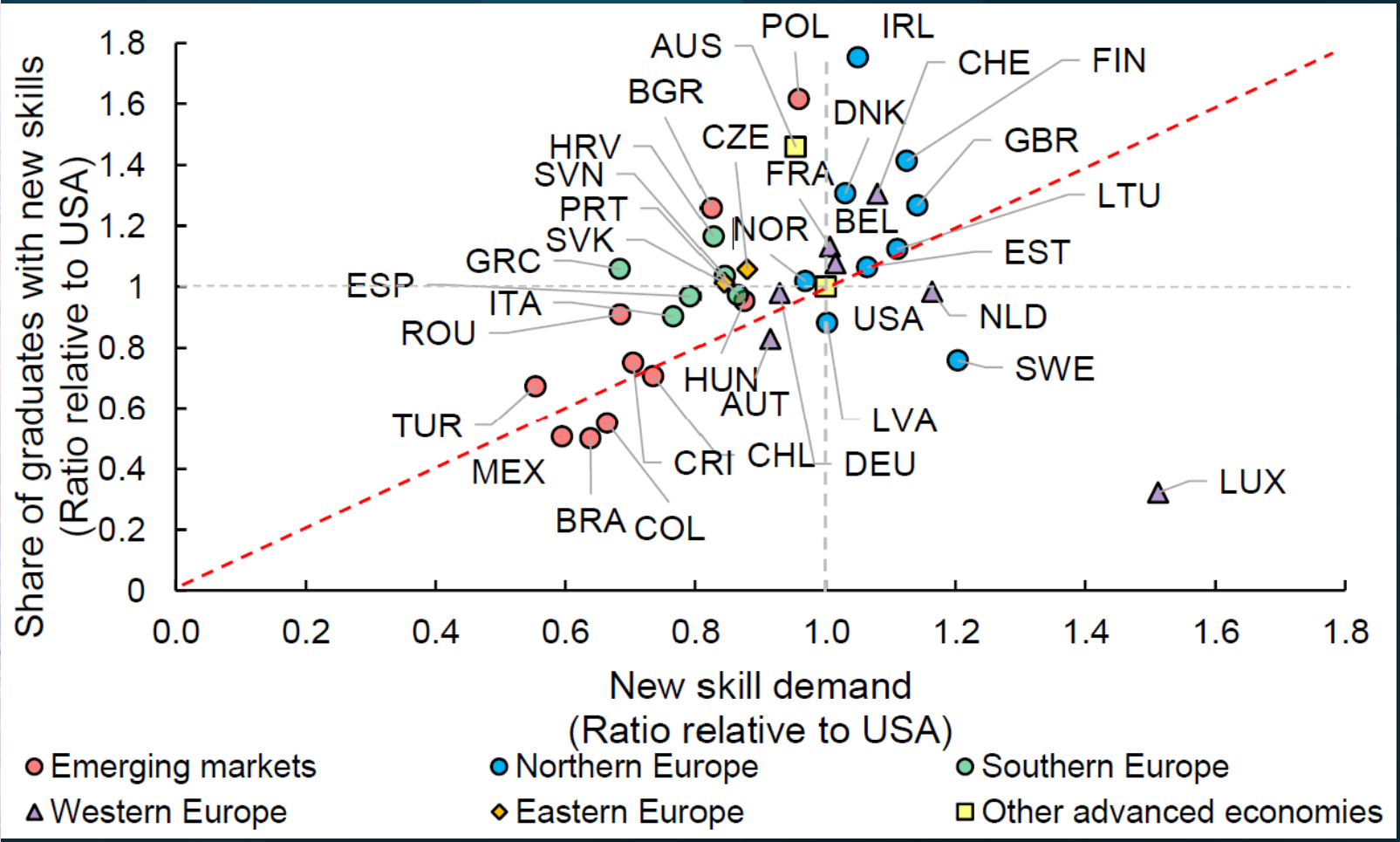
Policy Levers

Support Worker Training
- Reskilling programs
- Public investment in education
- Lifelong learning systems

Improve Skill Matching
- Skills-based hiring frameworks
- Efficient labor market intermediation

Strengthen Labor Market Institutions
- Social protection systems
- Unemployment insurance
- Transition support mechanisms

Supply versus Demand Relative to the United States



2026 International Monetary Fund
Bridging Skill Gaps for the Future: New Jobs Creation in the AI Age
https://www.imf.org/en/publications/staff-discussion-notes/issues/2026/01/09/bridging-skill-gaps-for-the-future-new-jobs-creation-in-the-ai-age-572136

Why this matters in practice or policy terms?

The result is a *dual labor market structure*:

on one side,
a core of highly skilled and protected
workers in globalized sectors;

on the other,
a growing number of precarious workers
in low-value-added activities

Coordinated Responses to Skill Transformation
The quadruple helix

Coordinated Responses to Skill Transformation

Individuals

- Prioritize continuous **learning** and professional development, blending technical and soft skills
- Explore opportunities in high-demand sectors such as **technology**, healthcare, and green energy
- Adapt to new work models, induding remote and hybrid arrangements

Educational Institutions

- Proactively update curricula to integrate future skills
- Foster stronger partnerships with industries to ensure relevance
- Expand lifelong learning opportunities
- Adapt teaching methods to deliver online and hybrid learning effectively

Businesses

- Invest in comprehensive **employee training** and upskilling programs
- Cultivate a culture of **continuous learning** within the organization
- Adapt recruitment **strategies to prioritize** future-oriented skills
- Embrace flexible work arrangements to attract and retain talent

Policymakers

- Implement policies to **support reskilling** and **upskilling** at national and European levels
- Promote **digital** and green **literacy** across the popul-
- Address critical sector skills gaps through targeted programs
- Facilitate smooth labor market transitions for affected workers

Alignment across actors is critical for inclusive skill transformation