

EVIDENCE IN ACTION: **ETF MONITORING FORUM 2025**

28-29 OCTOBER 202



EVIDENCE IN ACTION: **ETF MONITORING FORUM 2025**

28-29 OCTOBER 2025

***Session 1: Key developments in education,
skills, employment***

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Scope of monitoring

GEOGRAPHIC COVERAGE

SOUTHERN AND EASTERN MEDITERRANEAN

Algeria, Egypt, Israel, Jordan, Lebanon, Libya, Morocco, Palestine, Tunisia, and Syria

EASTERN EUROPE

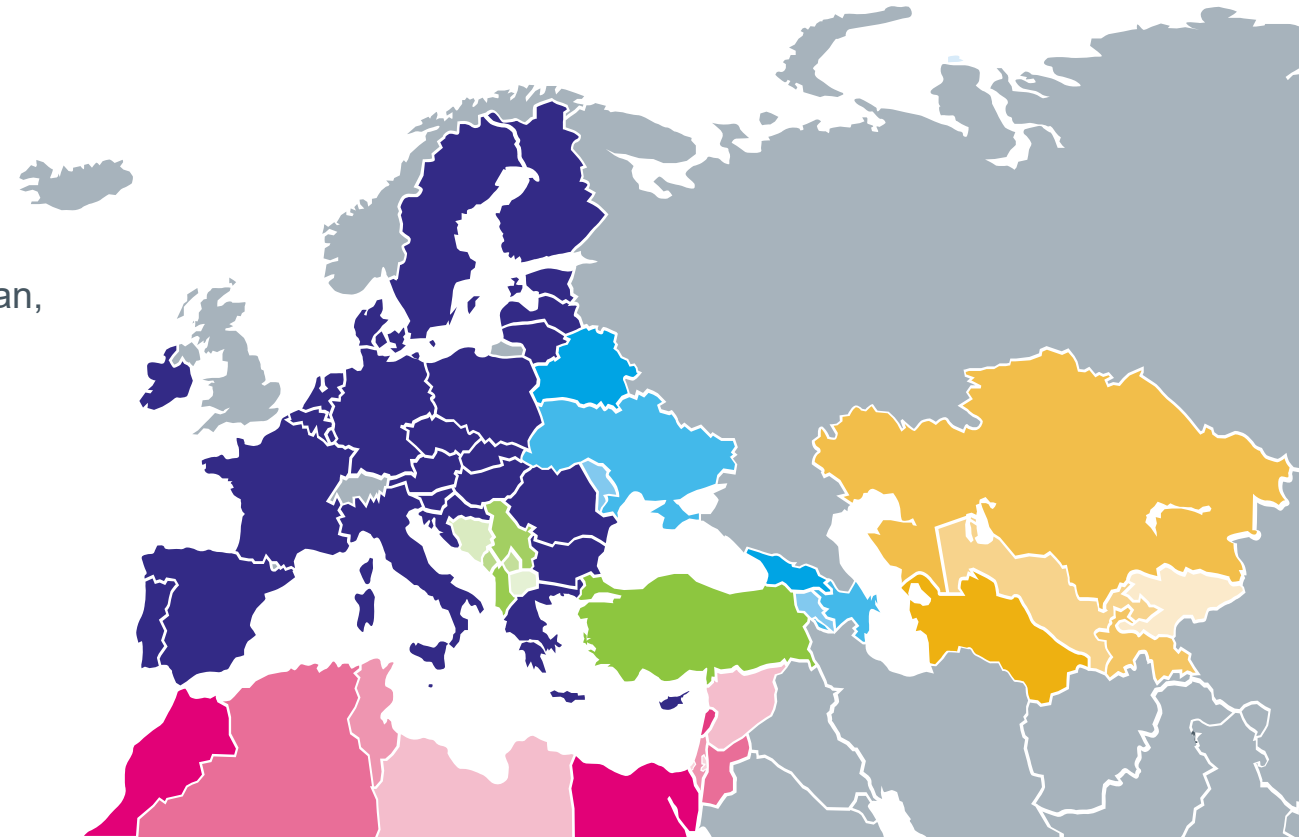
Armenia, Azerbaijan, Belarus, Georgia, Republic of Moldova, Russia, and Ukraine

SOUTHEASTERN EUROPE AND TURKEY

Albania, Bosnia and Herzegovina, Northern Macedonia, Kosovo, Montenegro, Serbia, and Türkiye

CENTRAL ASIA

Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan



FOCUS AND THEMATIC COVERAGE

Demographic and socioeconomic context

- Demography
- Economy
- Income and living standards

Headline indicators: education and VET

- Participation and access
- Attainment, completion, learning outcomes
- Resources and data

Headline indicators: employment

- Employment and labour market outcomes
- Demand for skills

System performance (Torino Process)

- Access and participation
- Quality and relevance
- System management and organisation

POLICY AND SYSTEM PERFORMANCE:

The extent to which countries deliver on their promises (commitments) to learners and other stakeholders in education and training

Populations of learners

Youth and adults

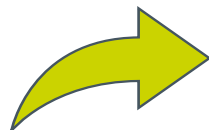
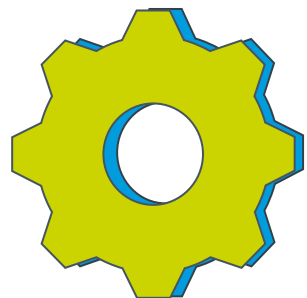
Female learners

Disadvantaged youth

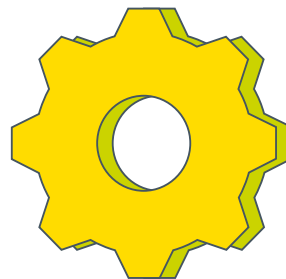
Adults at risk (low or no education)

Annual monitoring sequence and timeline: 2025

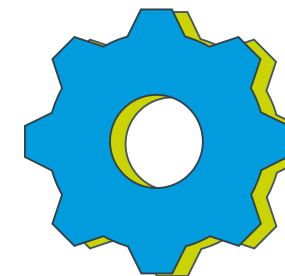
I. Evidence collection



II. Analysis and reporting



III. Release and dissemination



1

Collection of KIESE
data and
questionnaire
responses
May - August

2

Analysis of
evidence and
preparation of
deliverables
August - November

3

Release and
dissemination
November - December

Data types and sources

What do we collect: sources and types of evidence

KIESE data

received from NSO and/or Ministry of finance, Ministry of education in the ETF partner countries
TRP proxy

| Indicator |
|---|
| Educational attainment of total and active population by sex and age [%] |
| Early leavers from education (% aged 18-24) |
| NEET by sex and age [%], total and total distributed by educational attainment and labour market status |
| Participation in training/lifelong learning by sex, age, education and working status [%] |
| Activity rate (%) |
| People outside the labour force (%) |
| Employment rate by age (%) and by educational attainment (% aged 15+) |
| Employment rate of recent graduates aged 20-34 (ISCED levels 3-8) |
| Employment rate of recent graduates aged 20-34 (ISCED levels 3-4) by programme orientation |
| Employment by broad economic sectors (% aged 15+) |
| Employment by NACE economic sectors (number of employed persons aged 15+) |
| Employment by sex and status in employment [%] |
| Incidence of self-employment (% aged 15+) |
| Incidence of vulnerable employment (% aged 15+) |
| Employment by sex and broad occupational categories (% aged 15+) |
| Employment by ISCO-08 occupations (number of employed persons) |
| Unemployment rate by age (%) and by educational attainment (% aged 15+) |
| Youth unemployment ratio (% aged 15-29) |
| Ratio of youth unemployment ratio (15-29) to adult unemployment ratio (30-74) |
| Public expenditure on education, by level of education (in national currency units) |
| Public expenditure on education, by level of education (as % of GDP) |
| Teachers' statutory salaries, based on typical (most prevalent) qualifications at different points in the teaching career (national currency) |
| Average teacher salary of initial vocational education and training (IVET) teachers relative to other professions requiring a comparable level of qualification |
| Total number of teachers in initial vocational education and training (IVET) |
| Number of teachers in initial vocational education and training (IVET) who participated in professional development trainings in the last 12 months |

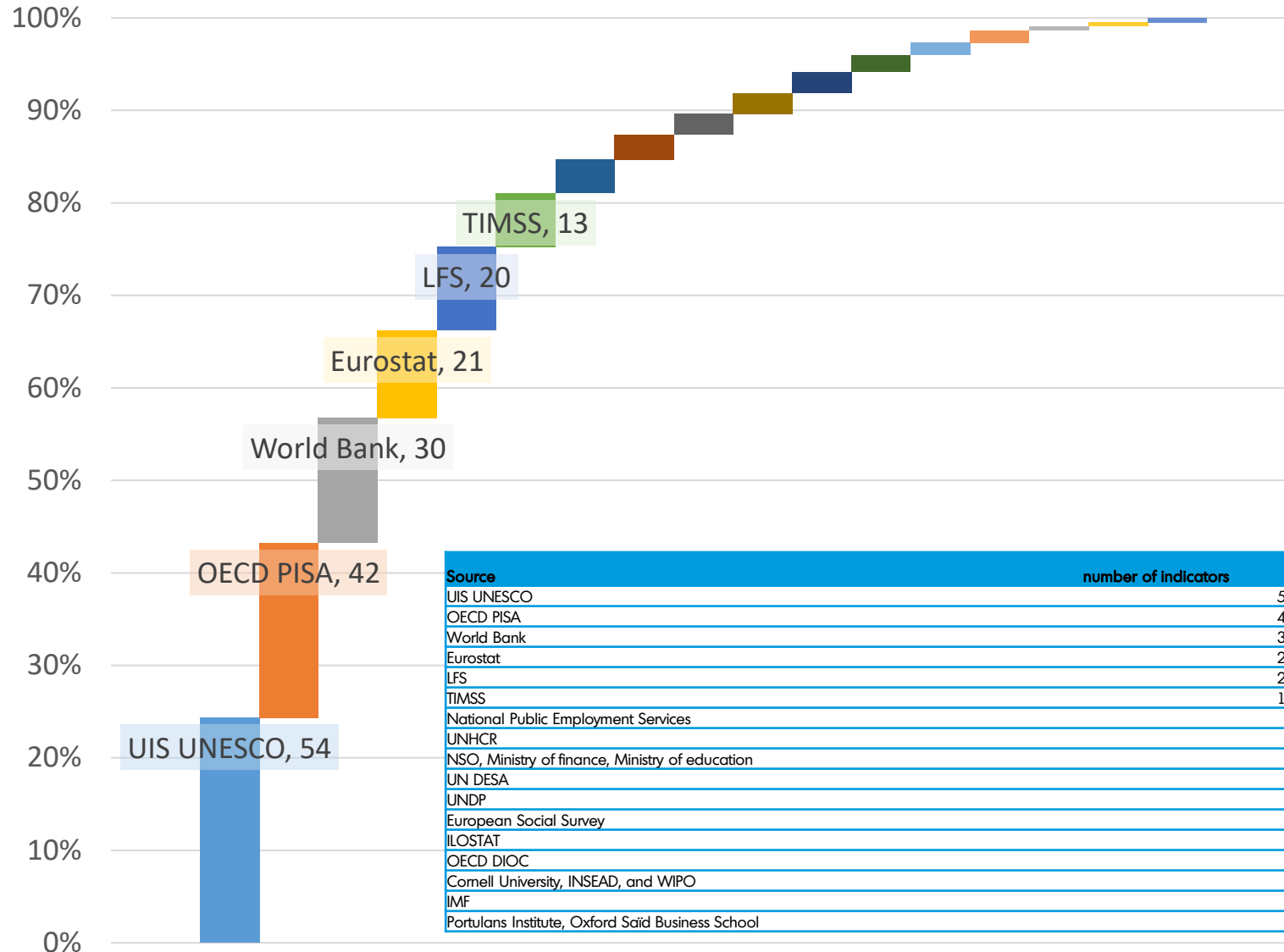
System performance indices

| Monitoring area | Monitoring dimension | Outcome | Monitoring target No. | Description of monitoring targets | Cor. | ALB | ARM | AZE | BH | DA |
|-----------------------------|----------------------|---------|-----------------------|--|------|-----|-----|-----|----|----|
| A. Access and participation | A.1 Access | A.1.1 | MT1 | Access to and attractiveness of initial VET for youth: all | Y | 90 | 50 | 75 | 71 | 75 |
| A. Access and participation | A.1 Access | A.1.1 | MT2 | Access to and attractiveness of initial VET for youth: females | N | 90 | 50 | 50 | 90 | 90 |
| A. Access and participation | A.1 Access | A.1.1 | MT3 | Access to and attractiveness of initial VET for youth: socio-economically disadvantaged | N | 75 | 50 | 75 | 50 | 75 |
| A. Access and participation | A.1 Access | A.1.1 | MT4 | Access to and attractiveness of initial VET for youth: first generation migrants | N | 75 | 25 | 75 | 25 | 75 |
| A. Access and participation | A.1 Access | A.1.2 | MT5 | Access to and attractiveness of continuing VET for adults: all | Y | 10 | 41 | 14 | 22 | 90 |
| A. Access and participation | A.1 Access | A.1.2 | MT6 | Access to and attractiveness of continuing VET for adults: females | N | 10 | 10 | 14 | 14 | 90 |
| A. Access and participation | A.1 Access | A.1.2 | MT7 | Access to and attractiveness of continuing VET provided for adults: formal learning settings (discontinued) | N | | | | | |
| A. Access and participation | A.1 Access | A.1.2 | MT8 | Access to and attractiveness of continuing VET provided for adults: non-formal learning settings (discontinued) | N | | | | | |
| A. Access and participation | A.1 Access | A.1.2 | MT9 | Access to and attractiveness of continuing VET for adults: long-term unemployed | N | 90 | 25 | 75 | 50 | 90 |
| A. Access and participation | A.1 Access | A.1.2 | MT10 | Access to and attractiveness of continuing VET for adults: economically inactive | N | 75 | 25 | 50 | 25 | 90 |
| A. Access and participation | A.1 Access | A.1.2 | MT11 | Access to and attractiveness of continuing VET for adults: low or no education | N | 75 | 25 | 75 | 25 | 90 |
| A. Access and participation | A.1 Access | A.1.2 | MT12 | Access to and attractiveness of continuing VET for adults: first generation migrants | N | 75 | 25 | 75 | 25 | |
| A. Access and participation | A.1 Access | A.1.3 | MT13 | Access to other opportunities for lifelong learning for adults: all | Y | 14 | 10 | 90 | 10 | 10 |
| A. Access and participation | A.1 Access | A.1.3 | MT14 | Access to other opportunities for lifelong learning for adults: females | N | 13 | 25 | 50 | 13 | 90 |
| A. Access and participation | A.1 Access | A.1.3 | MT15 | Access to other opportunities for lifelong learning for adults: formal learning settings (discontinued) | N | | | | | |
| A. Access and participation | A.1 Access | A.1.3 | MT16 | Access to other opportunities for lifelong learning for adults: non-formal learning settings (discontinued) | N | | | | | |
| A. Access and participation | A.1 Access | A.1.3 | MT17 | Access to other opportunities for lifelong learning for adults: long-term unemployed | N | 75 | | 75 | 50 | 75 |
| A. Access and participation | A.1 Access | A.1.3 | MT18 | Access to other opportunities for lifelong learning for adults: economically inactive | N | 10 | 25 | 75 | 10 | 75 |
| A. Access and participation | A.1 Access | A.1.3 | MT19 | Access to other opportunities for lifelong learning for adults: low or no education | N | 10 | | 75 | 10 | |
| A. Access and participation | A.1 Access | A.1.3 | MT20 | Access to other opportunities for lifelong learning for adults: first generation migrants | N | 75 | | 50 | 25 | |
| A. Access and participation | A.2 Participation | A.2.1 | MT21 | Flexible pathways: vertical permeability of VET for youth and adults | Y | 75 | 63 | 75 | 66 | 75 |
| A. Access and participation | A.2 Participation | A.2.1 | MT22 | Flexible pathways: vertical permeability of VET for youth and adults: females | N | 75 | 75 | 75 | 64 | 75 |
| A. Access and participation | A.2 Participation | A.2.1 | MT23 | Flexible pathways: vertical permeability of VET for youth: socio-economically disadvantaged | N | 75 | 25 | 75 | 50 | |
| A. Access and participation | A.2 Participation | A.2.1 | MT24 | Flexible pathways: vertical permeability of VET for youth and adults: first generation migrants | N | 50 | 25 | 75 | 25 | 75 |
| A. Access and participation | A.2 Participation | A.2.2 | MT25 | Flexible pathways: horizontal permeability of VET for youth and adults | Y | 14 | 81 | 81 | 41 | 90 |
| A. Access and participation | A.2 Participation | A.2.2 | MT26 | Flexible pathways: horizontal permeability of VET for youth and adults: formal and non-formal learning settings (discont.) | N | | | | | |
| A. Access and participation | A.2 Participation | A.2.2 | MT27 | Flexible pathways: horizontal permeability of VET for youth and adults: females | N | 75 | 25 | 90 | 50 | 90 |
| A. Access and participation | A.2 Participation | A.2.2 | MT28 | Flexible pathways: horizontal permeability of VET for youth: socio-economically disadvantaged | N | 50 | 25 | 90 | 50 | 75 |
| A. Access and participation | A.2 Participation | A.2.2 | MT29 | Flexible pathways: horizontal permeability of VET for youth and adults: first generation migrants | N | 90 | 25 | 90 | 25 | |
| A. Access and participation | A.2 Participation | A.2.3 | MT30 | Progression and evaluation in VET of youth | Y | 90 | 75 | 50 | 87 | 75 |
| A. Access and participation | A.2 Participation | A.2.3 | MT31 | Progression and evaluation in VET of youth: females | N | 75 | 38 | 75 | 89 | 88 |

Questionnaires



What do we collect: sources and types of evidence



II. SYSTEM PERFORMANCE AREAS

Area A. ACCESS AND PARTICIPATION

Dimension A.1 ACCESS

Outcome A.1.1: Access – initial VET

This outcome captures the extent to which initial VET is accessible and attractive to learners.

Question.A.1.1.MT1

Part 1: How accessible are initial VET programmes in your country overall, and to what extent do these programmes attract learners?

You may refer to relevant factors, which may include entry requirements, availability of programmes, geographical coverage, learner motivation, costs (including fees and charges), access to dormitories and transportation, as well as the public image of initial VET. Include also description of relevant policies and arrangements,¹ to the extent they are available.

Please, write your response here

Part 2: How would you rate the current situation in this area?

Your rating should reflect the extent to which the VET system delivers to learners in the area covered by the question, in line with relevant national and international commitments.

(Tick one box only)

- Needs significant improvement
- Needs some improvement
- Adequate
- Good
- Very good

Question.A.1.1.MT2

Part 1: How accessible are initial VET programmes in your country for female learners, and to what extent do these programmes attract them in practice?

Data selection for reporting: 2025

Country and system context (KIESE indicators)

1. COUNTRY PROFILE

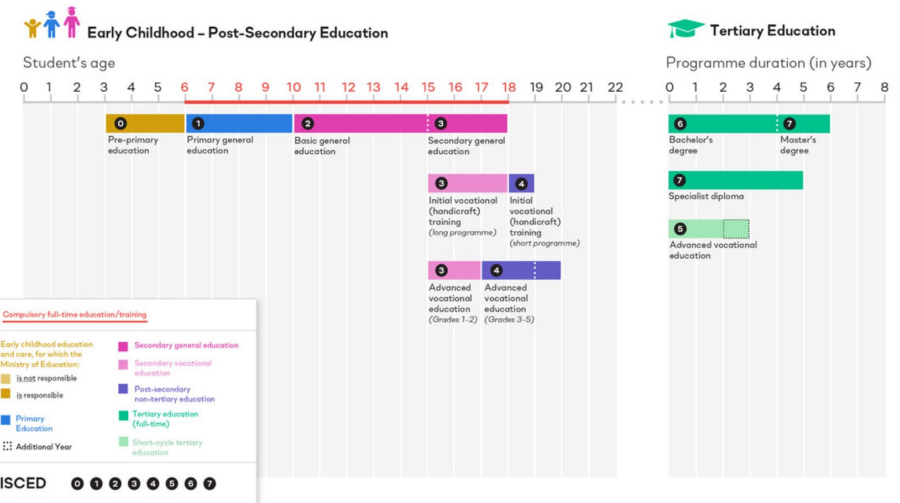
- *1.1 Demography
- *1.2 Economy
- *1.3 Income and living standards
- 1.4 Recent developments
- 1.5 The crisis/war and its impact

2. EDUCATION AND TRAINING: POLICIES AND DEVELOPMENTS

- *2.1 Structure and levels of education, including VET

| Indicator | Value | Year | Source (e.g.) |
|--|-------|------|---------------------|
| Total Population | | | UN DESA, World Bank |
| Relative Size of Youth Population (%) | | | UN DESA |
| <i>Population Growth Rate</i> | | | World Bank, UN DESA |
| <i>Dependency Ratio</i> | | | World Bank, UN DESA |
| Immigrant stock as % of total population | | | UN DESA |
| Emigrant stock as % of total population | | | UN DESA |
| GDP Growth Rate | | | World Bank |
| GDP per Capita (PPP) | | | World Bank |
| Migrant remittance inflows (US\$ mil.) as % of gdp | | | World Bank |
| <i>Inflation Rate</i> | | | IMF |
| Poverty Headcount Ratio (\$5.50/day) | | | World Bank |
| <i>Gini Coefficient (Income Inequality)</i> | | | World Bank |
| Human Development Index (HDI) | | | UNDP, World Bank |

Country name



Data selection for reporting: 2025

Headline indicators education (KIESE)

▲ *4. KEY INDICATORS: EDUCATION, SKILLS, EMPLOYMENT

▲ 4.1 Headline indicators

Education and VET

Employment and demand for skills

▲ 4.2 System performance indicators

▲ Access and participation

Access by age and gender

Retention and completion rates

▲ Quality and relevance of learning outcomes

Quality of learning by age and gender

Relevance and labour market outcomes

▲ System management and organisation

Financial resources in VET and lifelong learning

Human resources: allocation, use, professional capacity

System steering and management

| <i>Participation and access</i> | 2022 | 2023 | 2024 | EU average (latest available year) | Source (e.g.) |
|--|------|------|------|------------------------------------|---------------|
| Total net enrolment rate (lower secondary) | | | | | UIS UNESCO |
| Total net enrolment rate (upper secondary) | | | | | UIS UNESCO |
| Students in VET as a % of total upper secondary students | | | | | UIS UNESCO |
| Gross enrolment ratio (tertiary) | | | | | UIS UNESCO |
| Participation in training/lifelong learning in the previous 4 weeks (% aged 25-64) | | | | | LFS |
| <i>Attainment, completion and outcomes</i> | | | | | |
| | 2022 | 2023 | 2024 | EU average (latest available year) | Source (e.g.) |
| Educational attainment of total population: % with ISCED 5-8 | | | | | LFS |
| Early leavers from education and training (% aged 18-24) | | | | | LFS |
| Underachievers in maths (% aged 15) | | | | | PISA OECD |
| <i>System metrics</i> | | | | | |
| | 2022 | 2023 | 2024 | EU average (latest available year) | Source (e.g.) |
| Public expenditure on education (as % of GDP) | | | | | UIS UNESCO |
| Percentage of students in schools whose principal reported that the school's capacity to provide instruction is hindered at least to some extent by: Inadequate or poor-quality physical infrastructure | | | | | PISA OECD |
| Availability of internationally comparable data on education | | | | | TRP SPI |

Data selection for reporting: 2025

Headline indicators employment (KIESE)

▲ *4. KEY INDICATORS: EDUCATION, SKILLS, EMPLOYMENT

▲ 4.1 Headline indicators

Education and VET

Employment and demand for skills

▲ 4.2 System performance indicators

▲ Access and participation

Access by age and gender

Retention and completion rates

▲ Quality and relevance of learning outcomes

Quality of learning by age and gender

Relevance and labour market outcomes

▲ System management and organisation

Financial resources in VET and lifelong learning

Human resources: allocation, use, professional capacity

System steering and management

| <i>Employment and labour market outcomes</i> | 2022 | 2023 | 2024 | EU average (latest available year) | Source (e.g.) |
|---|------|------|------|------------------------------------|---------------|
| Employment rate (% aged 15+ or similar age group) | | | | | LFS |
| Employment rate (% aged 15-24 or similar age group) | | | | | LFS |
| Employment rate of recent graduates aged 20–34 (ISCED 3–8) | | | | | LFS |
| Unemployment rate (% aged 15+ or similar age group) | | | | | LFS |
| Unemployment rate (% aged 15-24 or similar age group) | | | | | LFS |
| NEET rate (% aged 15-29 or similar age group) | | | | | LFS |
| | | | | | |
| <i>Demand for Skills</i> | 2022 | 2023 | 2024 | EU average (latest available year) | Source (e.g.) |
| Employment by broad economic sectors (%): agriculture | | | | | LFS |
| Employment by broad economic sectors (%): industry | | | | | LFS |
| Employment by broad economic sectors (%): service | | | | | LFS |
| Incidence of vulnerable employment (%) | | | | | LFS |
| Employment by "educational mismatch": % overeducated | | | | | ILOSTAT |
| Employment by "educational mismatch": % undereducated | | | | | ILOSTAT |

Data selection for reporting: 2025

System performance indices – SPLs (Torino Process and KIESE)

▲ *4. KEY INDICATORS: EDUCATION, SKILLS, EMPLOYMENT

▲ 4.1 Headline indicators

Education and VET

Employment and demand for skills

▲ 4.2 System performance indicators

▲ Access and participation

Access by age and gender

Retention and completion rates

▲ Quality and relevance of learning outcomes

Quality of learning by age and gender

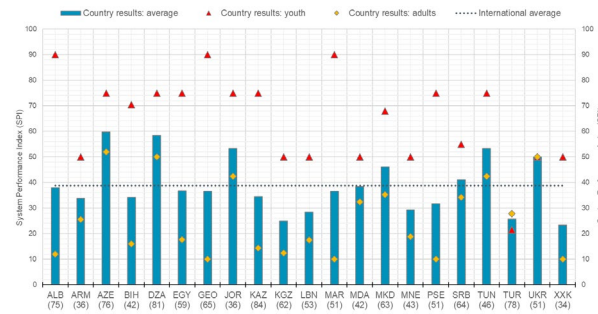
Relevance and labour market outcomes

▲ System management and organisation

Financial resources in VET and lifelong learning

Human resources: allocation, use, professional capacity

System steering and management



- **Access and participation**
 - By age and gender
 - Retention and completion
- **Quality and relevance**
 - By age and gender
 - Relevance (employment outcomes)
- **System management and organisation**
 - Financial resources
 - Human resources
 - Steering and management (data, quality assurance, leadership, internationalisation)

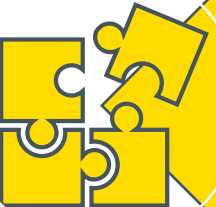
Results: where and how we show them



COUNTRY REPORTING:
Country Fiches



CROSS-COUNTRY REPORTING:
ETF cross-country monitoring report



THEMATIC REPORTING:
Thematic reports
(e.g., on gender, on data availability)

Publications & resources > Publications > Education, skills and employment: Trends and developments 2024

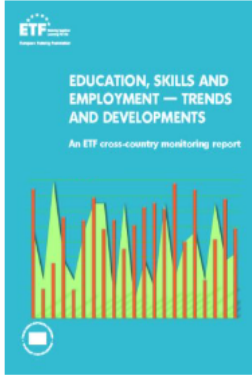
Education, skills and employment: Trends and developments ~~2024~~ 2025

An ETF cross-country monitoring report

Type Report

Year

PDF EN



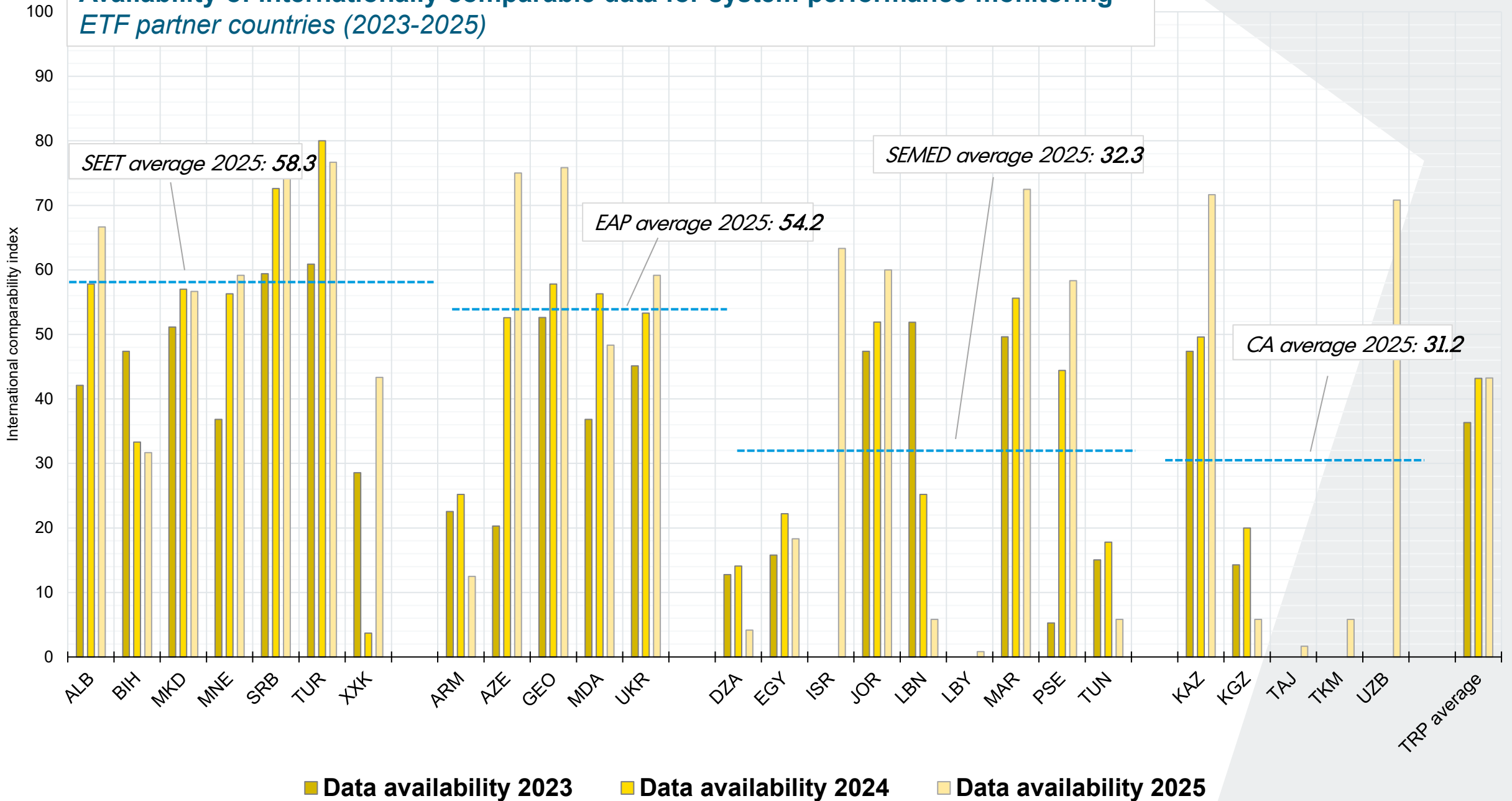
Each year the European Training Foundation (ETF) collects comprehensive evidence on trends and developments in employment, education, and training in its partner countries. Each year, these efforts culminate in the publication of a cross-country monitoring report, which provides key insights drawn from the data collected. This publication is the 2025 edition of the ETF cross-country monitoring report.

Findings: what do we know

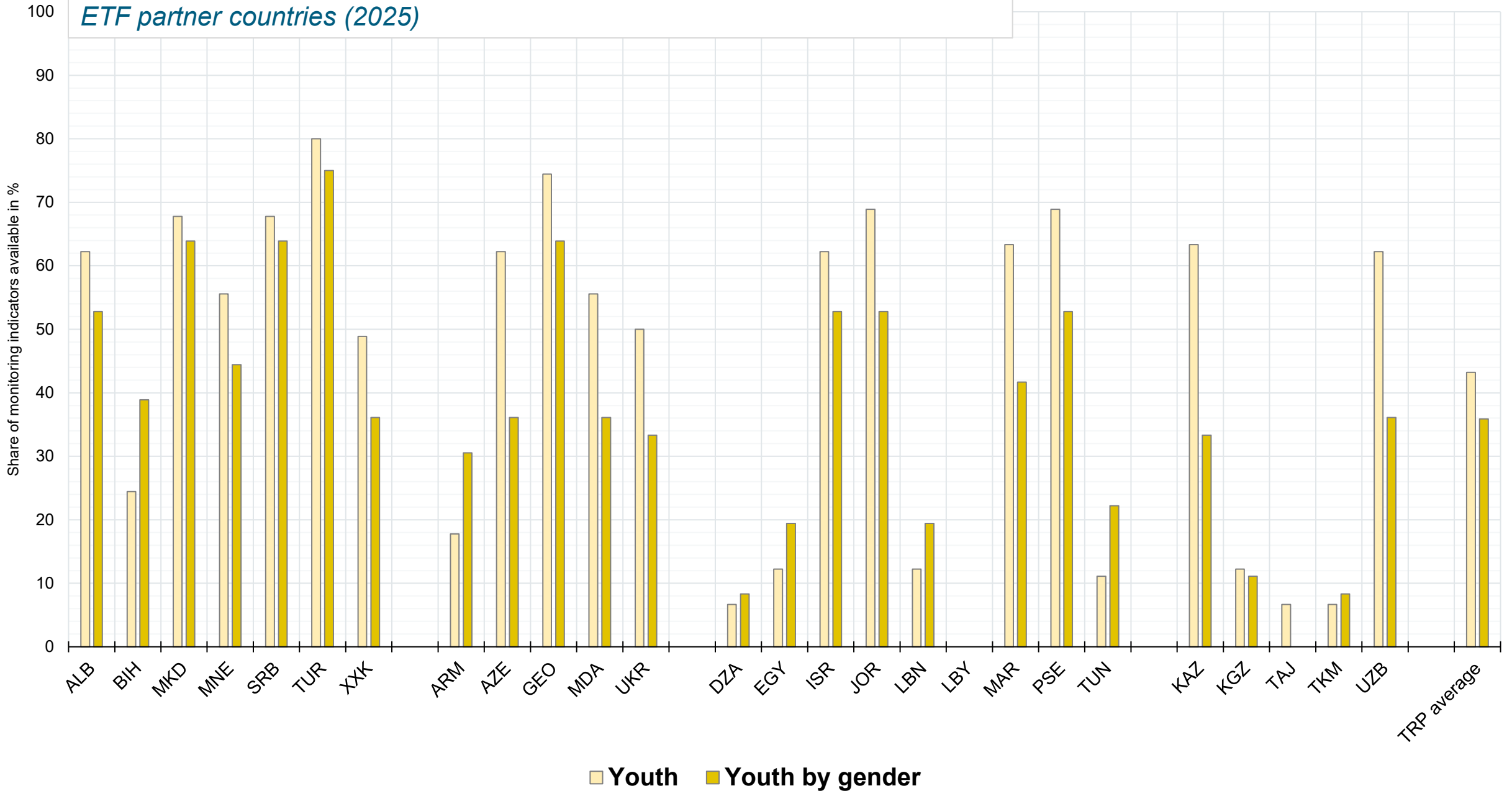
Findings: availability of data

Availability of internationally comparable data for system performance monitoring

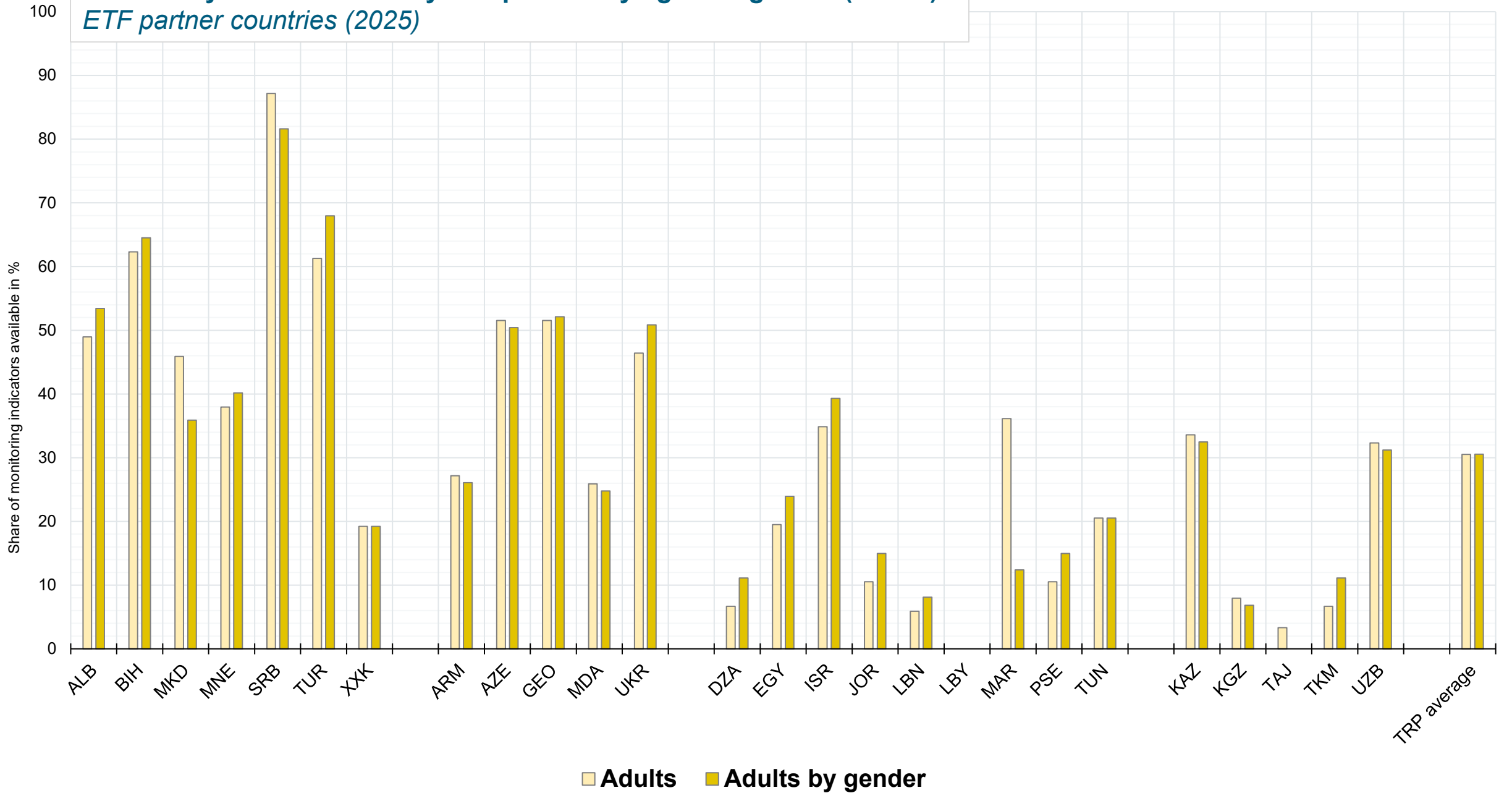
ETF partner countries (2023-2025)



Availability of internationally comparable data by age and gender (youth) ETF partner countries (2025)

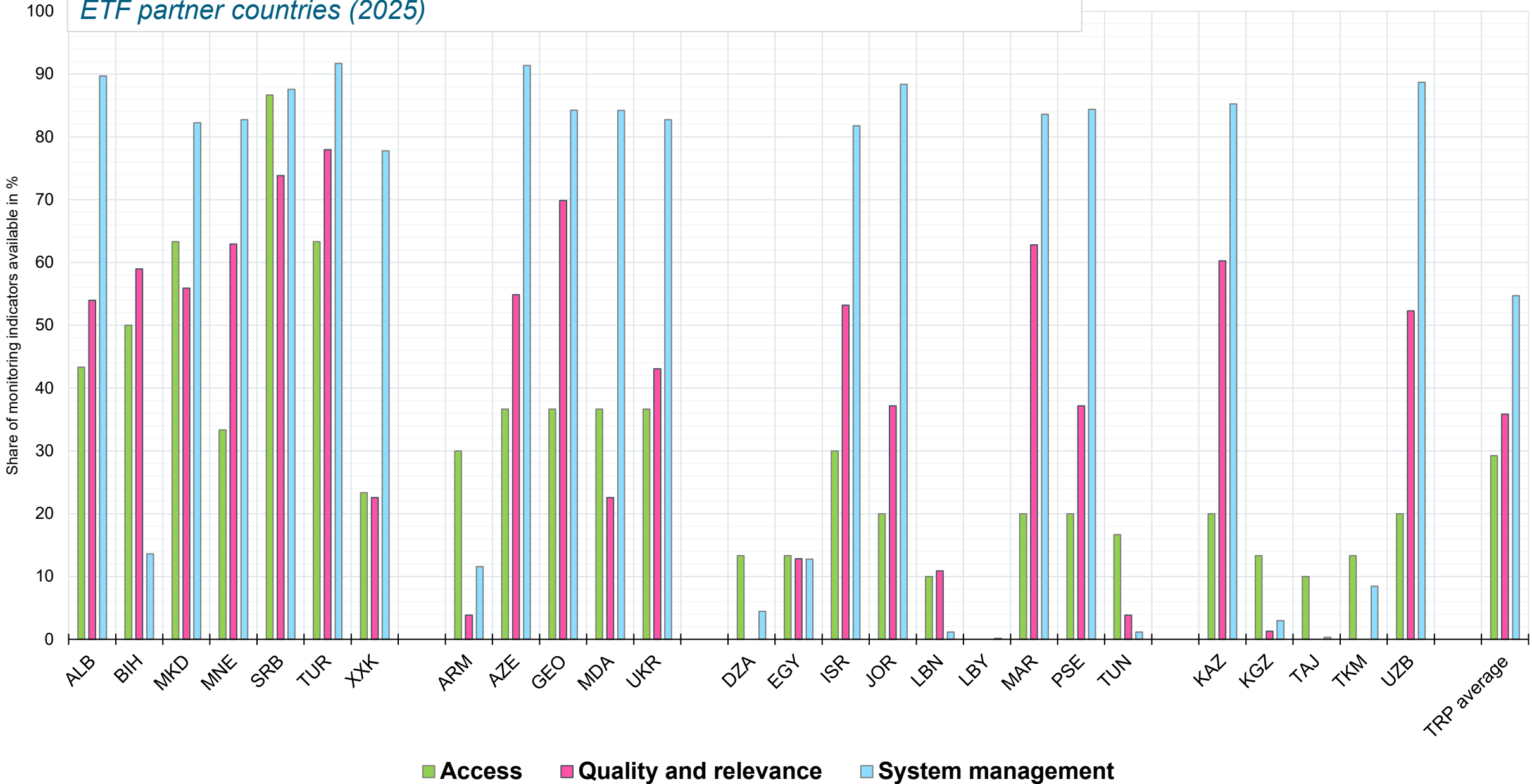


Availability of internationally comparable by age and gender (adults) ETF partner countries (2025)



Availability of internationally comparable data by area of policy monitoring

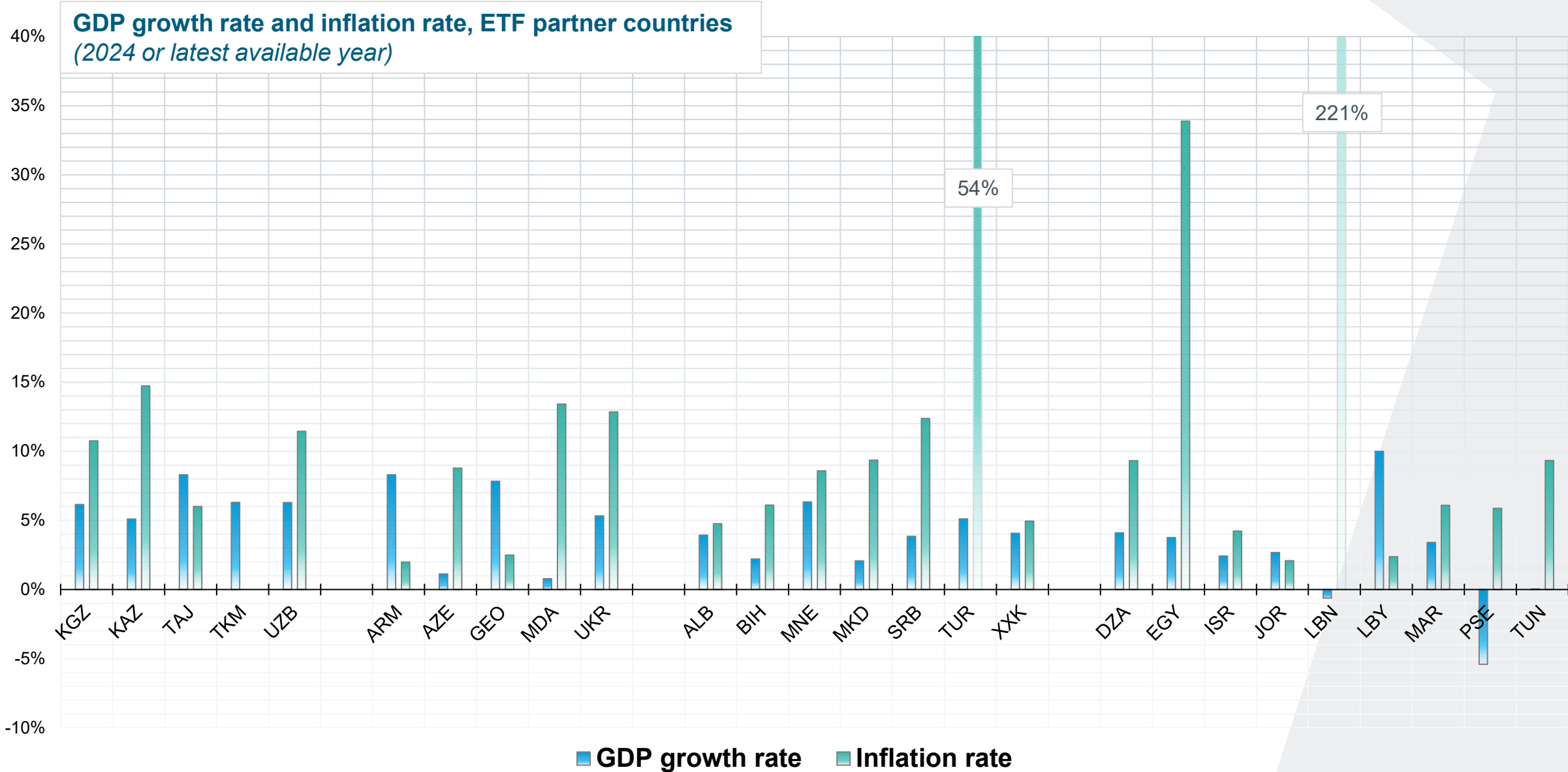
ETF partner countries (2025)



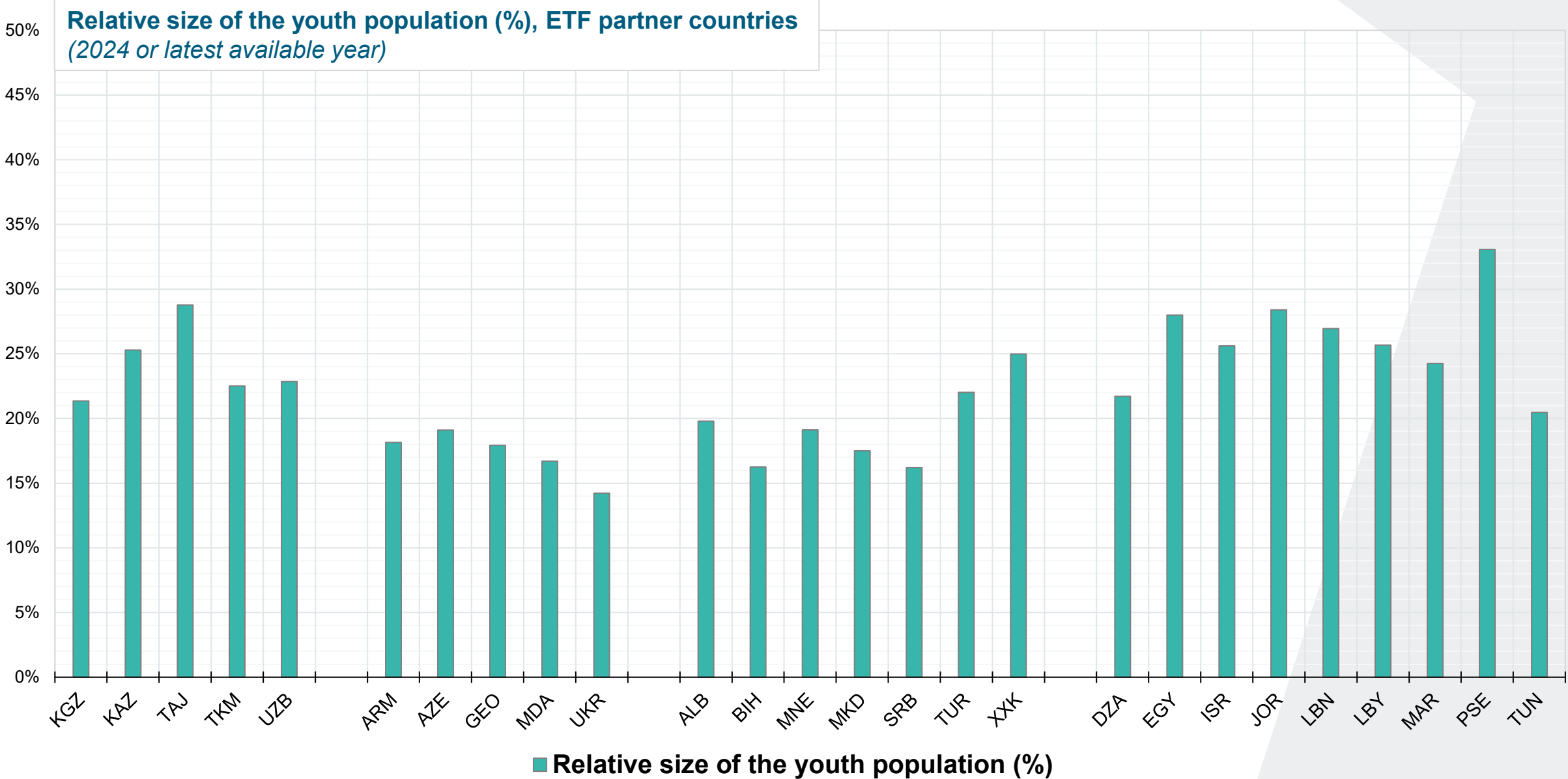
Findings:

Context and demand for learning

ECONOMIC CONTEXT



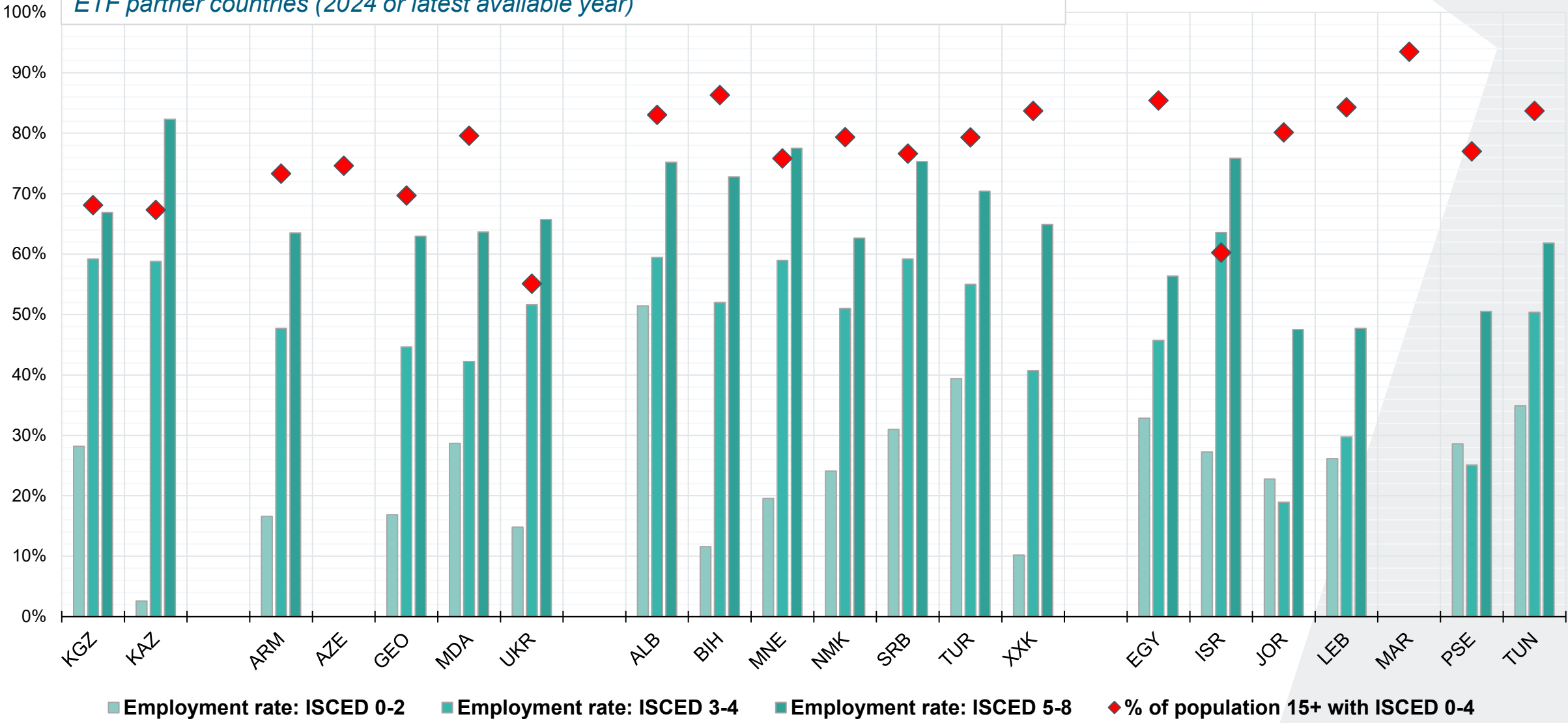
GAUGING DEMAND FOR LEARNING? (YOUTH)



Source: ETF KIESE and Torino Process database

GAUGING DEMAND FOR LEARNING? (ADULTS)

Employment rate by educational attainment (15+) and population 15+ with ISCED 0-4
ETF partner countries (2024 or latest available year)

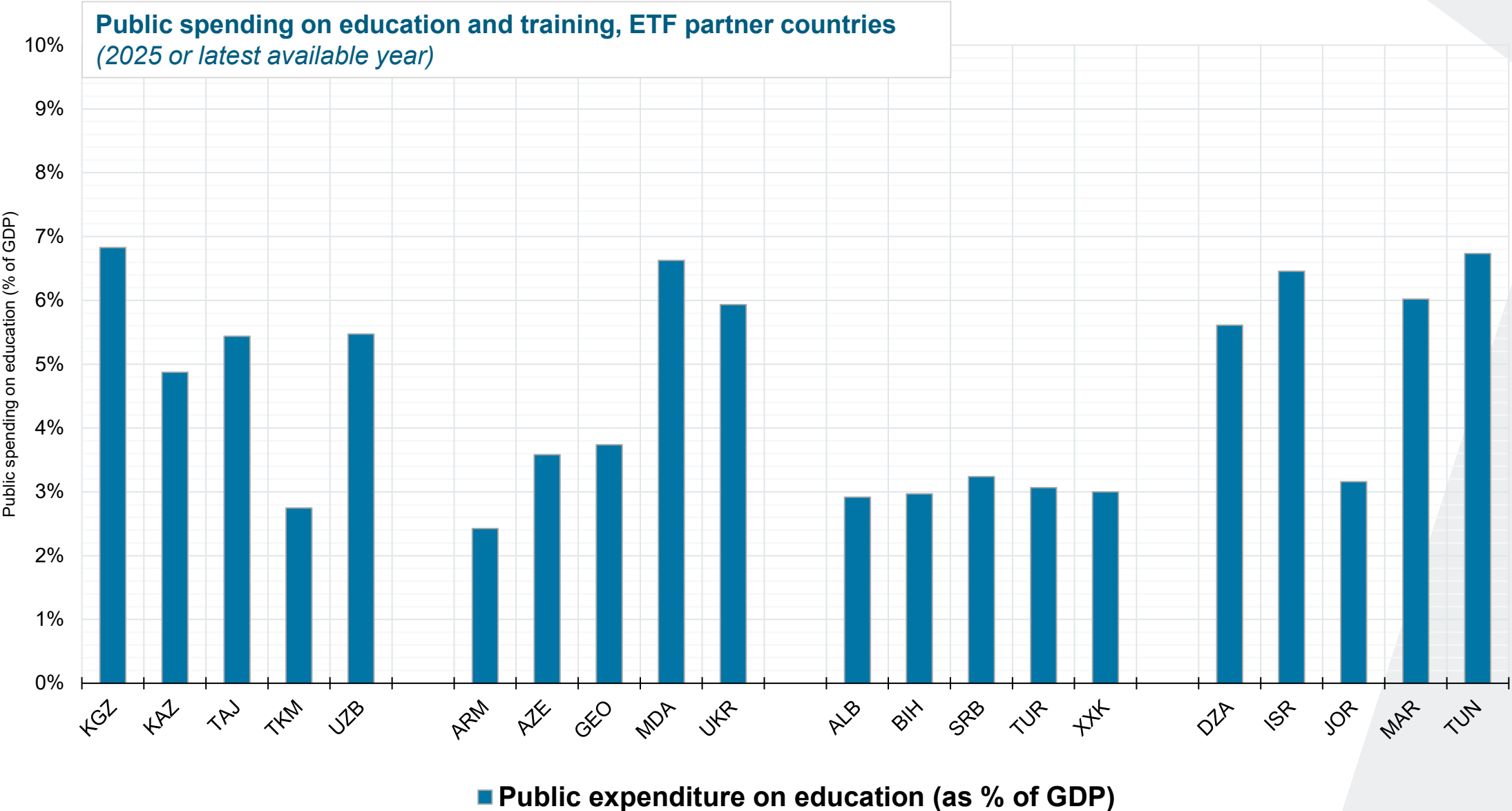


Source: ETF KIESE and Torino Process database

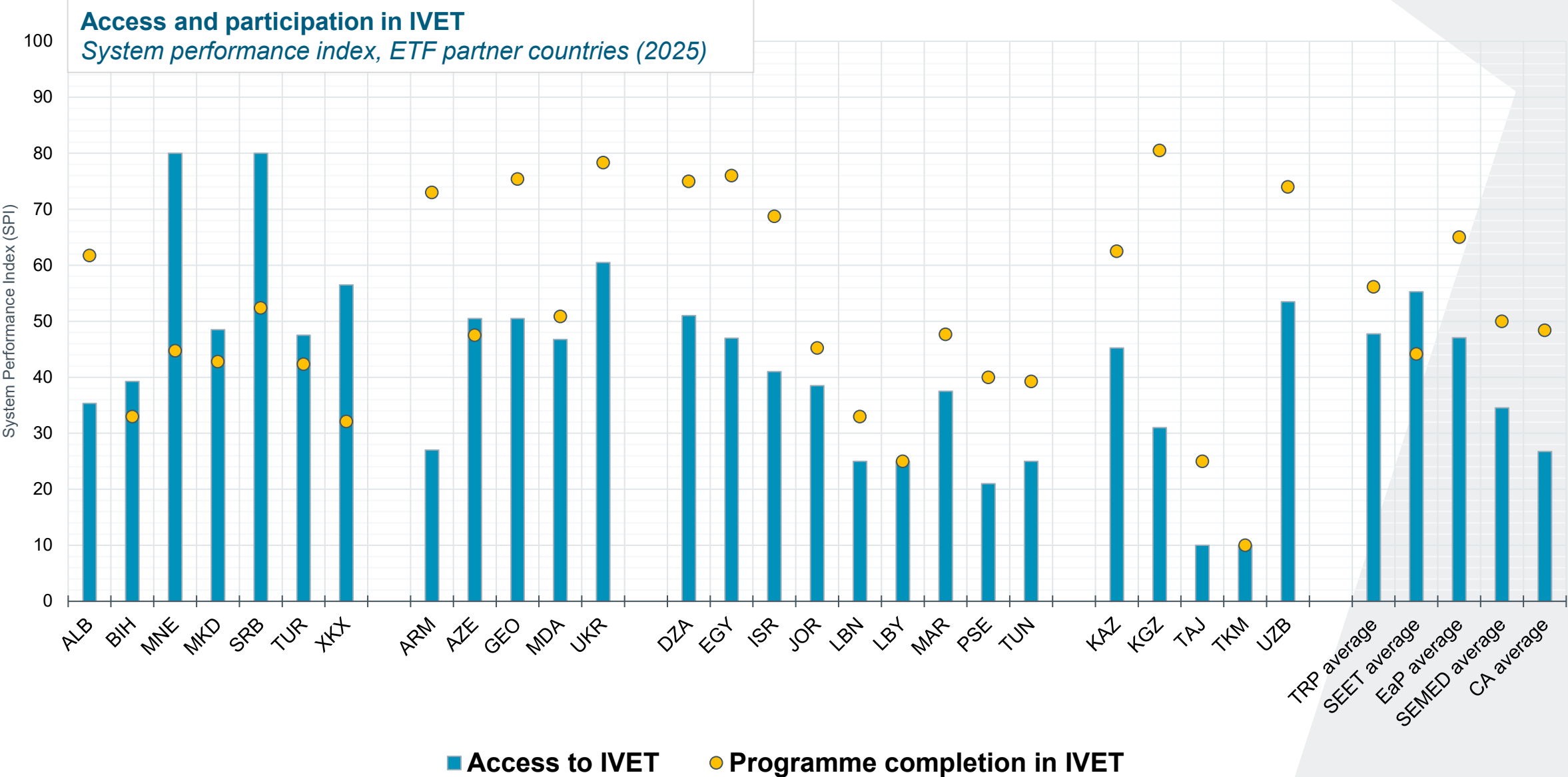
Findings:

Resources and results

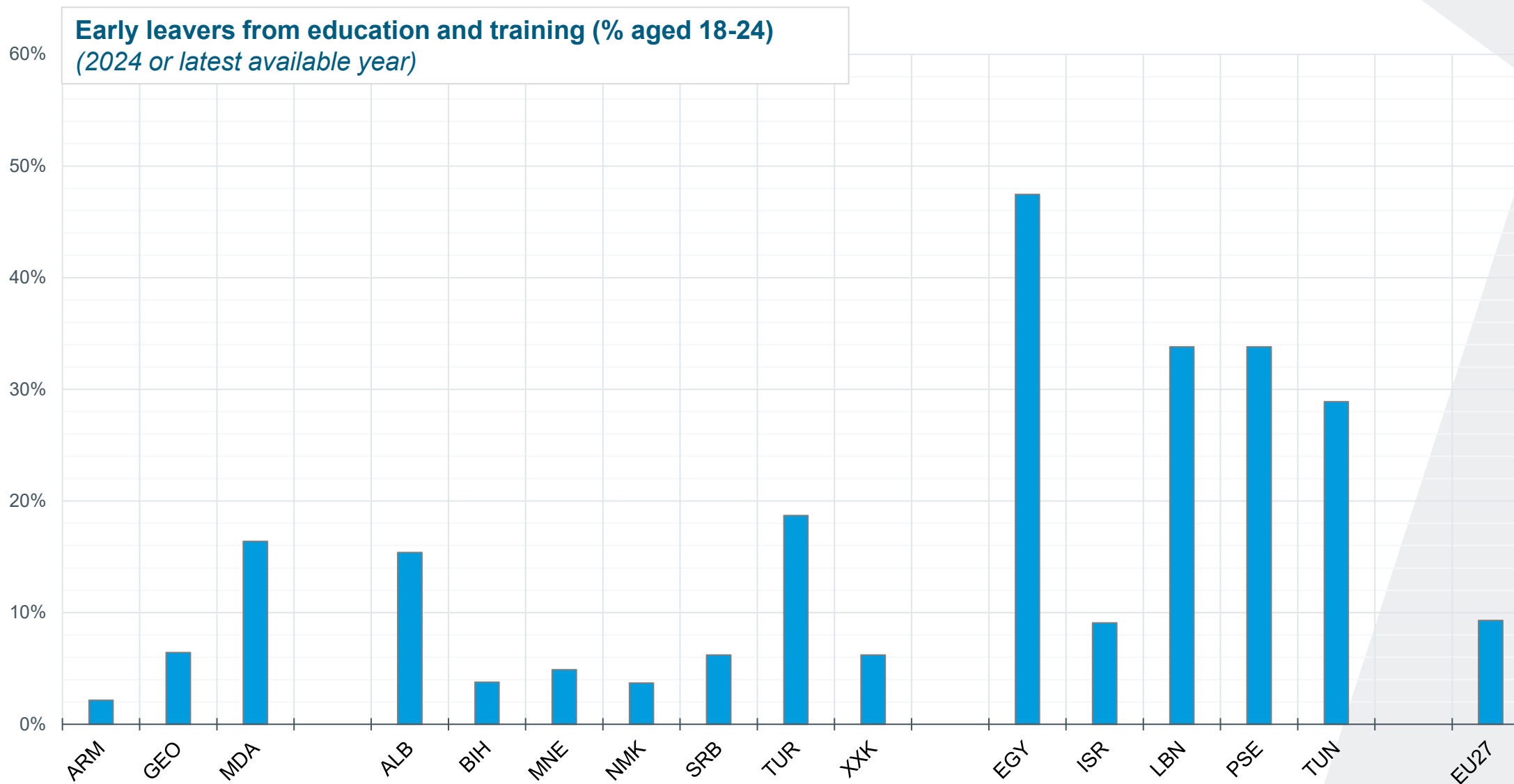
RESOURCES IN EDUCATION AND TRAINING



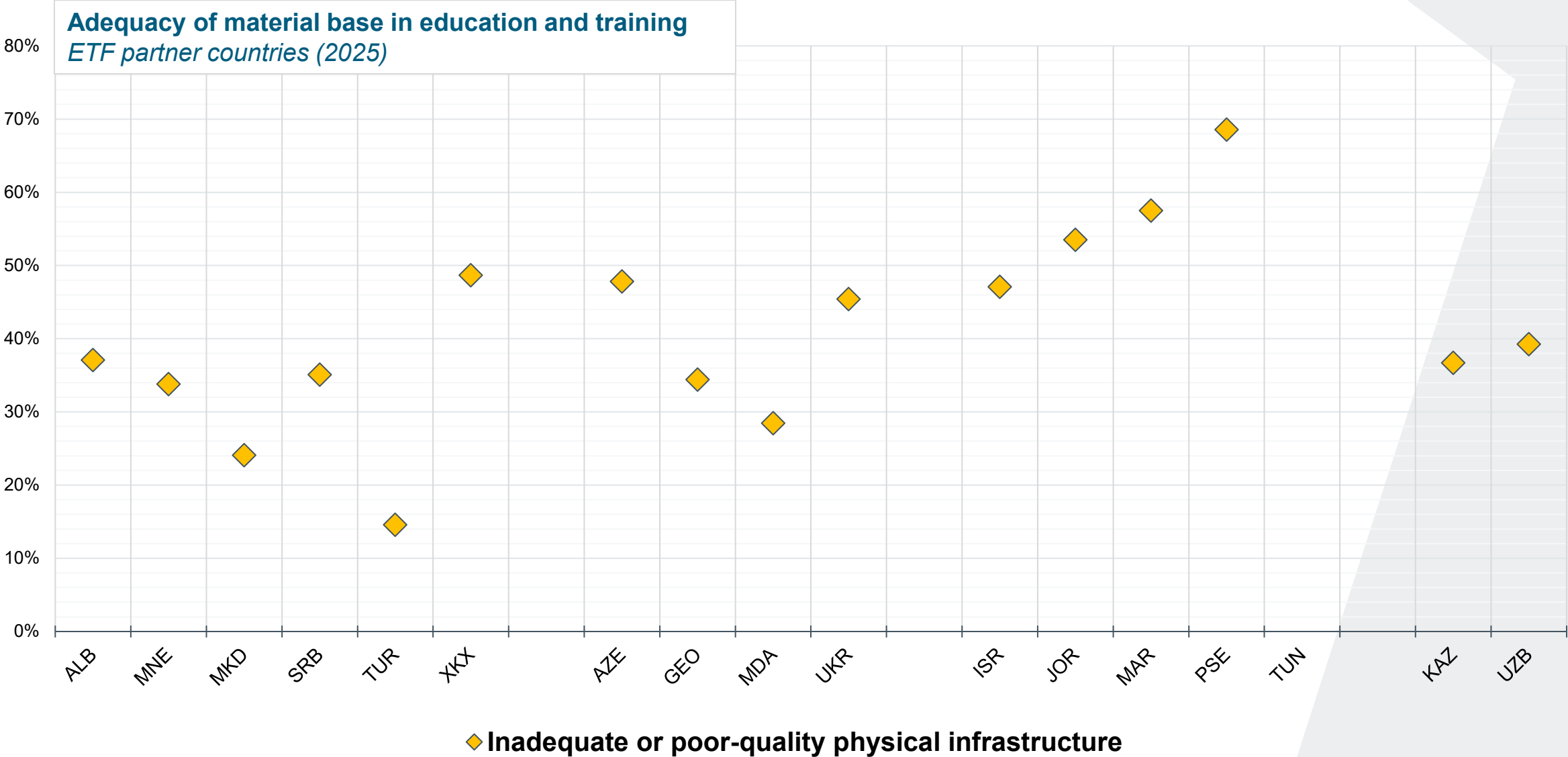
ACCESS AND PARTICIPATION: PROVIDER LEVEL



ACCESS AND PARTICIPATION: SYSTEM LEVEL

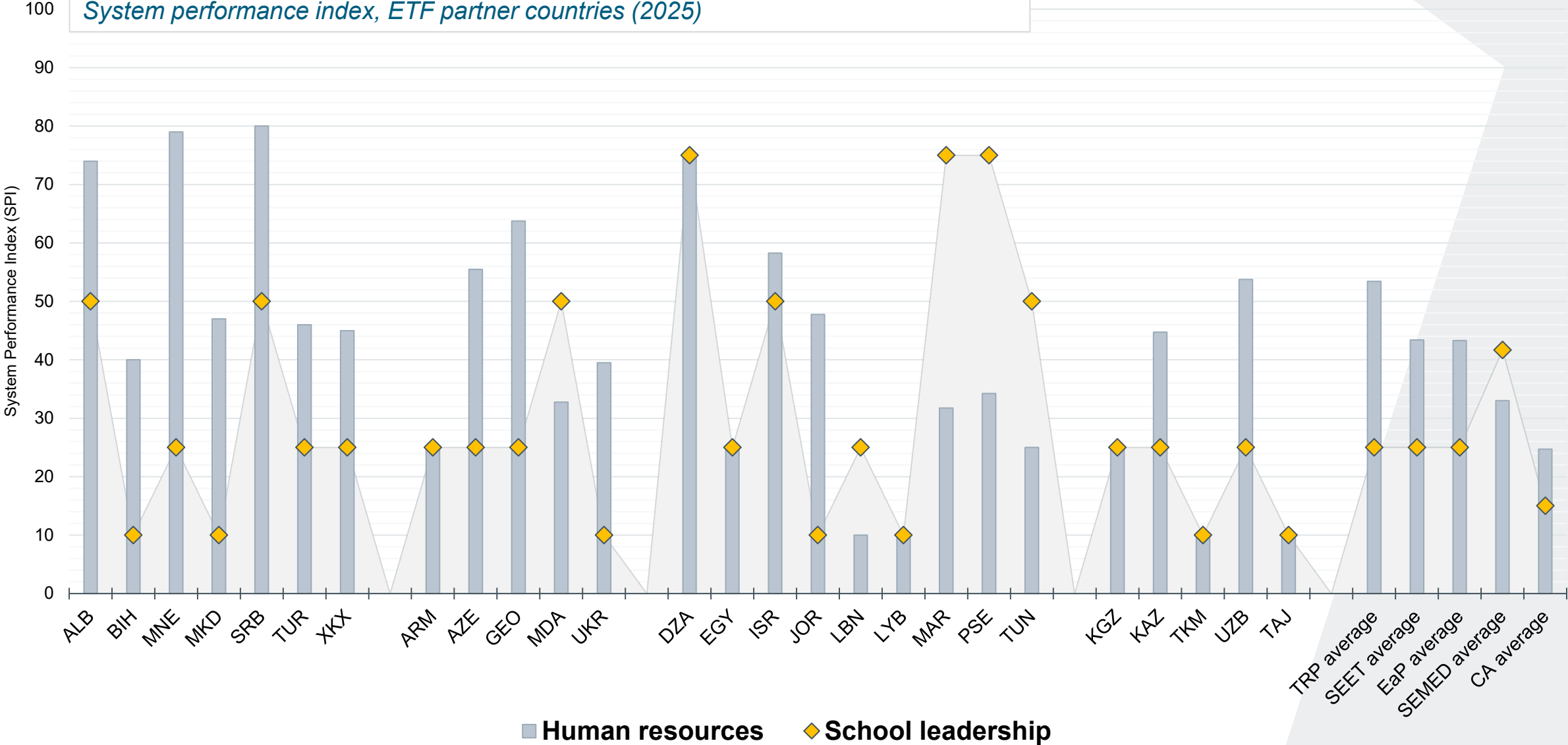


CONDITIONS OF TEACHING AND LEARNING



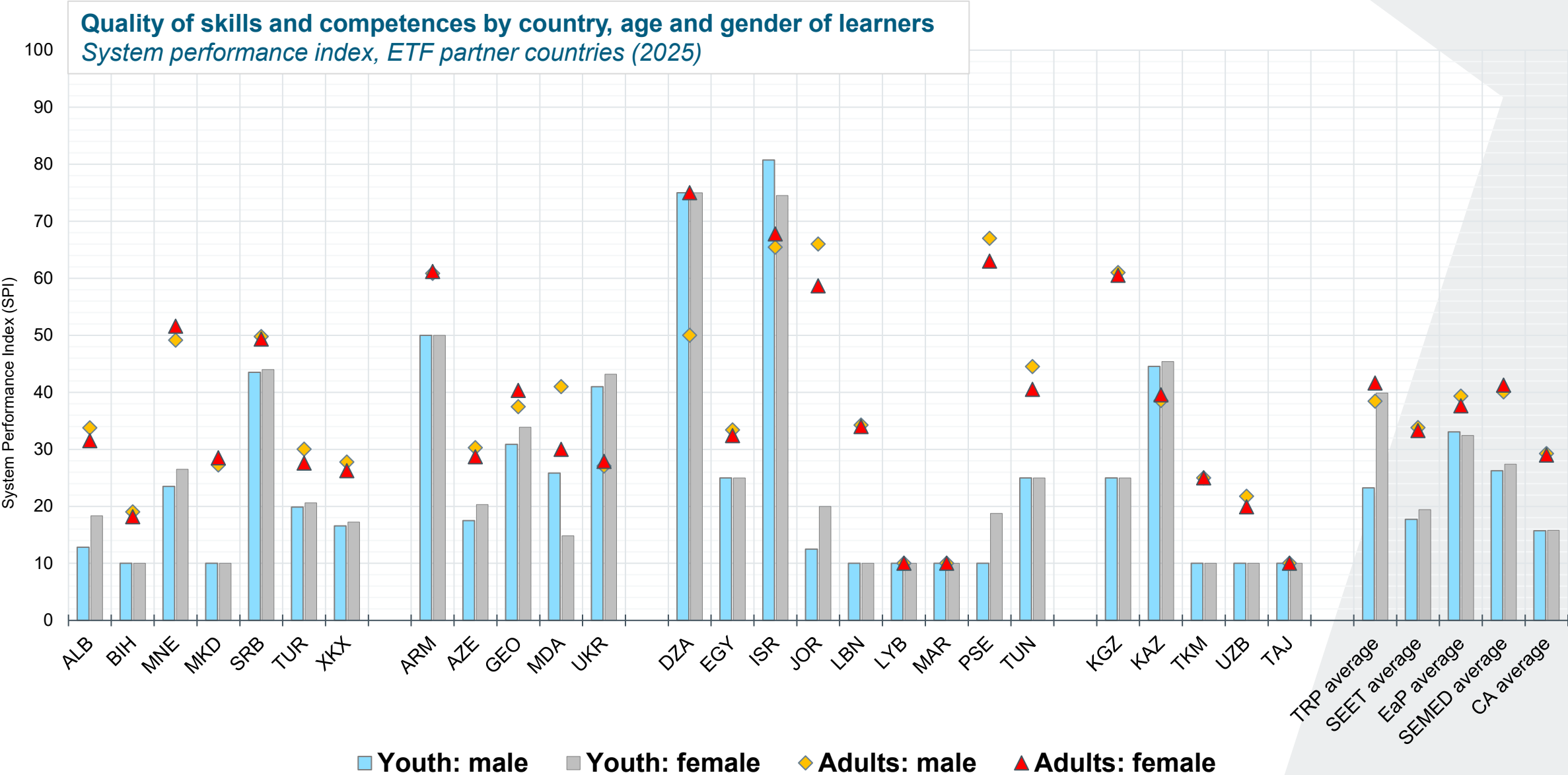
CONDITIONS OF TEACHING AND LEARNING

Adequacy of human resources and school leadership in education and training
System performance index, ETF partner countries (2025)

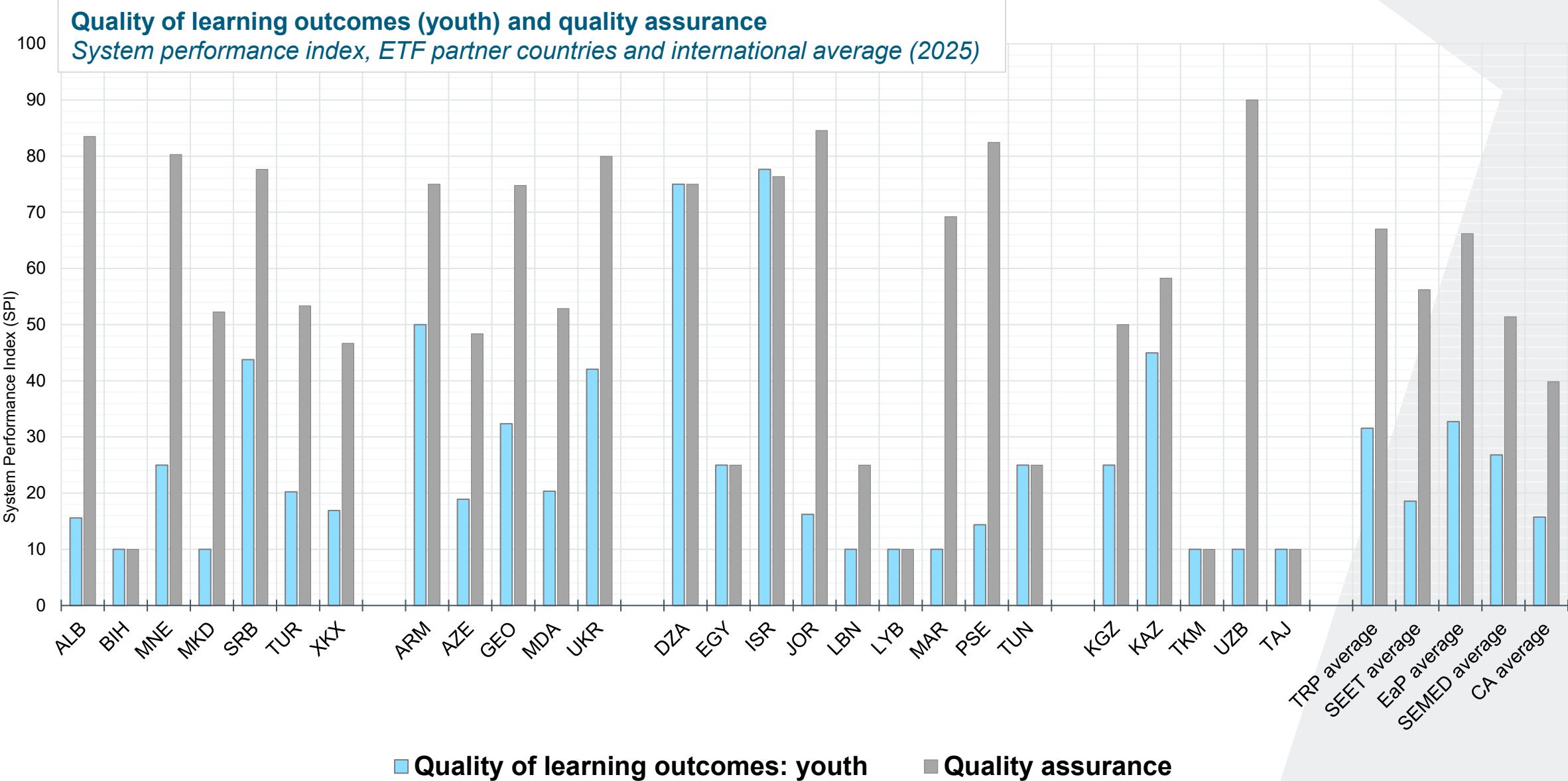


Source: ETF KIESE and Torino Process database

QUALITY AND RELEVANCE OF LEARNING

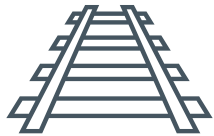


QUALITY AND RELEVANCE OF LEARNING



Monitoring: outlook 2026

TASKS AND STEPS 2026



Continuation

Update

- Thematic areas for monitoring
- KIESE indicator choices
- Torino Process monitoring questionnaires

Calibrate system performance indices

Evidence collection 2026

Monitoring results: analysis and reporting

Torino Process “classic” (policy reviews)



New

Develop and pilot **Skills Gap Index**

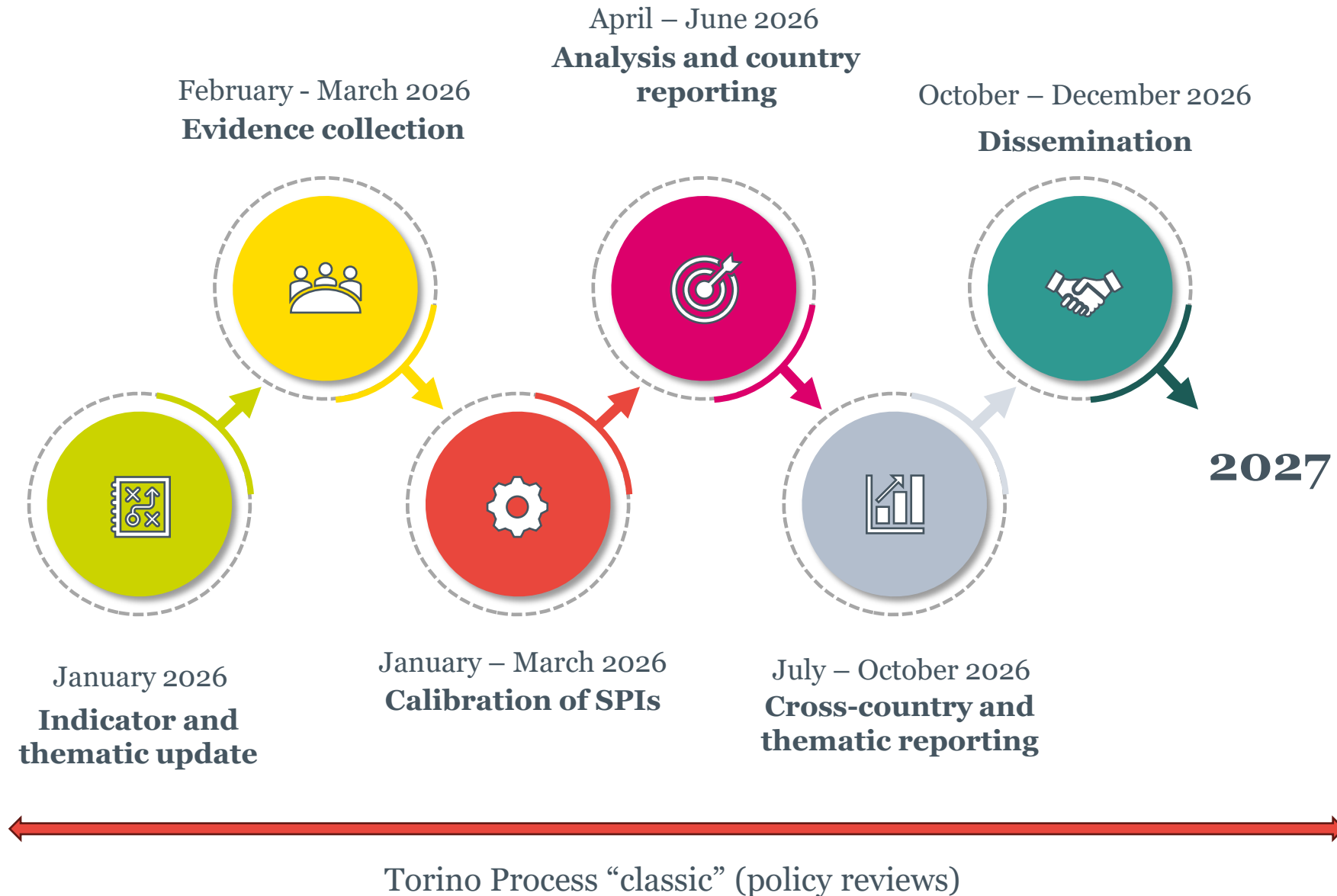
Supplementary evidence collection: **NIVET**

Public release: **ETF monitoring database**

New thematic areas

- **Integrity** in education and VET
- **Inclusive VET**
- **Other...** (proposals welcome)

TIMELINE 2026



THANK YOU!

End of Session 1



EVIDENCE IN ACTION: **ETF MONITORING FORUM 2025**

28-29 OCTOBER 2025

Session 2: Novelties and updates



ETF SKILLS GAP INDEX

Elma Aga (ETF)

Oliver Tošković (Faculty of Philosophy, University of Belgrade)

Outline

Context

Scope and focus

Definition

Metric & Method

The example of SPIs

Context

- The **ETF Skills Gap Index (SGI)** - a new initiative offering a concise and comparable overview of how far countries are from meeting their skills needs.
- Responds to the need to capture a more integrated view of how education, training, and employment systems work together in the context of skills gaps.
- Supports evidence-based policy dialogue on improving the alignment between skills supply and demand.

Scope and focus

Inputs and Outputs

- Investment in education
- Learning infrastructure
- Completion and retention
- Quality of learning outcomes
- ...

Mobilisation

- Skills relevance and utilisation
- Inclusion and participation
- Effectiveness of public employment services
- ALMPs
- ...

Skills gaps within the ecosystem

Enabler/readiness *institutional linkages*
Work-based learning, career guidance, ...

Definition

The ETF Skills Gap Index (SGI) is a composite measure that quantifies how far countries are from the base of skills they need to support economic growth and social development. It does so by tracking the distance to benchmark across several dimensions of the skills ecosystem.

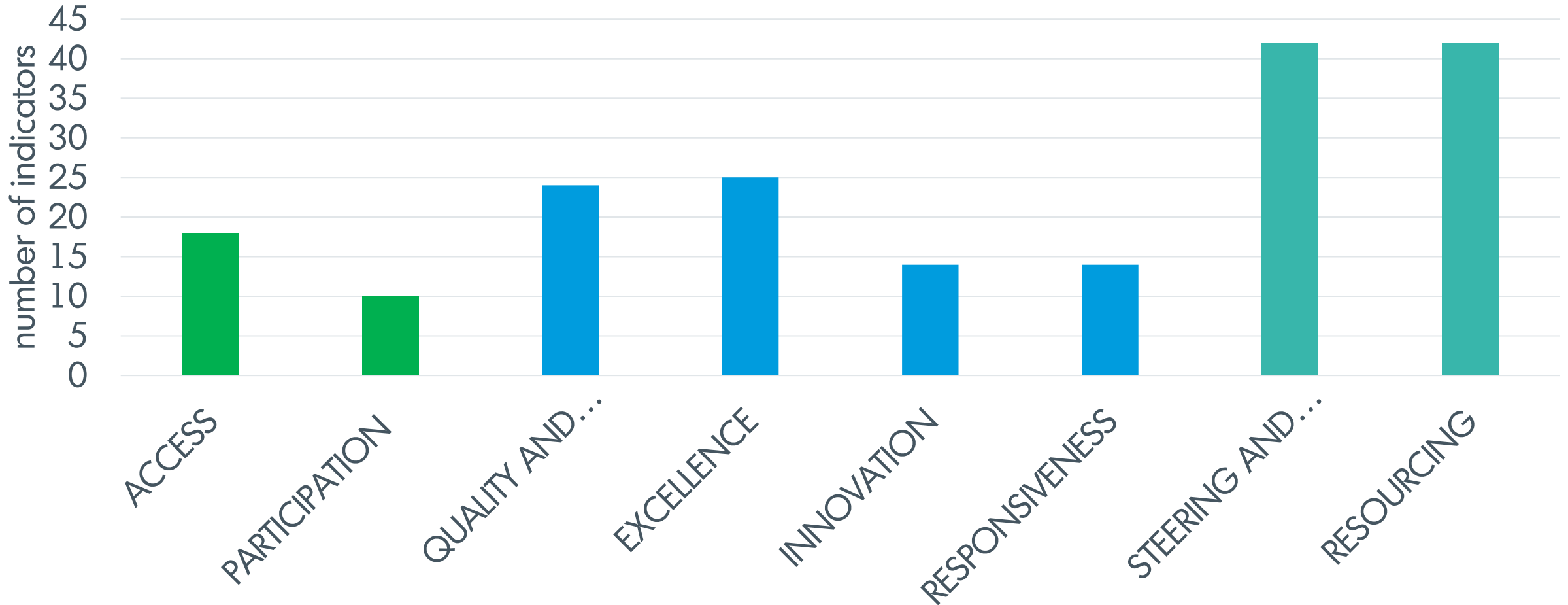
How could we measure the Skills Gap?
(The Torino Process SPI experience)

System Performance Indices (SPIs): intended coverage

| Areas | Dimensions |
|----------------------------------|---|
| Area A. Access and participation | Dimension A.1: ACCESS |
| | Dimension A.2: PARTICIPATION |
| Area B. Quality and relevance | Dimension B.1: QUALITY AND RELEVANCE |
| | Dimension B.2: EXCELLENCE <i>(discontinued in 2025)</i> |
| | Dimension B.3: INNOVATION <i>(discontinued in 2025)</i> |
| | Dimension B.4: RESPONSIVENESS |
| Area C. System organisation | Dimension C.1: STEERING AND MANAGEMENT |
| | Dimension C.2: RESOURCING |

INDICATORS

Initially started from 189 indicators in total

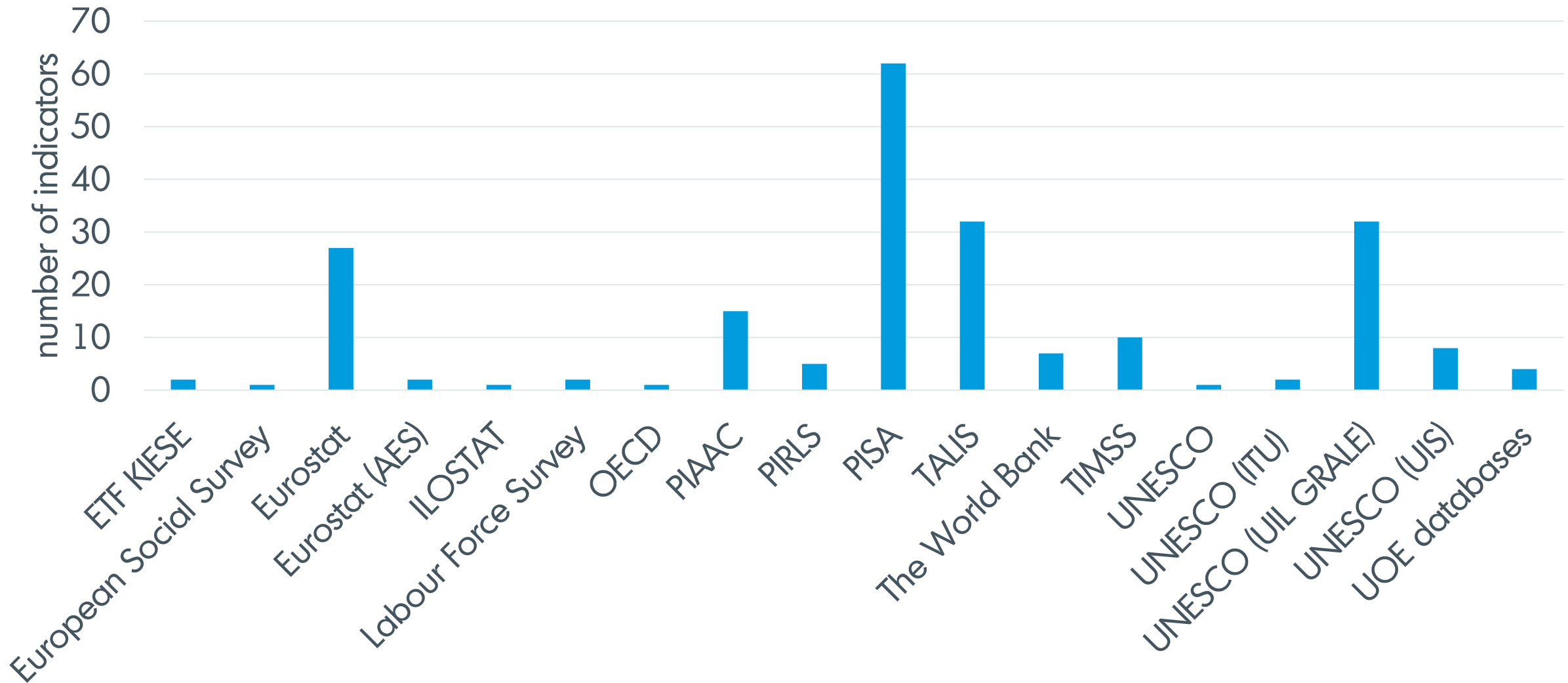


EXAMPLE quantitative

| Area | ACCESS | INDICATOR | SOURCE | argument | limitation_concept | limitation_time |
|-------|--|---|----------|--|--|------------------------------------|
| A.1 | | | | | | |
| A.1.2 | Access and attractiveness: continuing VET | The average cost of CVET courses per participant expressed through purchasing power standard. | Eurostat | Already used as a proxy of access to continuing VET in adults (e.g. CVET in Europe: the way ahead (Cedefop, 2015)), since costs are mentioned by potential learners as one of the reasons for their non-participation... | ...it doesn't measure whether adults continue their further education despite of costs or not. | ...not available for 2010 and 2015 |

SOURCES

- some indicators have multiple sources (up to 3)



Composite scores

- Initially (in 2023): 8 dimensions (several outcomes for each)
 - covered by different quantitative and qualitative indicators
- Composite scores for monitoring dimensions
 - horizontal aggregation (indicator to outcome scores),
 - vertical aggregation (outcome to monitoring dimension scores)
- Incorporate qualitative evidence (combining it with quantitative)
- Indicators measured using different types of scales

Composite scores

- Rescaling all indicators to common scale with a known and definite range
- Applying weights to each indicator
 - based on either expert evaluation
 - or unsupervised statistical methods
- Combining weighted indicators into a single score which lies in a known and definite range

Rescaling indicators to a common scale

- rescaled to a scale 0-100
- higher scores correspond to better outcomes
- user-centered approach (scale resembles percentages)

Rescaling indicators to a common scale

- *Binary Indicators and Identity Transformations*
 - absence: 0 or presence: 1

$$\text{Rescaled Indicator} = \text{Indicator} * 100$$

- *Indicators that utilized Likert's scale*
 - positivity/negativity or manifestation of a certain issue
 - scales with different ranges

$$\text{Rescaled Indicator} = (\text{Indicator value} - 1) * \frac{100}{\text{theoretical}(\text{Indicator}) - 1}$$

Rescaling indicators to a common scale

- *Binary Indicator – EXAMPLE*
- *Participatory governance in adult learning and education:*
 - *“Since 2009, has your government consulted stakeholders and civil society about the formulation, implementation, and evaluation of ALE policies? “No” or “Yes”*

$$\text{Rescaled} = 0 * 100 = 0$$

$$\text{Rescaled} = 1 * 100 = 100$$

Rescaling indicators to a common scale

- *Likert's scale – EXAMPLE*
- *Most teachers in this school strive to develop new ideas for teaching and learning;*
 - *"Strongly disagree/Disagree/Agree/Strongly agree*

$$\text{Rescaled} = (1 - 1) * \frac{100}{4 - 1} = 0$$

$$\text{Rescaled} = (4 - 1) * \frac{100}{4 - 1} = 100$$

Rescaling indicators to a common scale

- *Indicators with interval scale of unspecified range*
 - ratio of two proportions
 - *min-max transformation*
 - relies on theoretical minimum and maximum values
 - a min and a max value observed across all available countries in original databases

$$\text{Rescaled Indicators} = \frac{\text{Indicator value} - \min(\text{Indicator})}{(\text{Indicator}) - \min(\text{Indicator})} * 100$$

Rescaling indicators to a common scale

- *Scale of unspecified range - EXAMPLE*
 - Ratio of graduation rates for IVET and graduation rates of general education

$$\text{Rescaled Indicators} = \frac{0.2 - 0.2}{0.9 - 0.2} * 100 = 0$$

$$\text{Rescaled Indicators} = \frac{0.9 - 0.2}{0.9 - 0.2} * 100 = 100$$

Rescaling indicators to a common scale

- *Entropy transformations*
 - diversity of education funding (proportion of funding sources)
 - Entropy - variety in distribution across categories
 - schools receive funds from 4 sources with 25% of funding from each
 - schools receive funds from 4 sources but 90% coming from one or
 - schools receive funds from 1 or 2 sources.

$$Entropy = - \sum_i^m p_i \log p_i$$

- rescaled by using the following transformation formula:

$$Rescaled\ Indicators = \frac{Calculated\ entropy}{\hspace{10em}}$$

Rescaling indicators to a common scale

- *Entropy transformation - EXAMPLE*

- Percentage of total funding for the school year from different sources assessed by school principals:
 - Government; Student fees or School charges paid by parents; Benefactors, donations, bequests, sponsorships, parent fundraising; Other

$$\text{Entropy} = -(0.9 * \log(0.9) + 0.1 * \log(0.1)) = 0.14$$

Entropy

$$= -(0.2 * \log(0.2) + 0.2 * \log(0.2) + 0.2 * \log(0.2) + 0.2 * \log(0.2) + 0.2 * \log(0.2)) = 0.70$$

$$\text{Rescaled} = \frac{0.14}{0.70} * 100 = 20$$

Other applications?

- **Misalignment between education/training systems and labour market needs**
- **Entry point for assessing structural weaknesses**

THANK YOU!

End of Session 2

