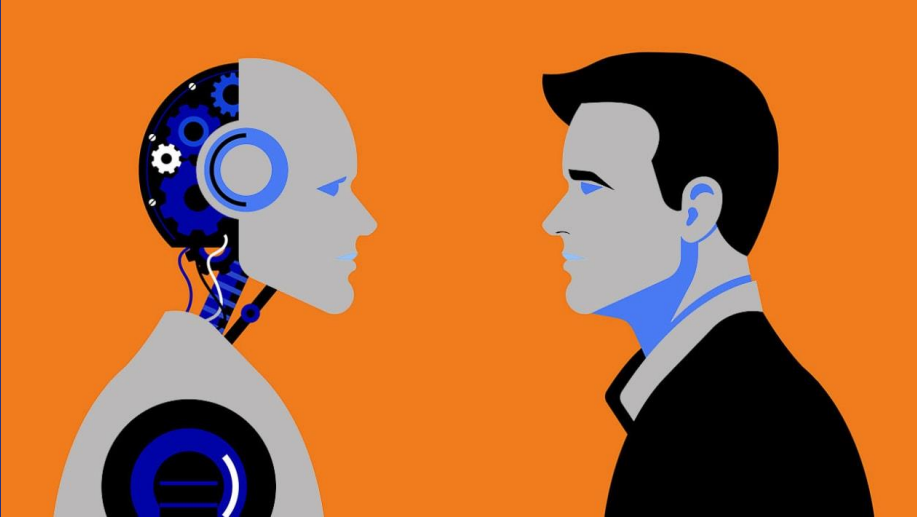
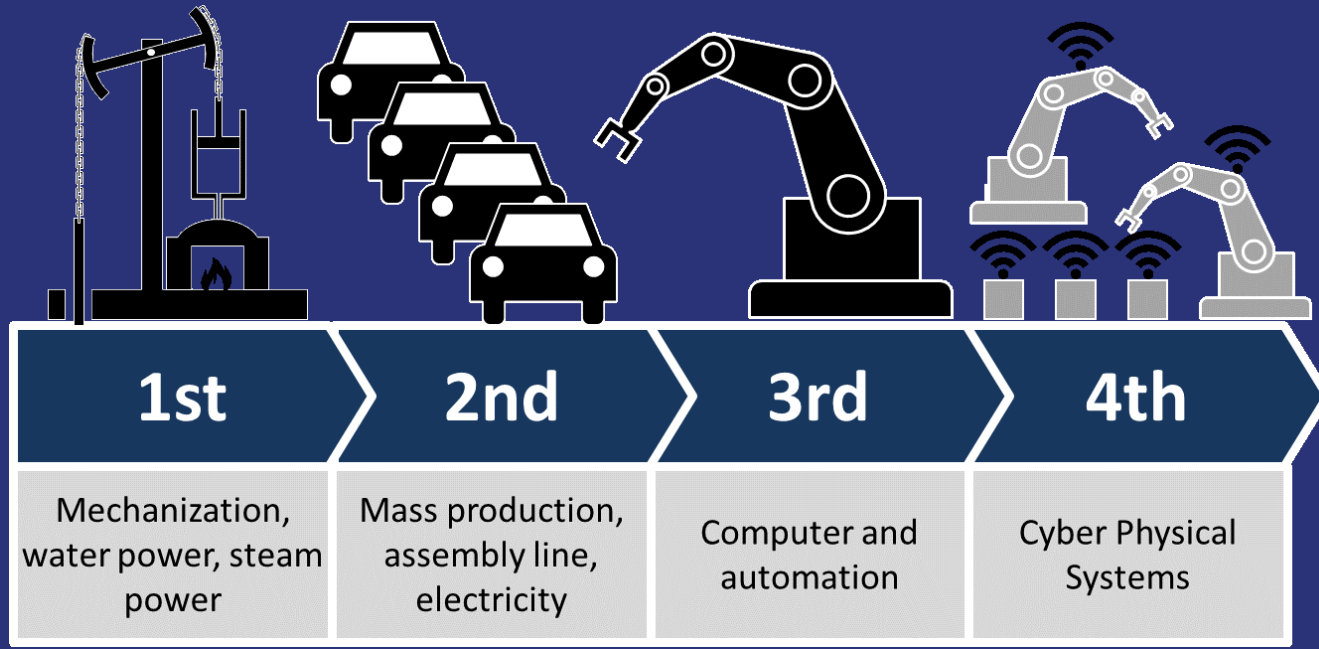




Future Skills and the Future of Work

# The 4th Industrial Revolution





**Education 1.0**

*Lectures, rote learning, & memorisation*

**Education 2.0**

*Internet-enabled learning*

**Education 3.0**

*Knowledge-based education*

**Education 4.0**

*Innovation-based education*





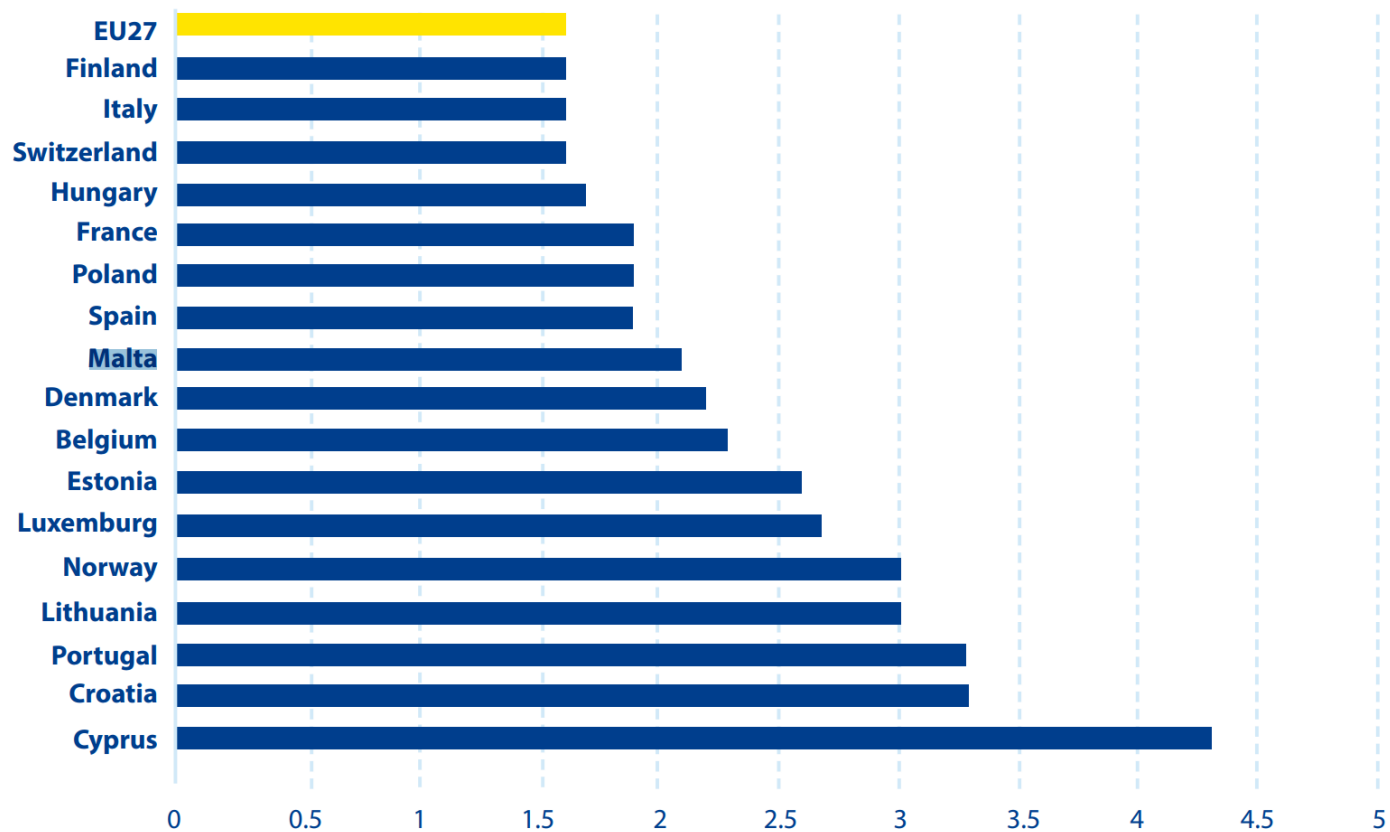
Difficult to predict precisely what types of skills are needed in which occupations, sectors and regions in a constantly changing world of work.

Establish appropriate initial and continuing vocational education, training and on-the-job programmes.

The digital skills gap and the skills required to make the transition to a carbon-free economy are increasingly evident.

NATIONAL  
**Skills**  
COUNCIL

**Figure 14** – Countries where the forecast for ICT professionals is equal or above the EU average (2021–2026)



st skills,



crn2].

Source: Cedefop online skill forecast 2021–2026



# What makes **your** job exposed to GPT?

Exposure: potential economic impact

## Low Exposure

1. Low wages
2. Manufacturing
3. Agriculture
4. Mining
5. Science skills
6. Jobs requiring low formal education
7. Jobs requiring many hours of on-the-job training
8. Critical thinking skills

## High Exposure

1. High wages
2. Writing
3. Programming
4. Information processing
5. Work that requires college degree or higher
6. Minimal on-the-job training
7. Routine & repetitive work



# What jobs are exposed to GPT?

## Low Exposure

1. Athletes
2. Stonemasons
3. Cement Masons
4. Dishwashers
5. Tire Repairers and Changers
6. Pile Driver Operators
7. Automotive Repairers
8. Carpenter Helpers
9. Cooks

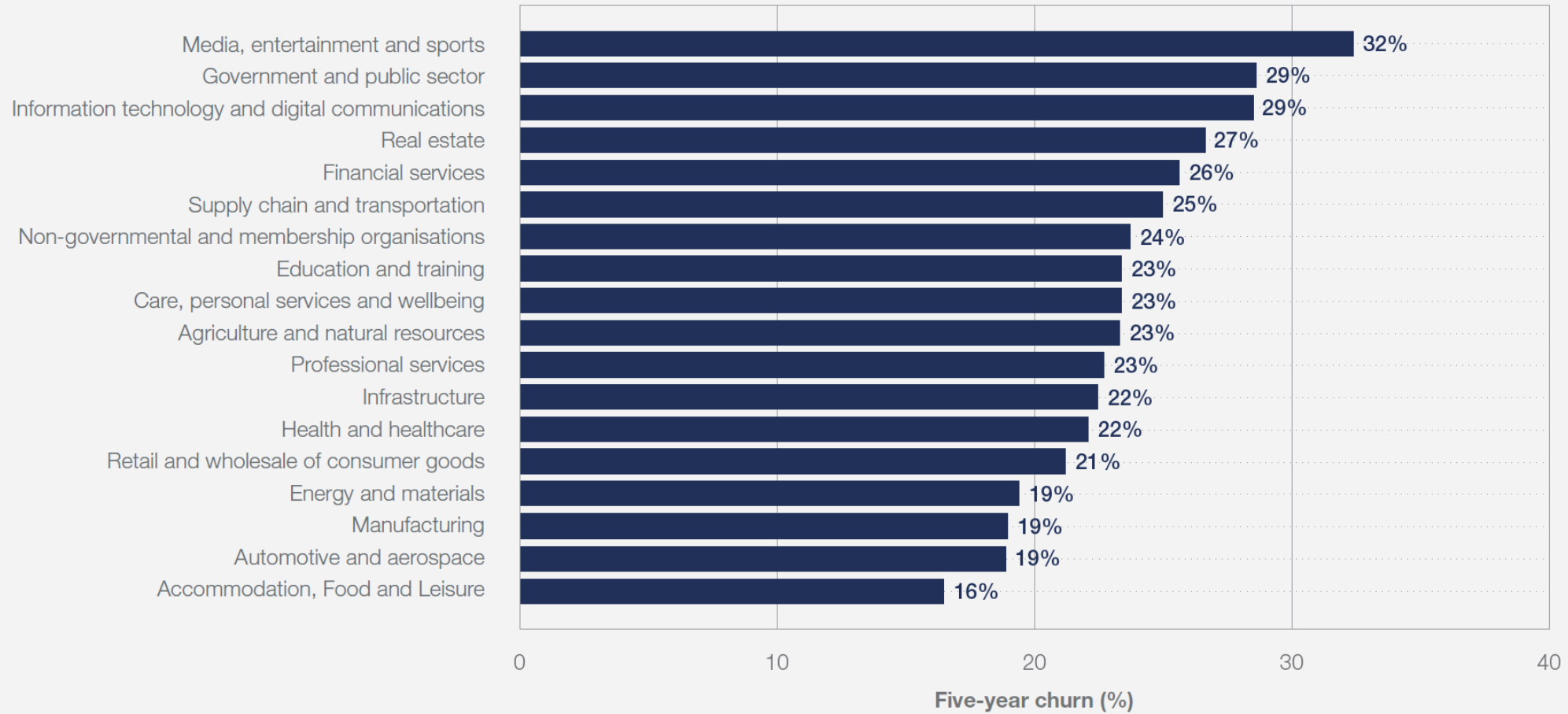
## High Exposure

1. Interpreters + Translators
2. Survey Researchers
3. Writers and Authors
4. Accountants and Auditors
5. Proofreaders and Copy Markers
6. Mathematicians
7. Blockchain Engineers
8. Tax Preparers
9. Public Relations Specialists



FIGURE 3.2

Labour market churn, by industry



Source

World Economic Forum, Future of Jobs Survey 2023.

Source

Labour-market churn refers to the total expected job movement - including both new roles being created and existing roles destroyed - as a proportion of current employment. This excludes situations where a new employee replaces someone in the same role.

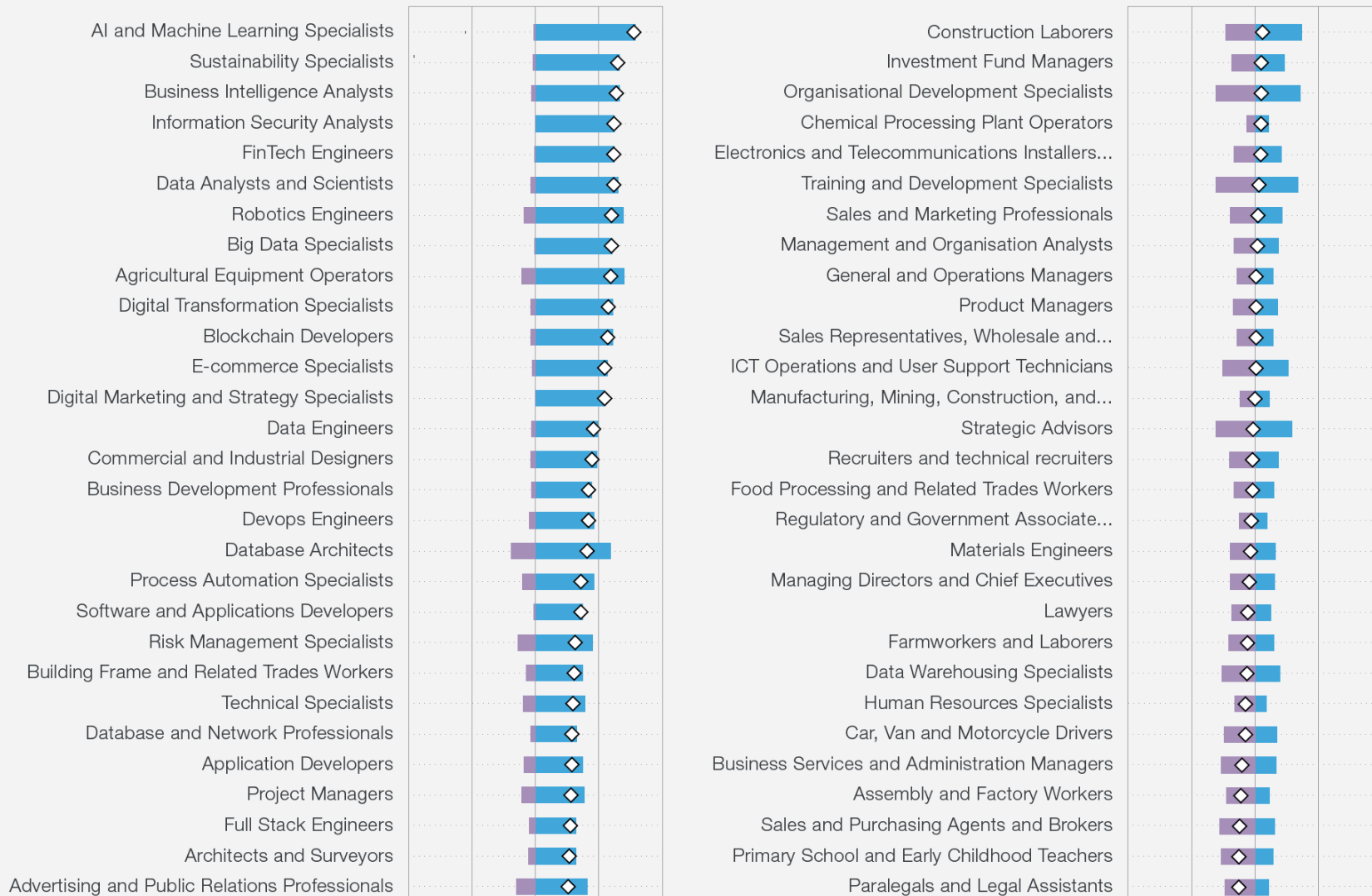


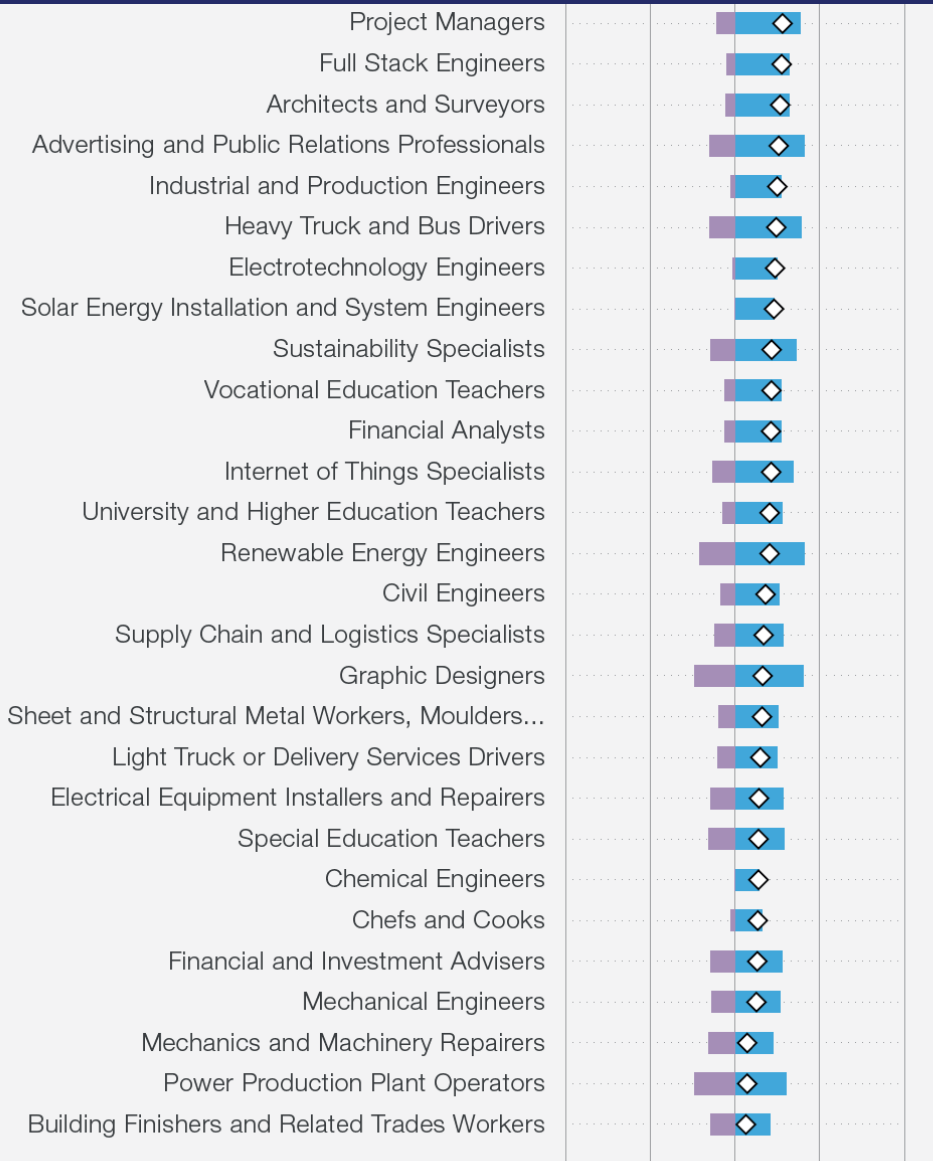


FIGURE 3.3

### New jobs and lost jobs, 2023-2027

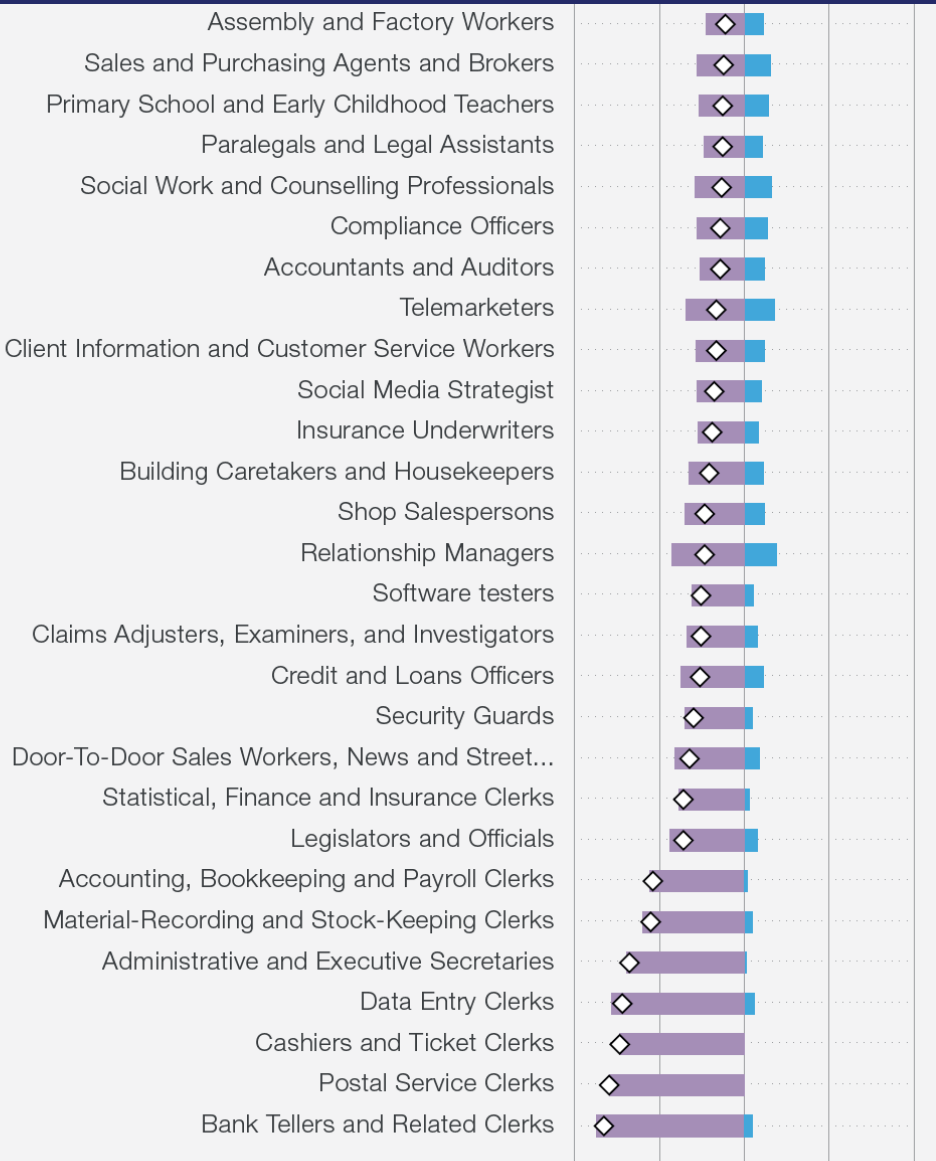
Projected job creation (blue) and displacement (purple) between 2023 and 2027, as a fraction of current employment, for the global employee data set studied in this report. The projected net growth or decline for each occupation in the next five years (diamonds) calculated by subtracting the two fractions. The projected structural labour-market churn for each occupation in the next five years is the sum of the two fractions, and is indicated by the full width of the bars. Averaged across occupations, structural labour-market churn represents 23% of current employment.





-50 -25 0 +25 +50

Fraction of current workforce (%)



-50 -25 0 +25 +50

Fraction of current workforce (%)

Source

World Economic Forum, Future of Jobs Survey 2023

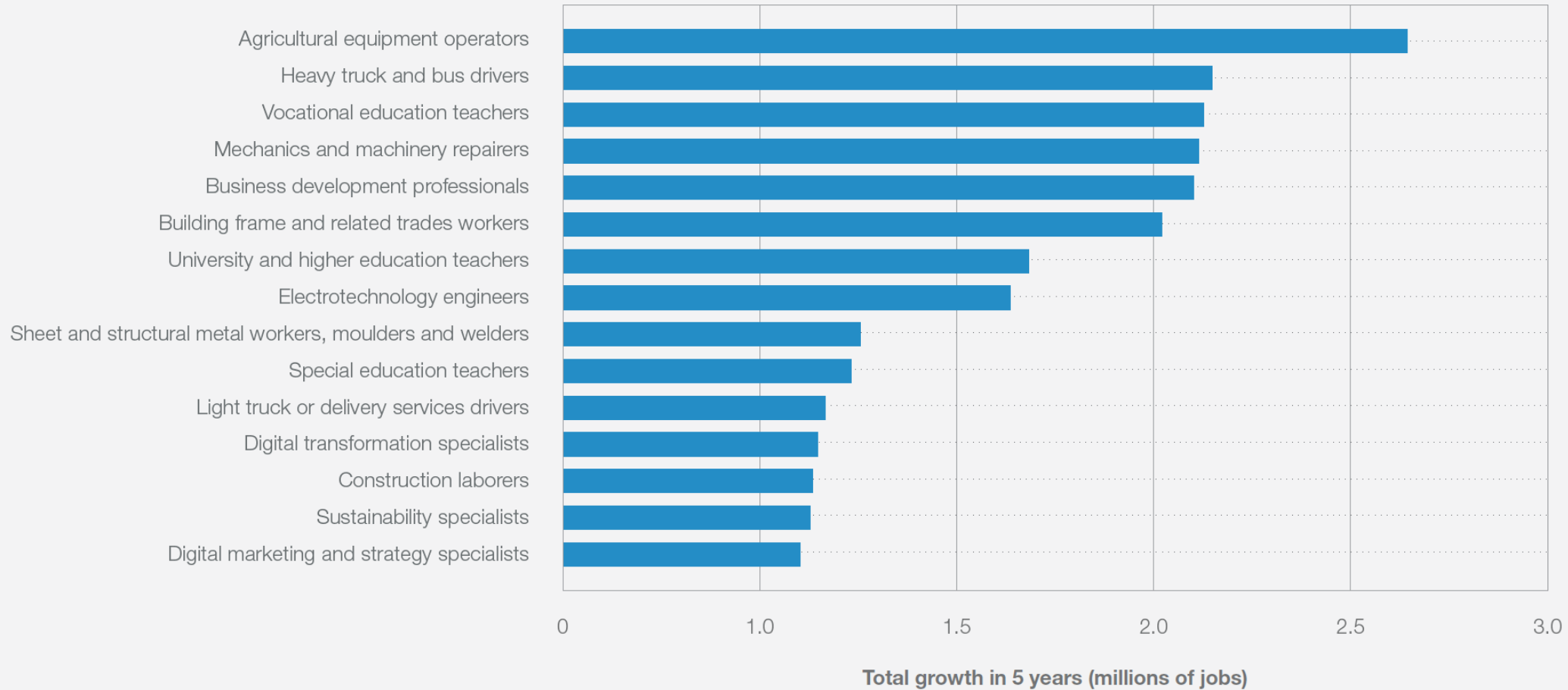
Jobs created Jobs displaced Net growth or decline



FIGURE 3.4

### Largest job growth, millions

Top roles ordered by largest net job growth, calculated based on ILO Occupation Employment statistics and growth reported by organizations surveyed



Source

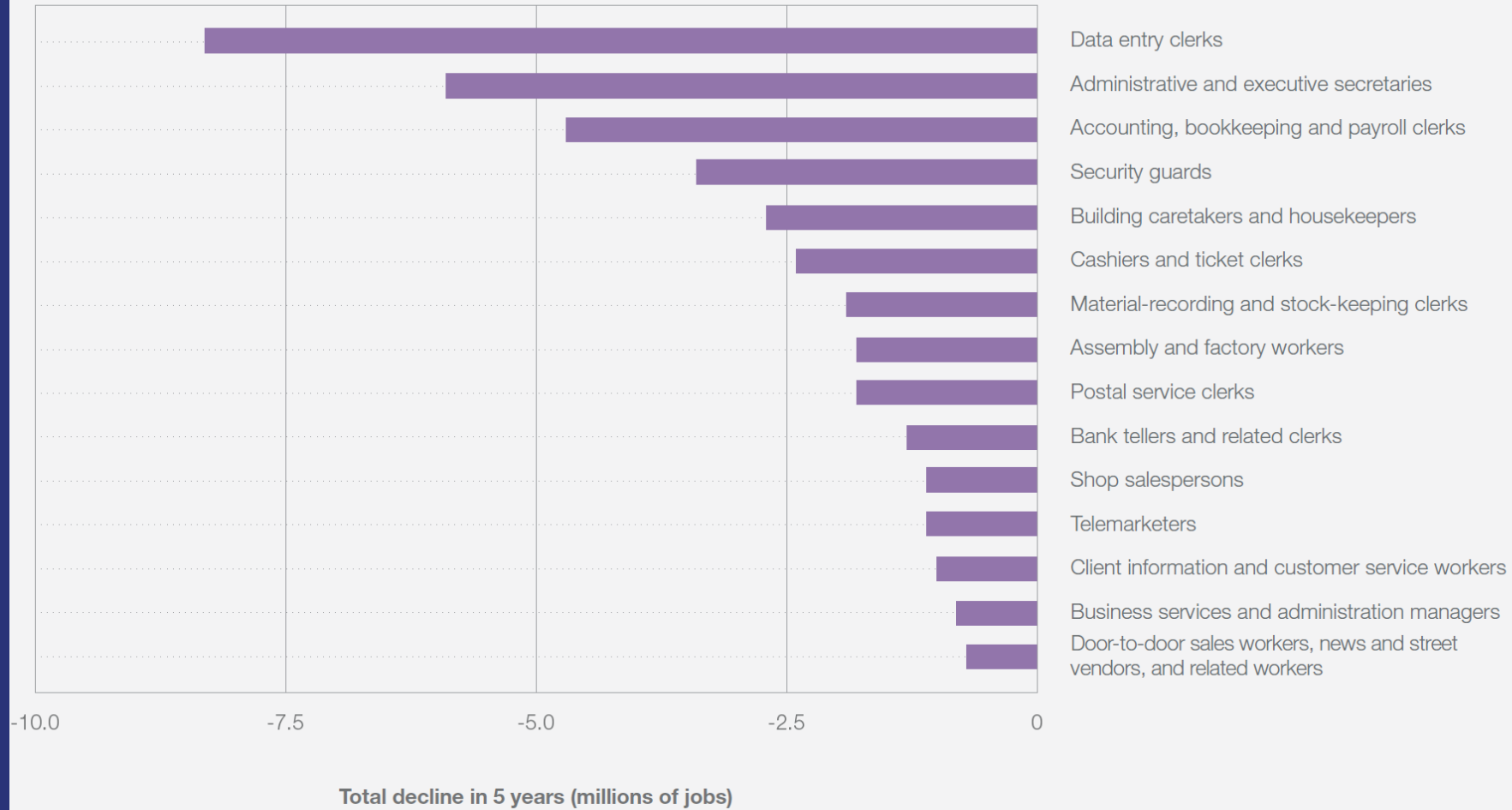
World Economic Forum, Future of Jobs Survey 2023.



FIGURE 3.5

### Largest job decline, millions

Top roles ordered by the largest net jobs reduction, calculated based on ILO Occupation Employment statistics and growth reported by organizations surveyed



Source

World Economic Forum, Future of Jobs Survey 2023.



# Labour shortages in Malta that required specific skills or knowledge for the green transition



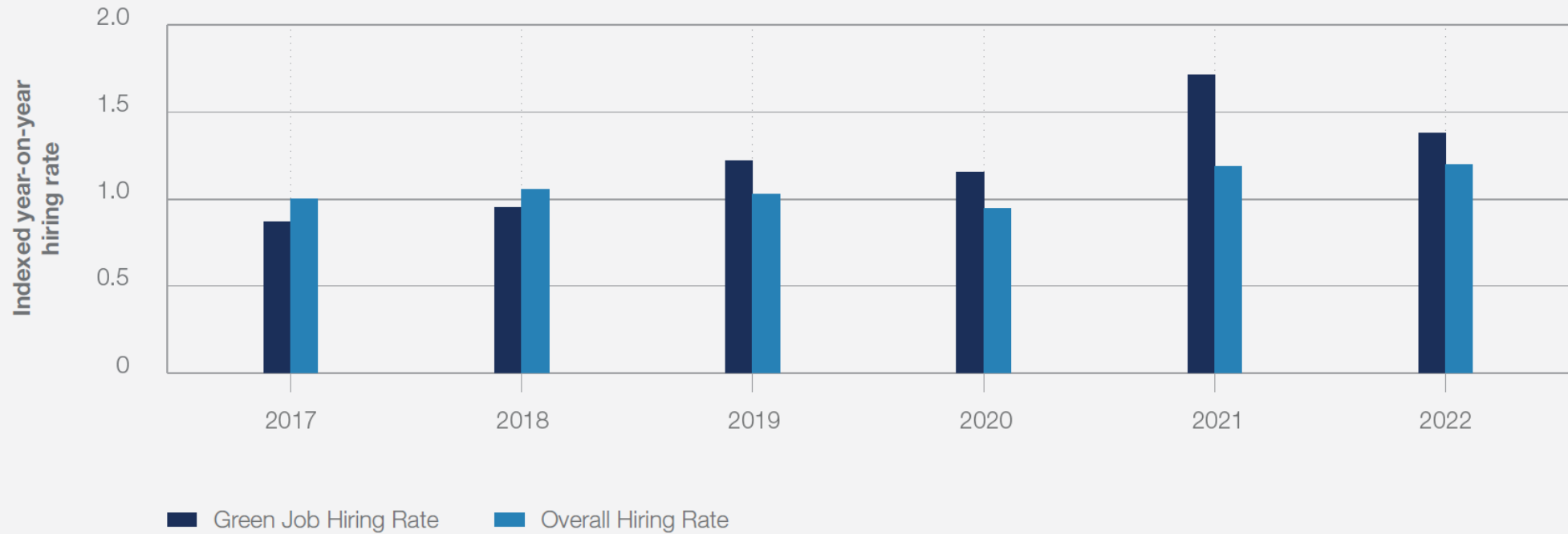
Source:  
European Labour Authority (2023)  
EURES Report on labour shortages and surpluses 2022



FIGURE B3.1

### Growth in annual hiring rates for green jobs

Hiring rates for green jobs and the global sample as a fraction of the previous year's hiring rate for that sample. 1 indicates no change.



Source  
LinkedIn.



# The sectors with the largest labour and skills shortages include:

Country reports of the 2022 Thematic Review of the European Centre of Expertise (ECE) in the field of labour law, employment and labour market policies, on 'Skills shortages and structural changes in the labour market during the Covid-19 pandemic and in the context of the digital and green transition

*Engineering  
craft workers*  
(machinists, welders, electricians,  
plumbers, and mechanics)

*ICT*

*Hospitality*  
(restaurants and  
accommodation sector)

*Healthcare*

*Construction*





# Eurostat highest number of job vacancies in 2022 Q4

Construction



Hospitality



Financial and Insurance Services



Information and Communication (including ICT)

Arts/Creative Sector (including iGaming)





# NSO 2022 Q4 highest share of GDP output growth

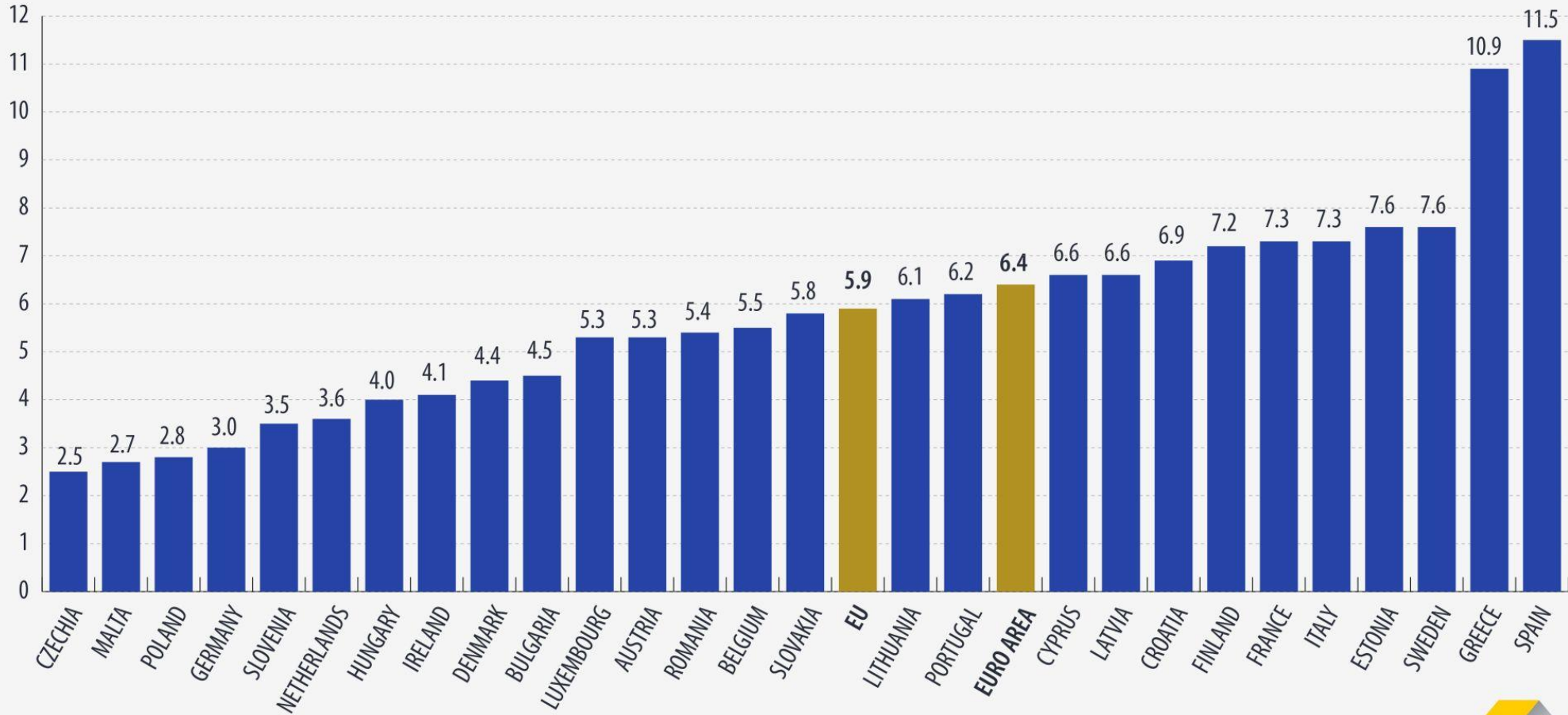


- Manufacturing*
- ICT sector*
- Financial and insurance activities*
- Public administration activities*
- Entertainment sector (which includes the iGaming sector)*
- Agriculture and fisheries*



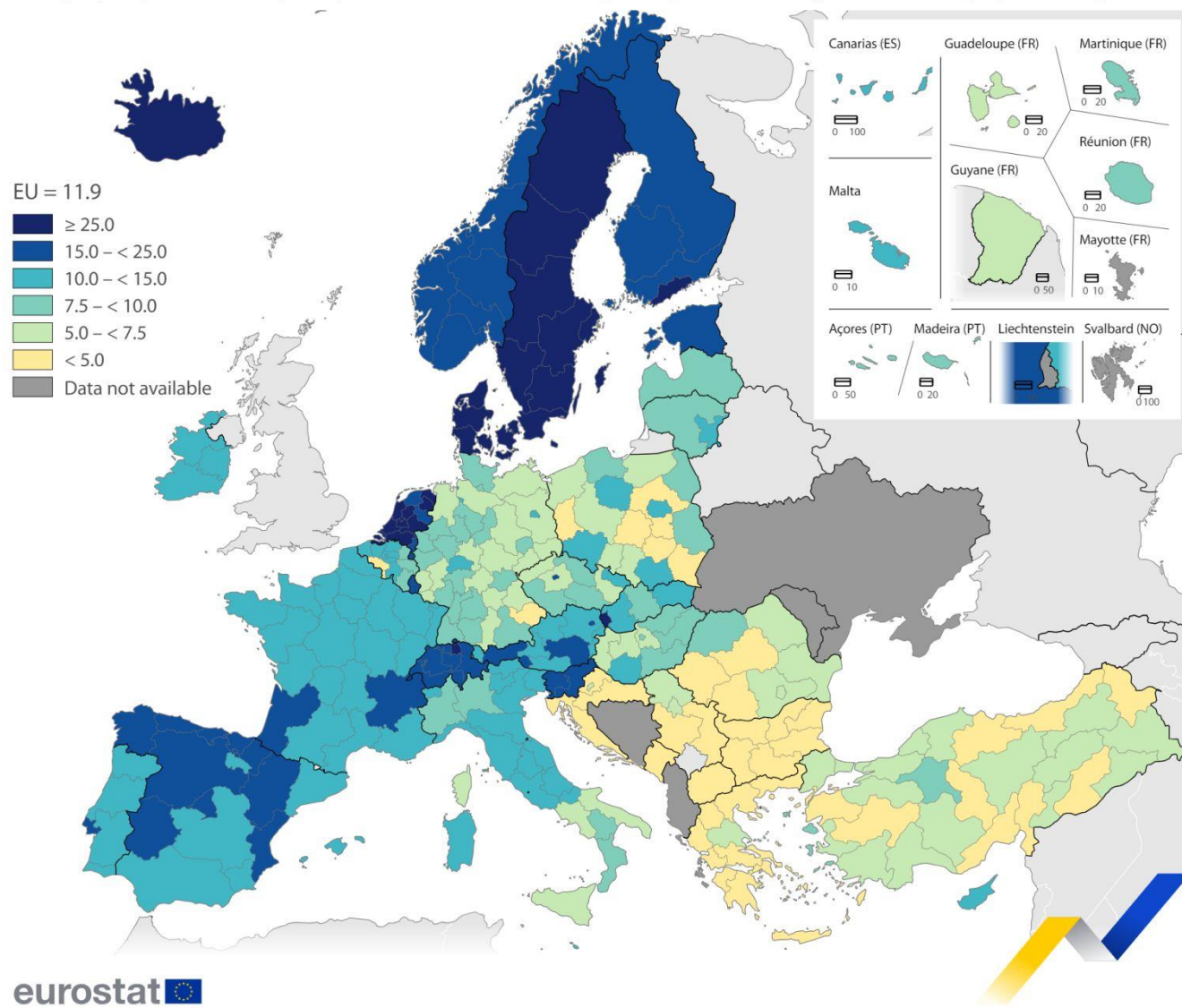
# Unemployment rates, August 2023

Seasonally adjusted, %



# Participation rate in education and training, 2022

(% of people aged 25–64 who participated in education and training during the four weeks prior to the survey, by NUTS 2 regions)



Malta: 12.8%

EU Average: 11.9%

Highest rates in:  
SE Stockholm  
(38.1%)

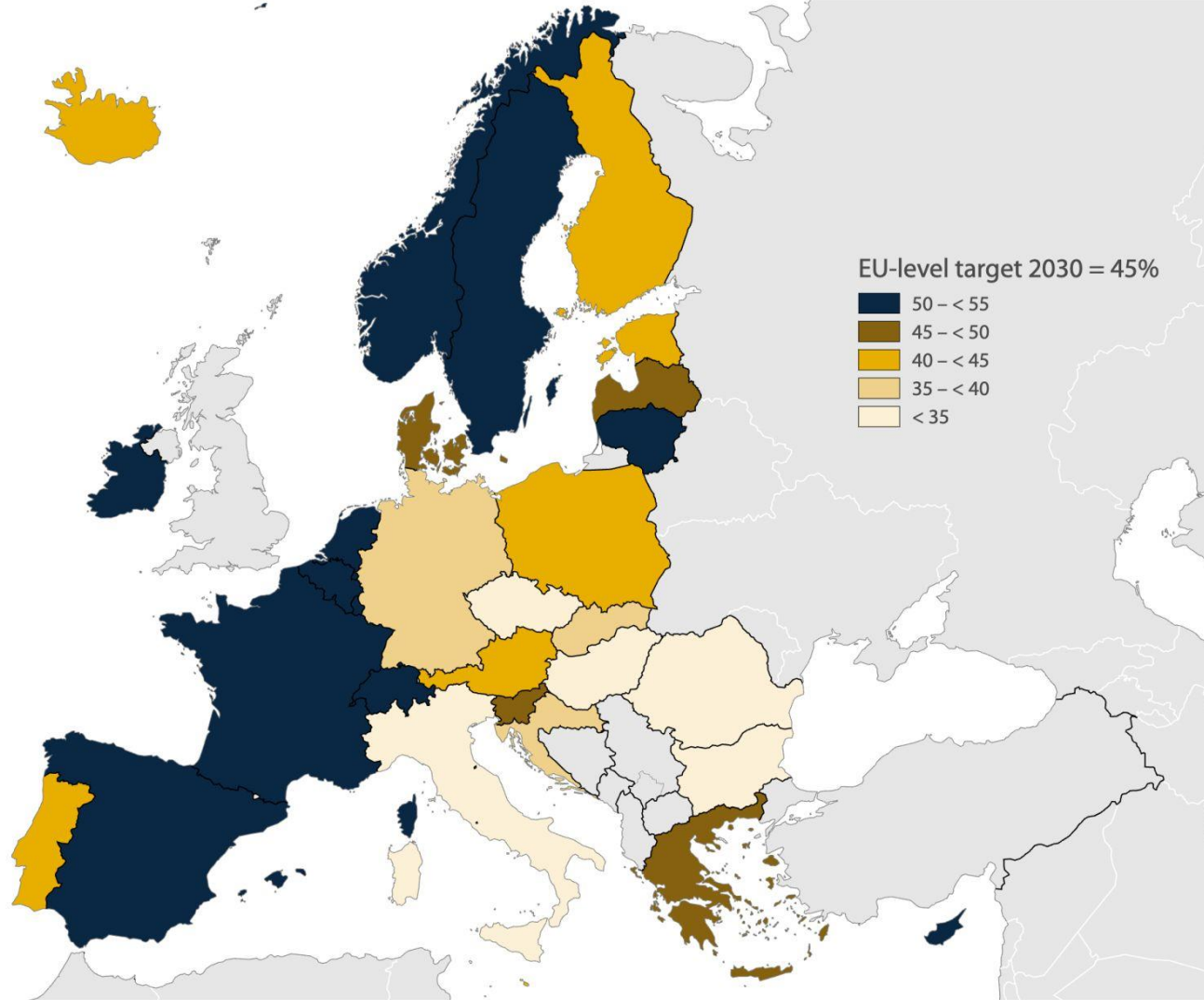
Note: Montenegro, North Macedonia and Türkiye, 2020.  
Source: Eurostat (online data code: trng\_lfse\_04)

Administrative boundaries: © EuroGeographics © UN-FAO © Turkstat  
Cartography: Eurostat – IMAGE, 10/2023



# Tertiary education attainment, 2022

(% of population aged 25-34)



Tertiary education: ISCED 2011 levels 5-8.

Administrative boundaries: © EuroGeographics © UN-FAO © Turkstat  
Cartography: Eurostat - IMAGE, 05/2023

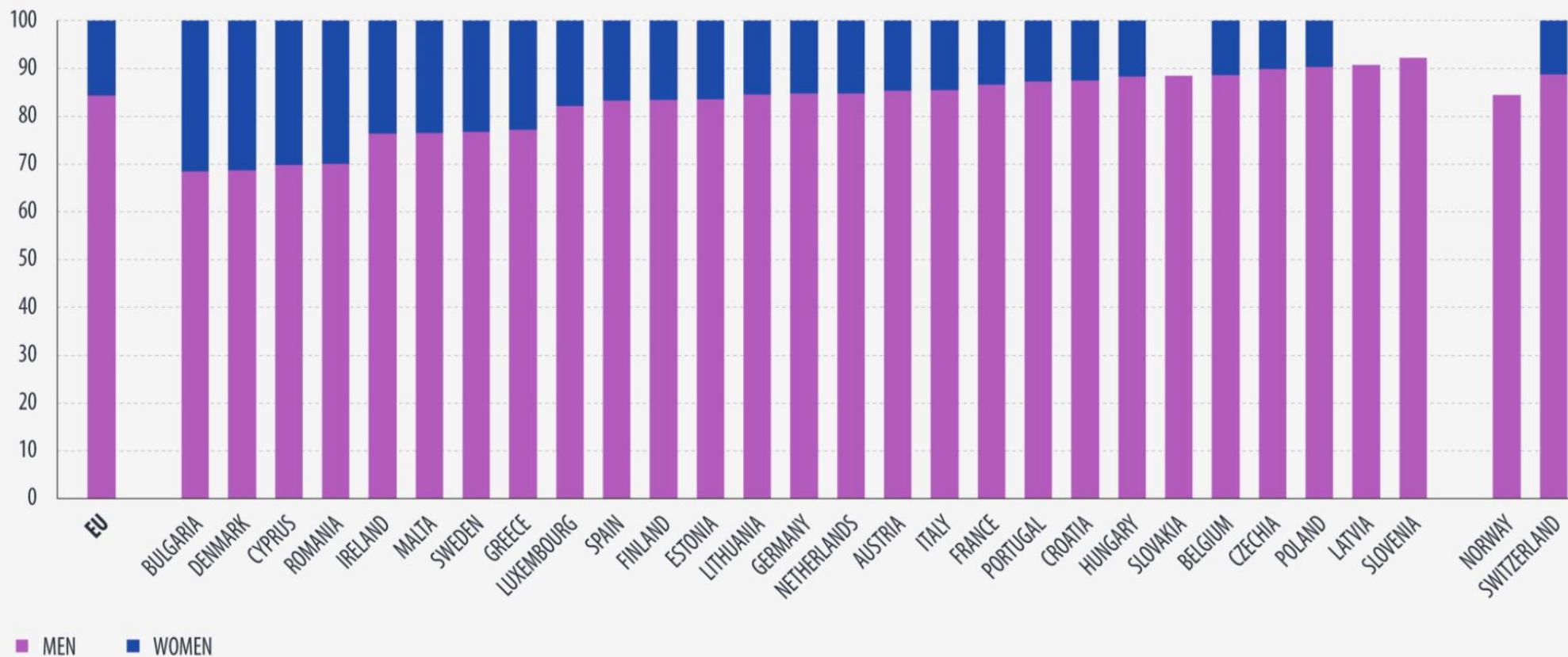
Malta: 42.4%  
Males - 37.8%  
Females - 47.9%

EU Average: 42.0%  
Males - 36.5%  
Females - 47.6%



# Employed people with an ICT education by sex, 2022

(%)



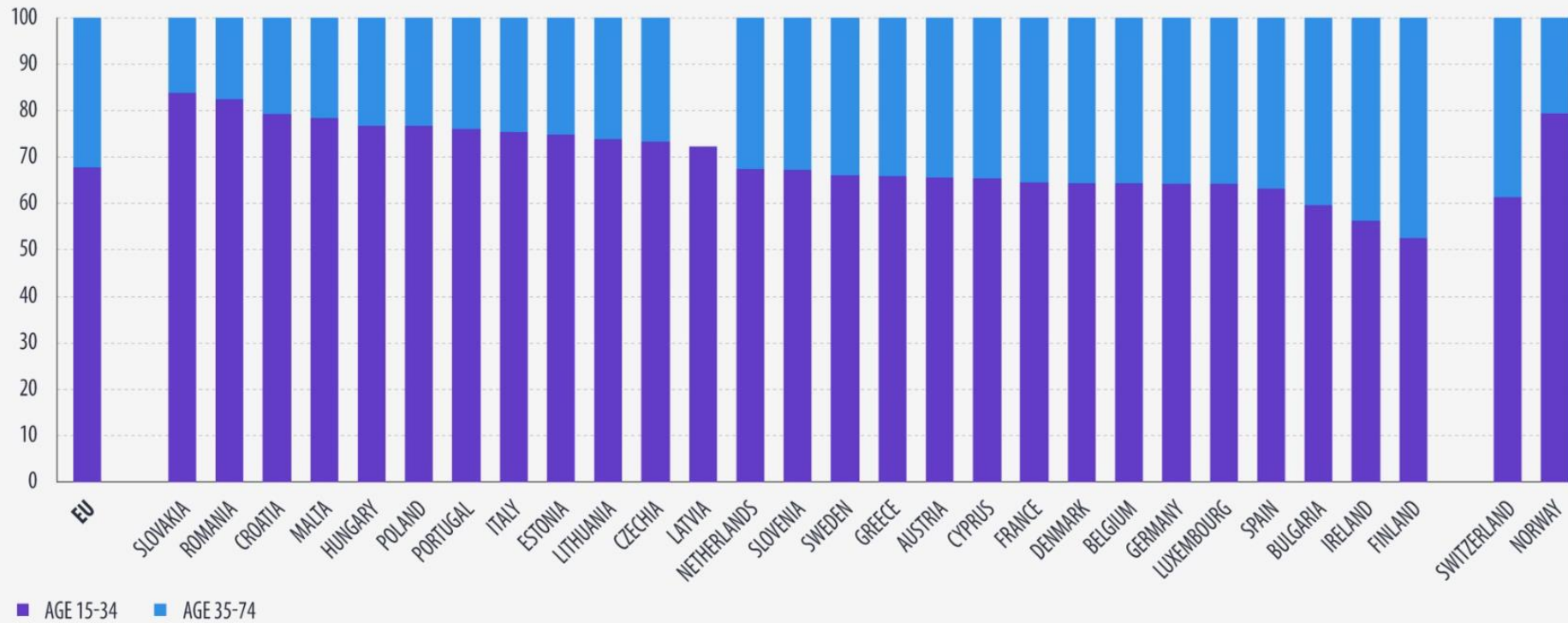
Low reliability data for women for Malta, Austria, Portugal, Croatia and Belgium; no reliable data for publication on women for Slovakia, Latvia and Slovenia.  
 Definition differs for Spain and France (see LFS methodology).



In 2022, there were 3.0 million people employed with an #ICT education in the EU. 🖥️



...see more



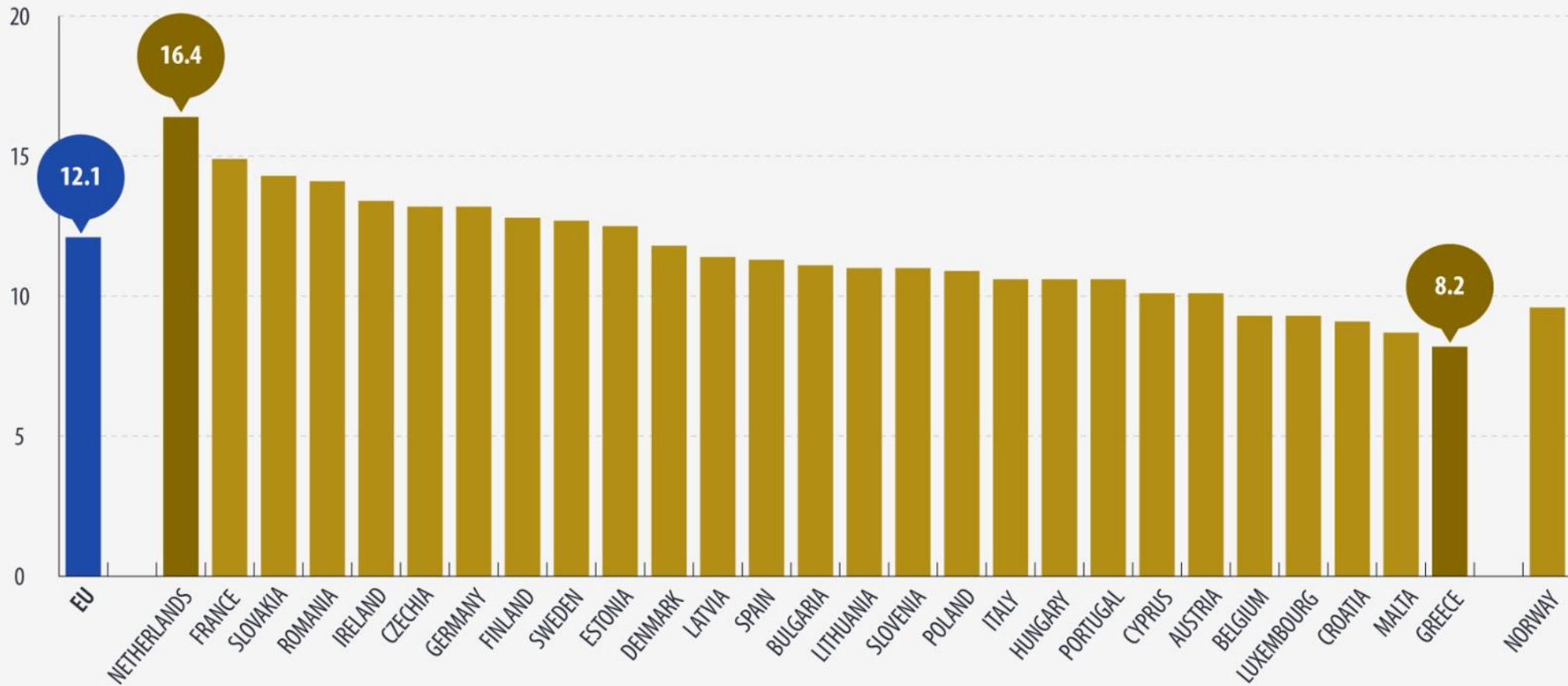
Low reliability for 15-34 age class for Slovenia.

Low reliability data for 35-74 age class for Slovakia, Croatia, Malta, Slovenia and Austria; no reliable data for publication for 35-74 age class for Latvia.

Definition differs for Spain and France (see LFS methodology).



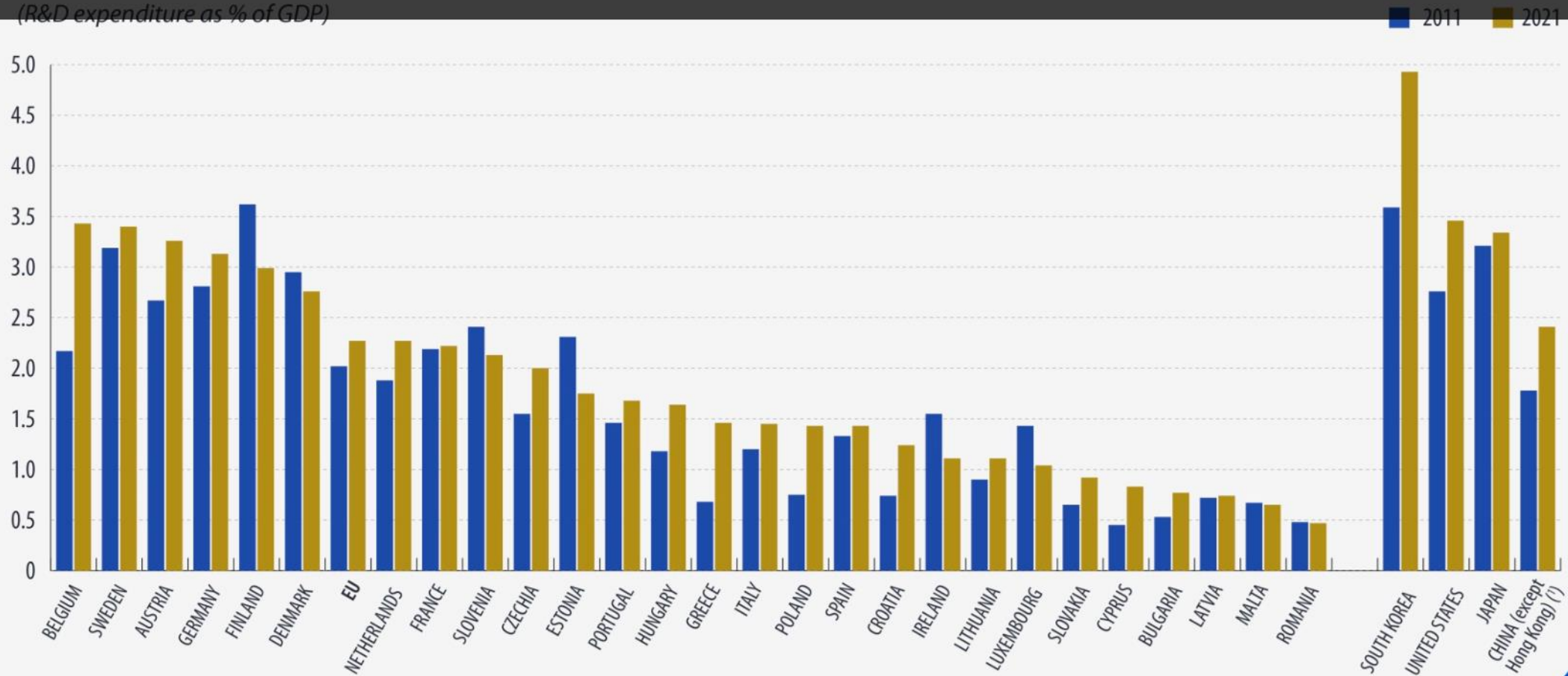
## Ratio of pupils and students to teachers in primary to upper secondary education, 2021



*Estonia, France, Germany, Ireland, Italy, Portugal and Slovenia: definition differs with regard to the ratio of pupils and students to teachers.*

# EU investment in R&D increased to €331 billion in 2021 • 2 pages

(R&D expenditure as % of GDP)



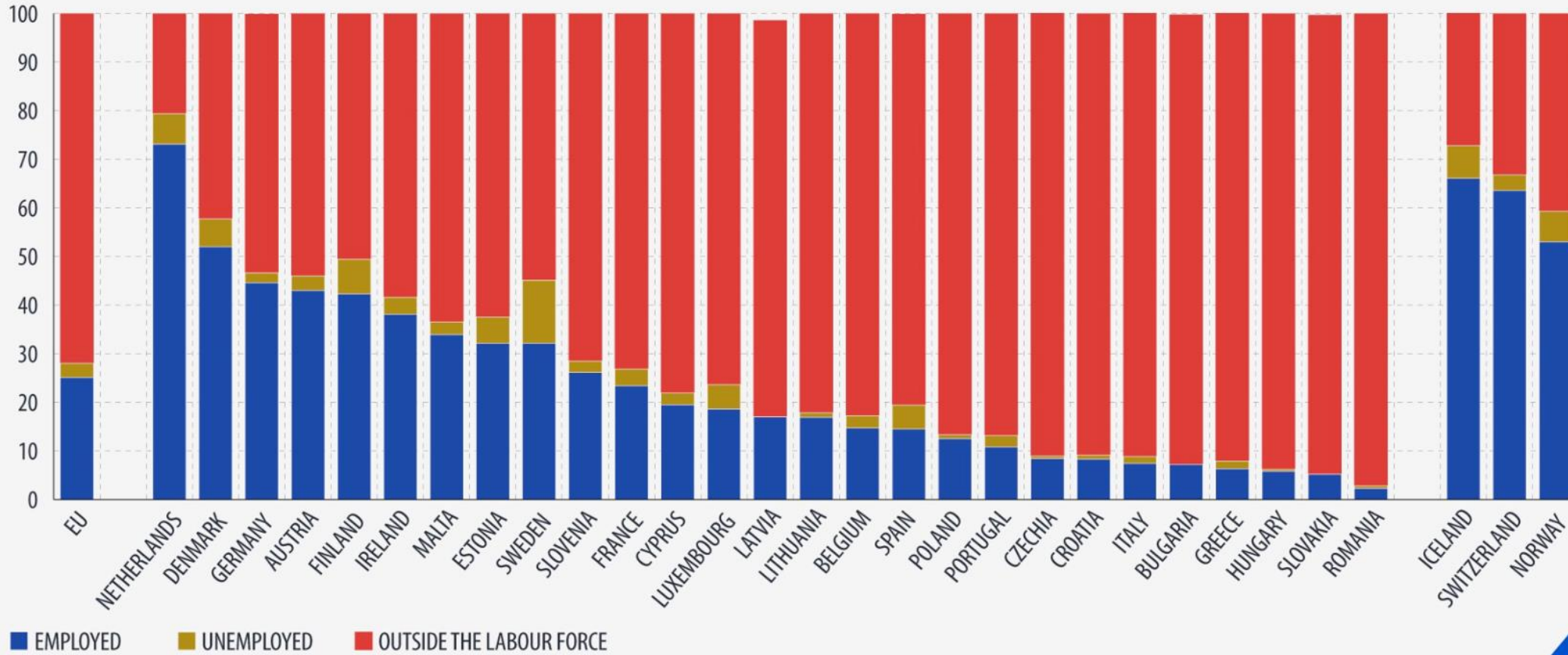
(1) 2020 instead of 2021.

Data sorted by 2021 values, from highest to lowest.



# Young people in formal education by labour market status, 2022

(% of the population in formal education, age group 15-29)

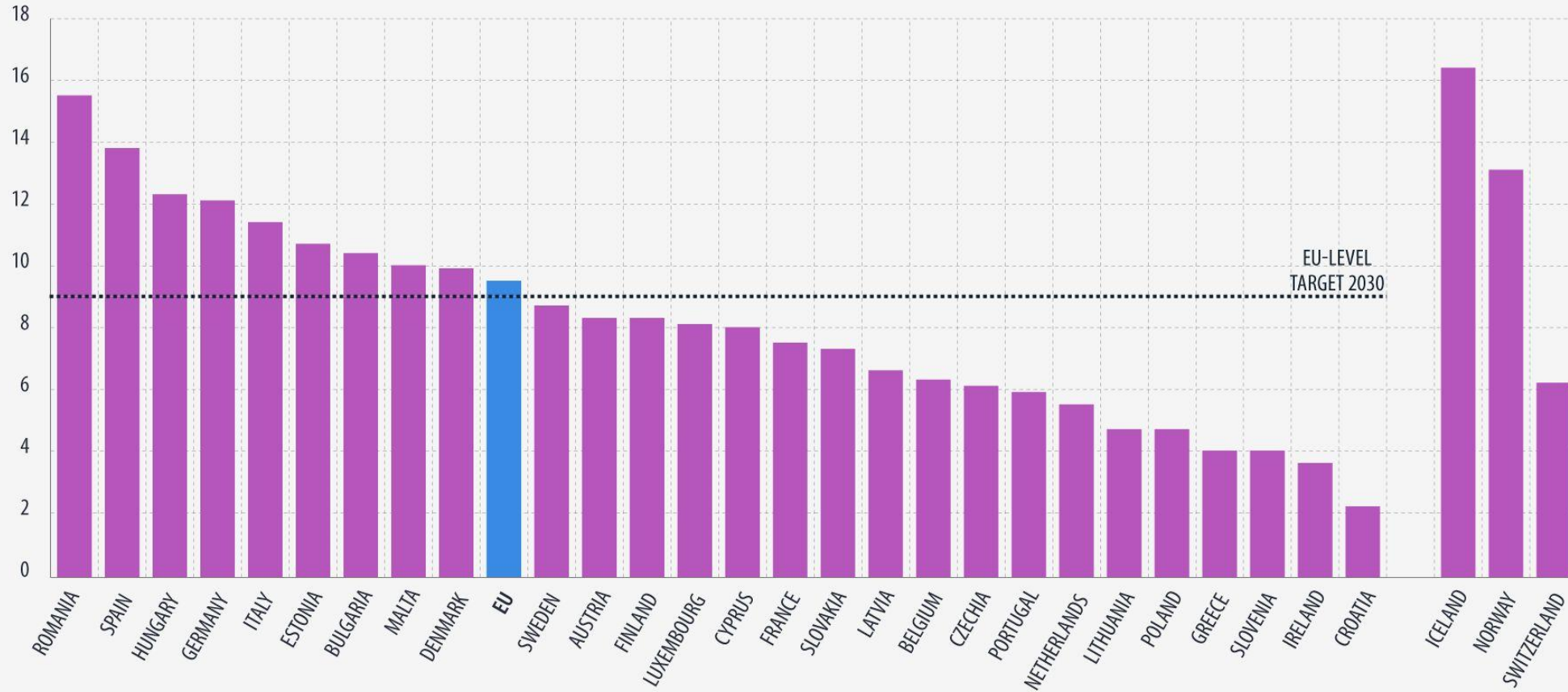


Low data reliability for unemployed people: Bulgaria (not shown), Croatia, Cyprus, Latvia (not shown), Lithuania, Hungary, Malta, Romania, Slovakia (not shown) and Slovenia



# Early leavers from education and training, 2022

(% of population aged 18-24)

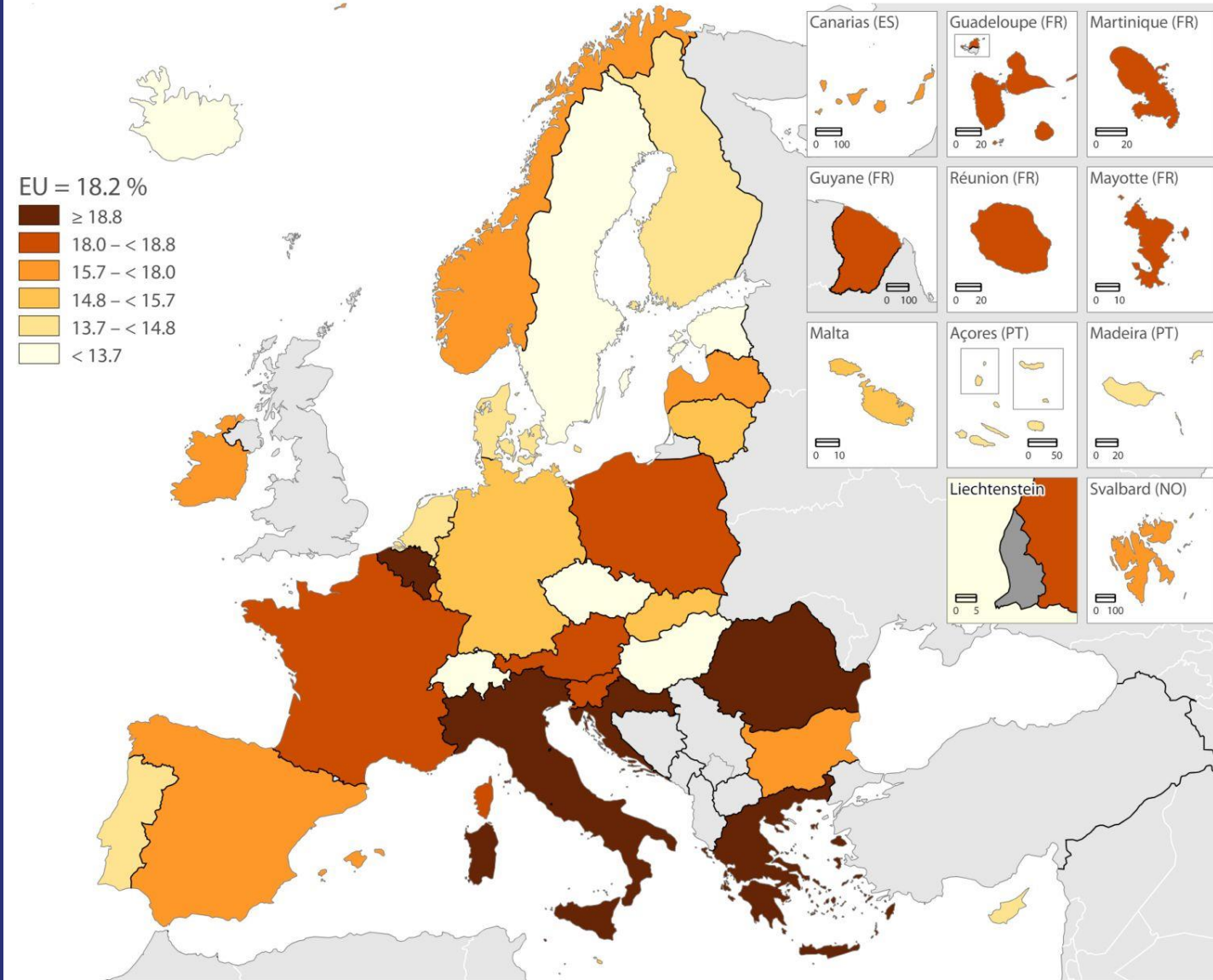


Low reliability: Croatia



# People not in education and outside the labour force, Q1 2023

(in % of total people aged 15-64 not in education)



MT: 15.2%  
EU Average: 18.2%

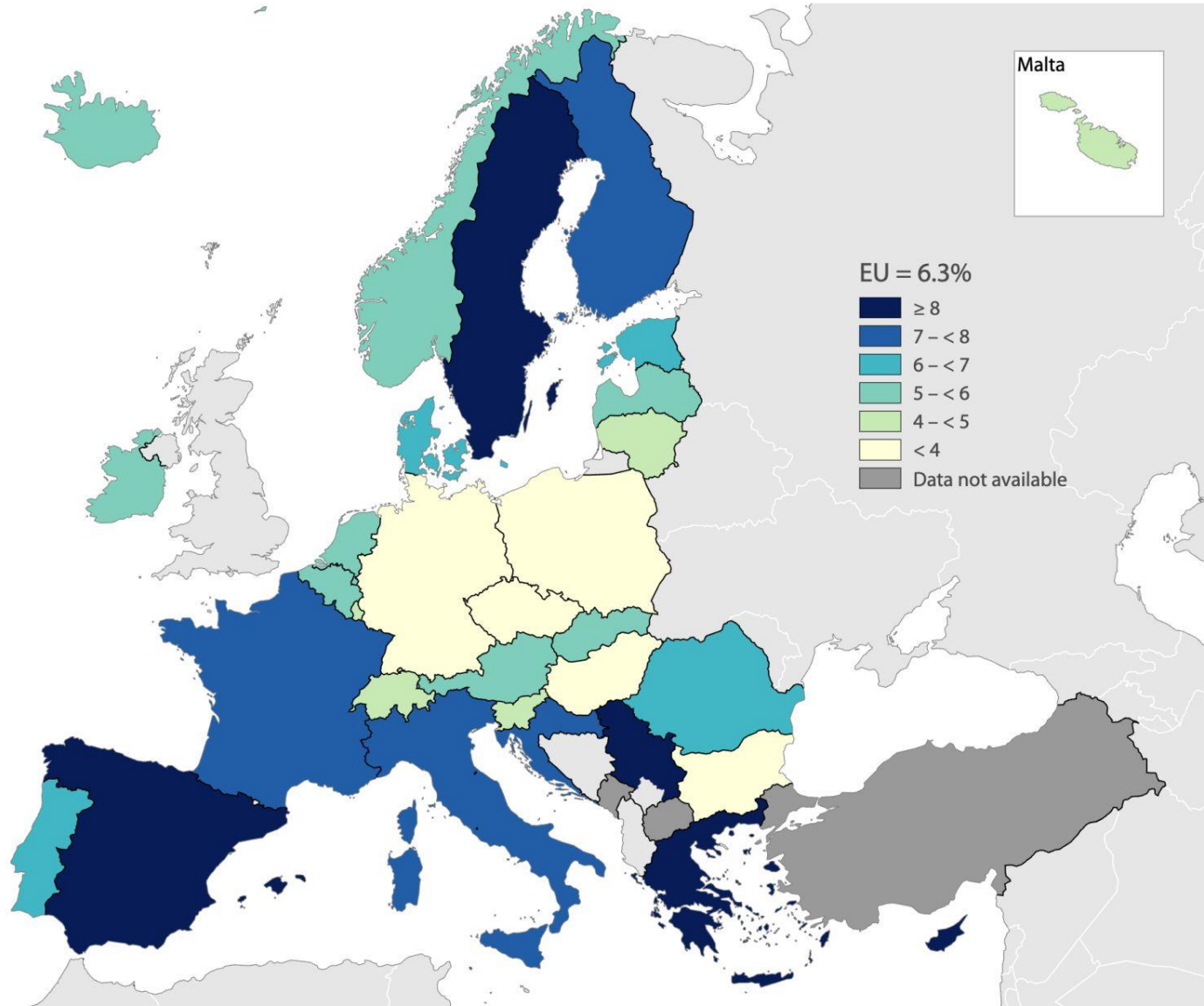
Not in education: no participation in formal education and training (student or apprentice) in the last 4 weeks.

Romania: Q1 2022 data

Administrative boundaries: © EuroGeographics © UN-FAO © Turkstat  
Cartography: Eurostat - IMAGE, 07/2023

# Youth unemployment

(as % of the total population of the same age; 15-29 years old)



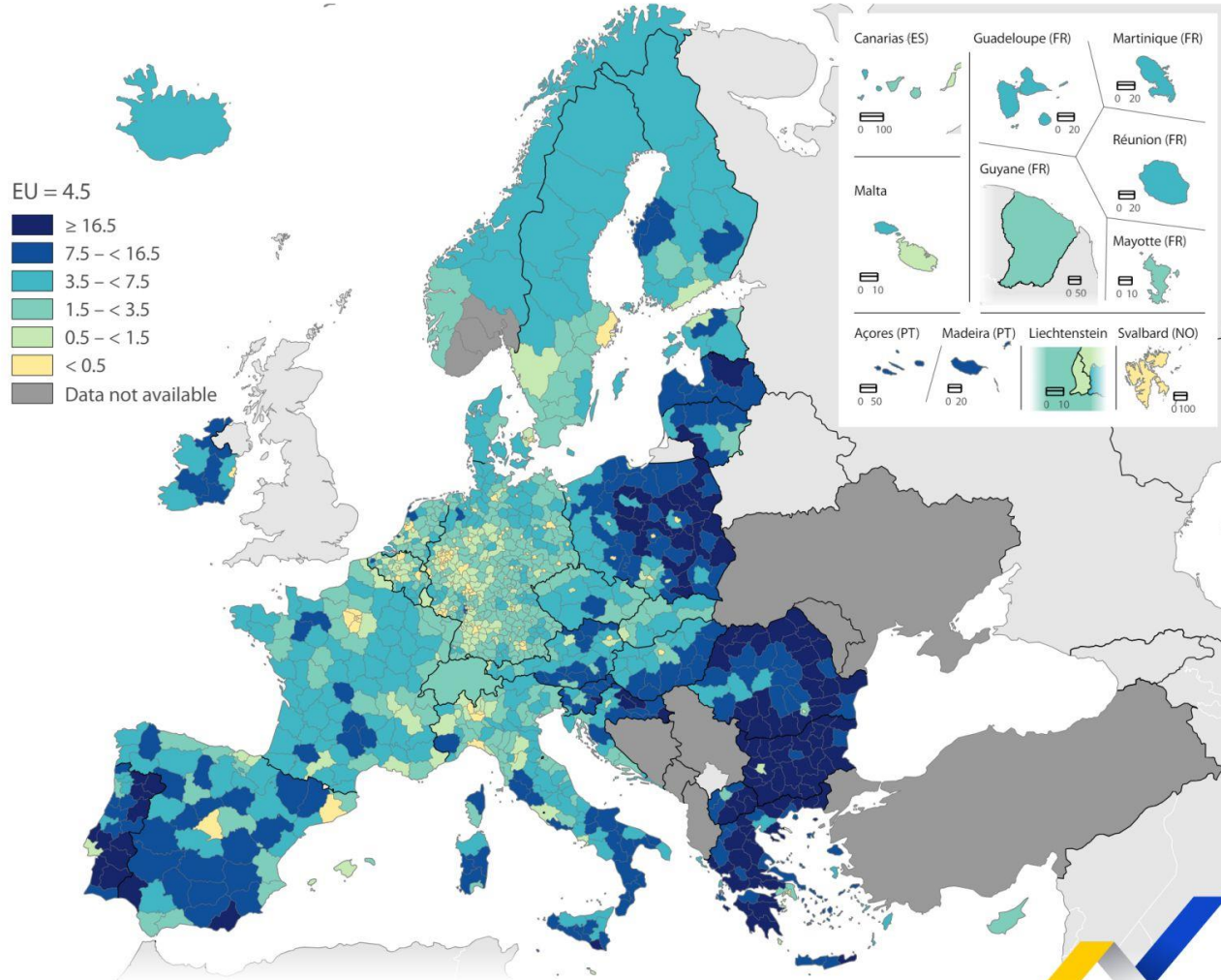
Administrative boundaries: © EuroGeographics © UN-FAO © Turkstat  
Cartography: Eurostat - IMAGE, 05/2023

MT: 4.4%  
EU Average: 6.3%



# Employment in agriculture, forestry and fishing, 2020

(% of total employment, by NUTS 3 regions)

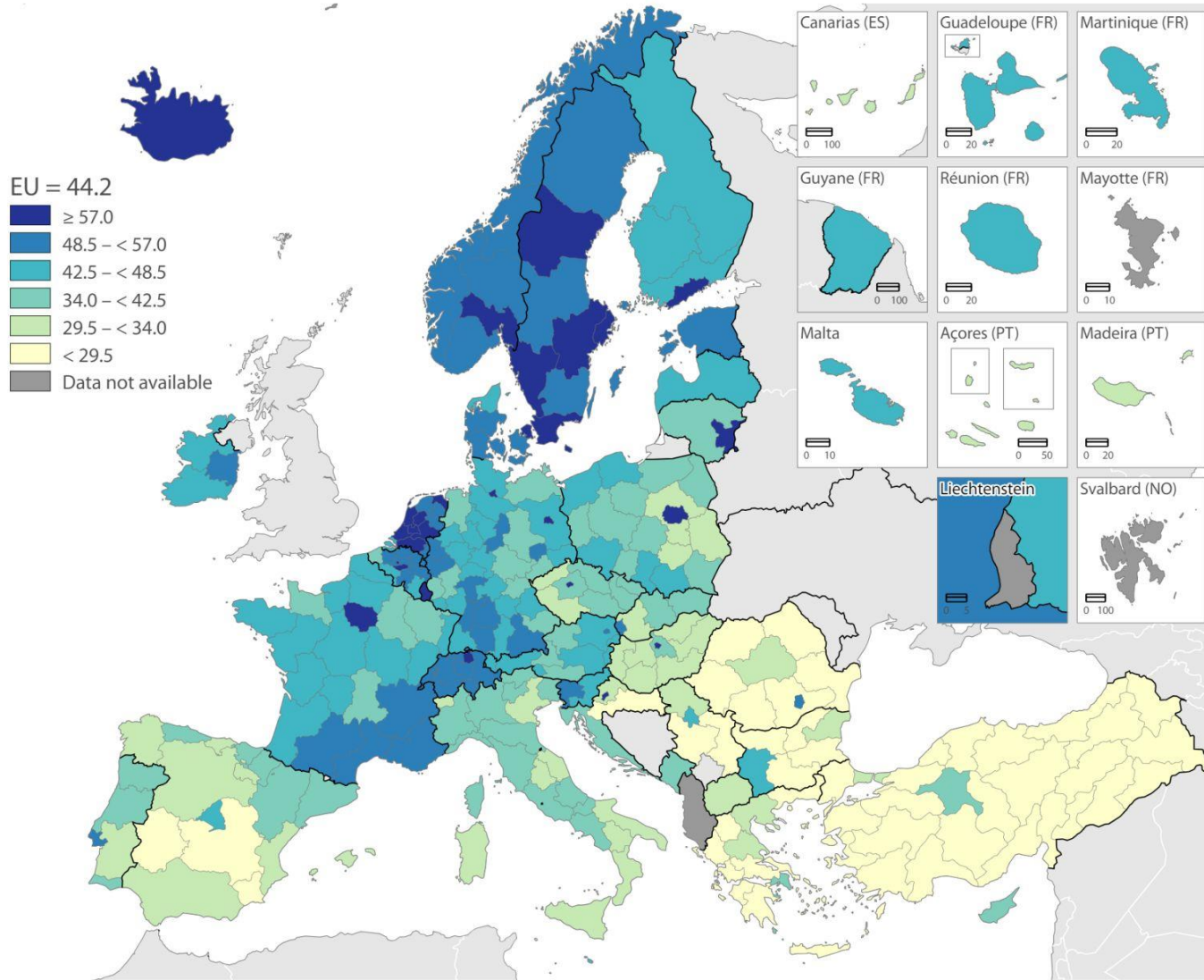


In 2020, approximately 4.5% of the EU's total employment worked within the agriculture, forestry, and fishing sector.



# Highly-skilled employed people, 2022

(% of people employed aged 25–64, by NUTS 2 regions)



Source: Eurostat (labour force survey)

Administrative boundaries: © EuroGeographics © UN-FAO © Turkstat  
Cartography: Eurostat – IMAGE, 10/2023

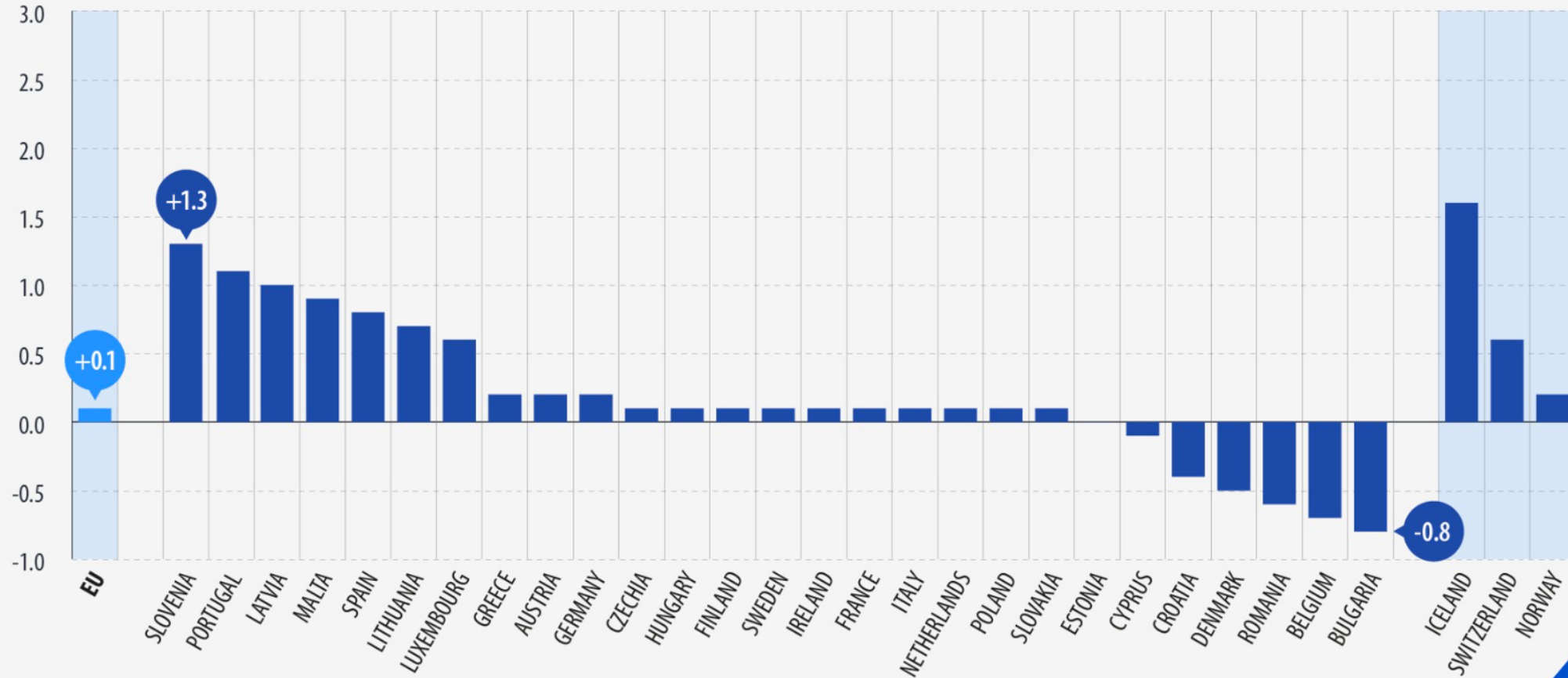
Employed people with high-skills are defined as people who are employed in the following occupations: managers; professionals; or technicians and associate professionals.

EU Average: 44.2%



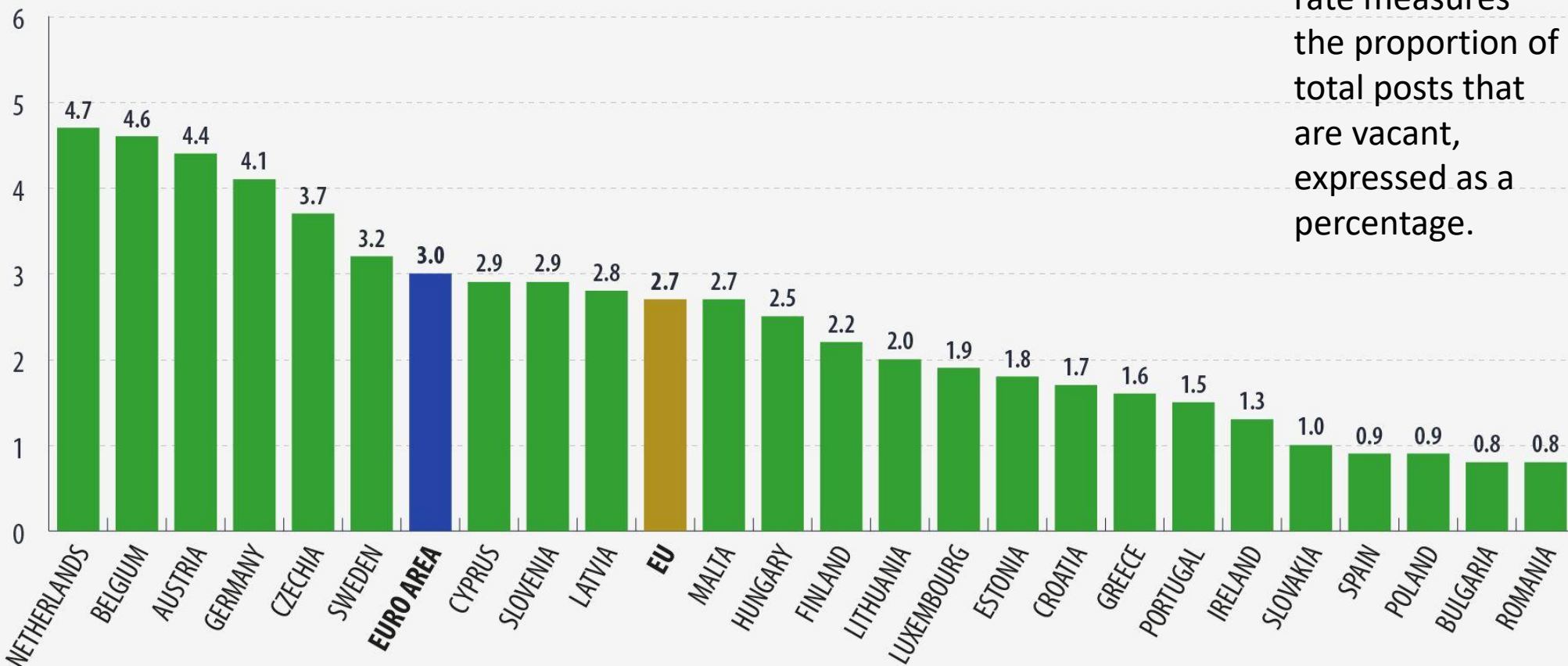
# Change in employment rate in EU countries

(Q2 2023 compared with Q1 2023, age group 20-64, in percentage points, seasonally adjusted data)



## Job vacancy rates, whole economy, second quarter of 2023

(not seasonally adjusted)

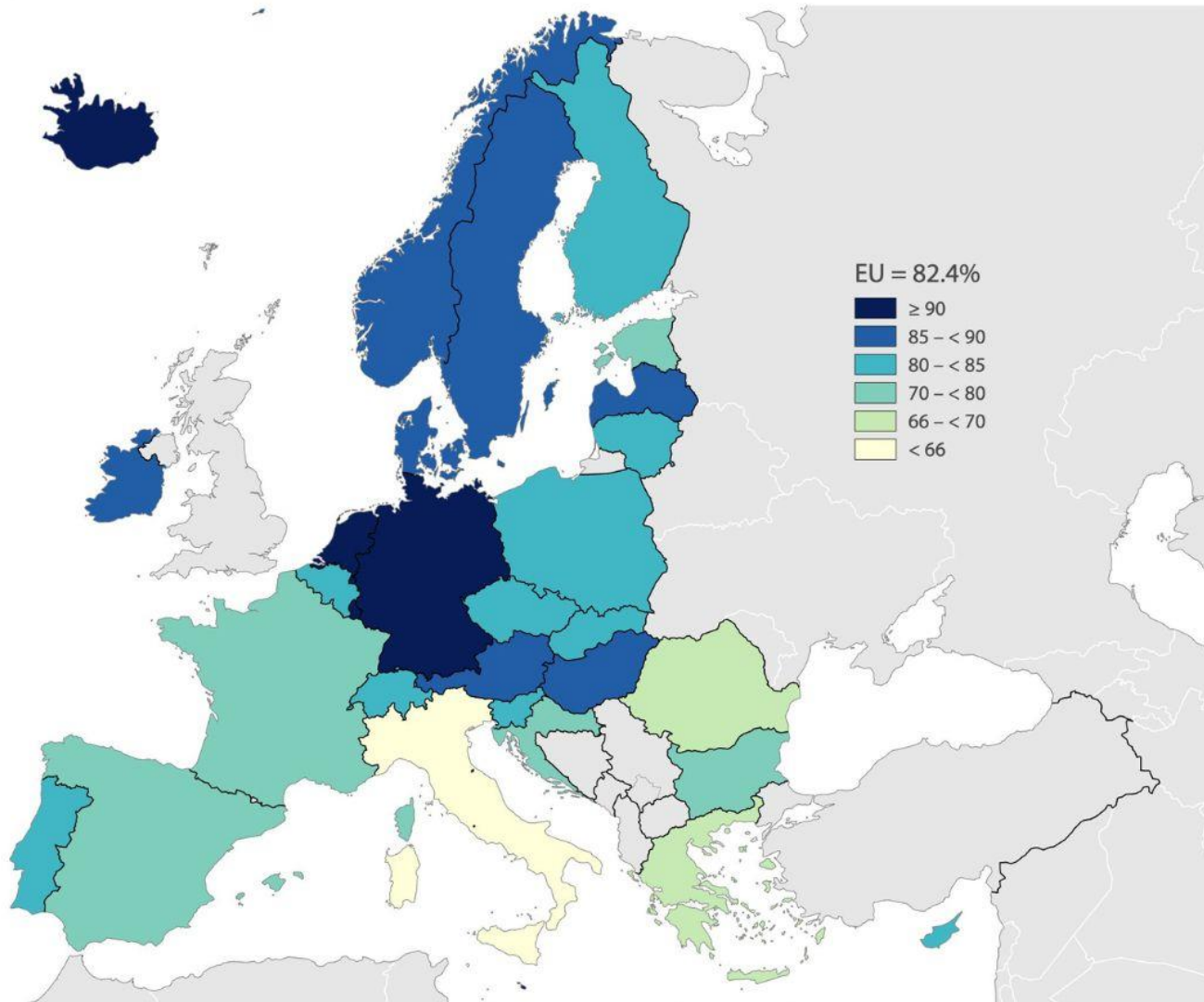


Denmark, France and Italy: not shown, as data are not strictly comparable.



## Employment rates of recent graduates aged 20–34, 2022

(%)



Recent graduates: people who completed their highest education level (at least ISCED 3) 1-3 years ago and are not in further studies.

Spain and France: definition differs.

Administrative boundaries: © EuroGeographics © UN-FAO © Turkstat  
Cartography: Eurostat – IMAGE, 08/2023

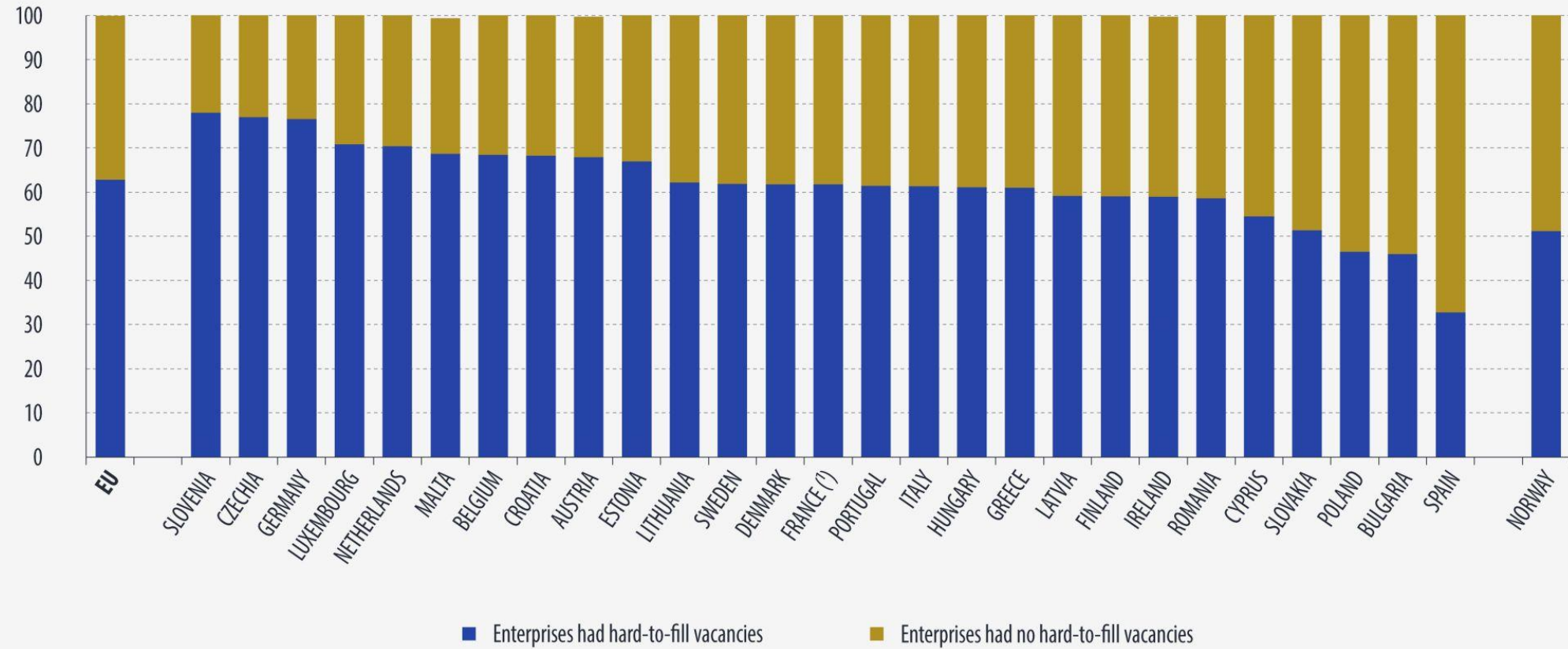
#EurostatTopPosts

In 2022, in the EU, the employment rates of recent graduates were highest in:  
LU Luxembourg and NL the Netherlands (both 93%)  
DE Germany (92%)  
MT Malta (91%)



# Enterprises that recruited ICT specialists, with and without difficulties in filling vacancies, 2021

(% of enterprises that recruited or tried to recruit)

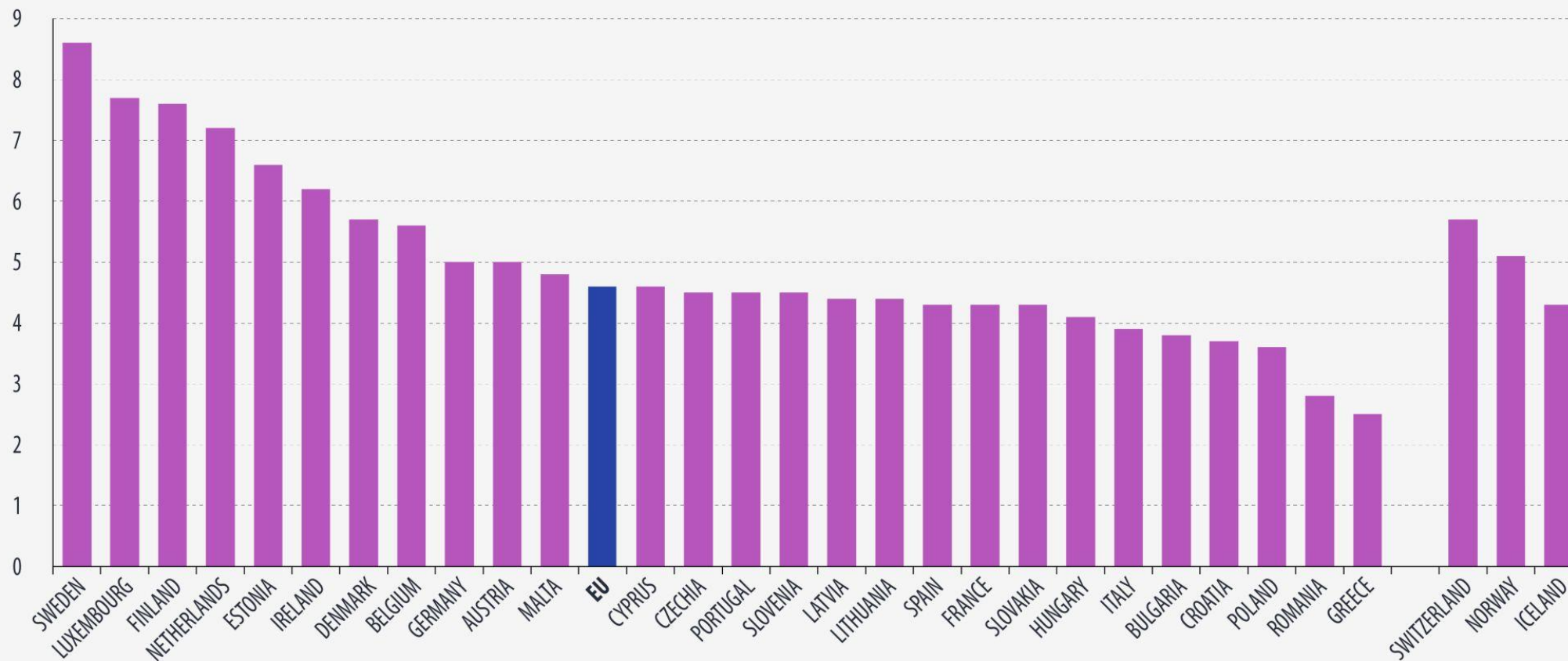


(1) Break in the time series.



## Proportion of ICT specialists in total employment, 2022

(%)



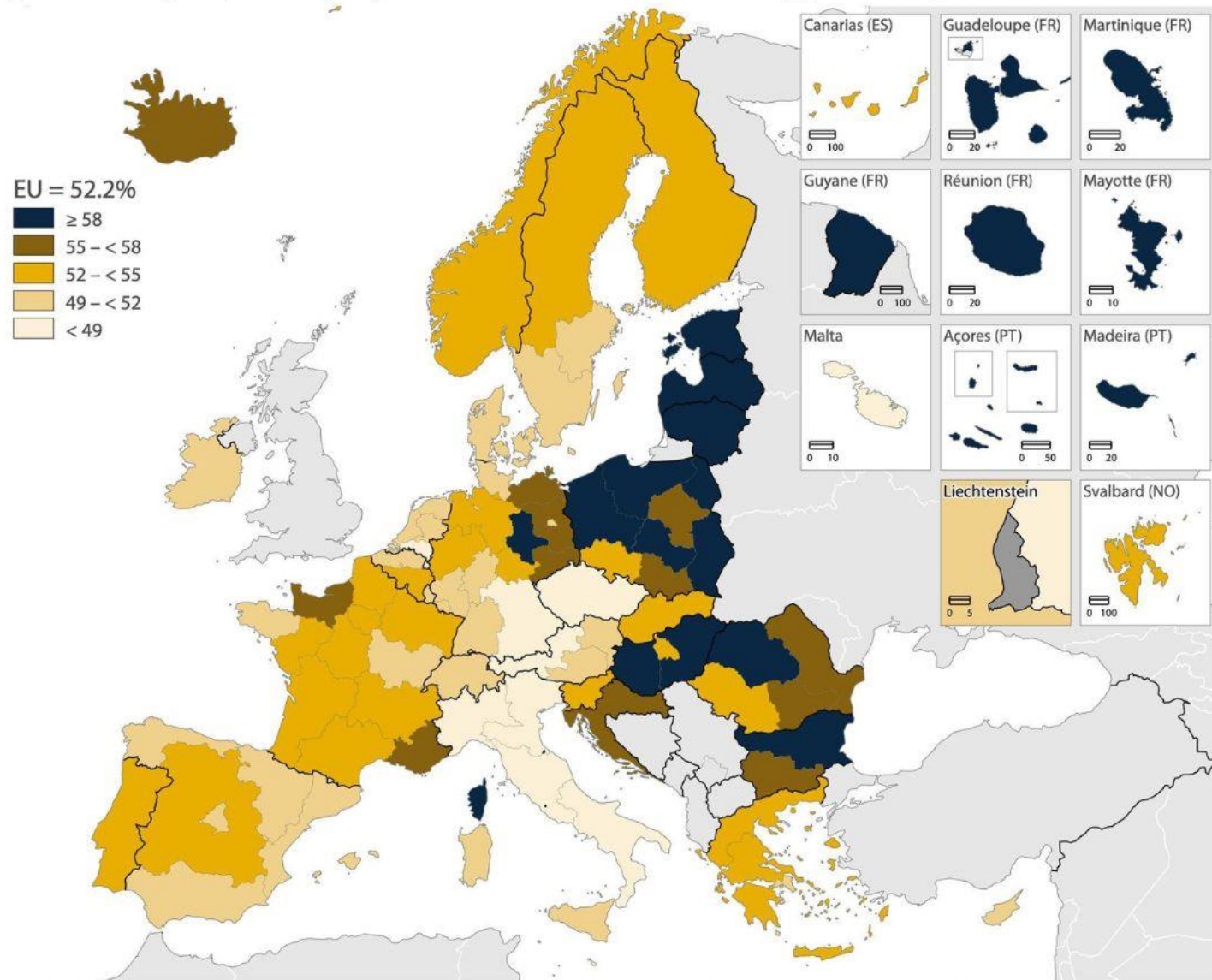
For country notes, see source dataset (isoc\_sks\_itspt).

Spain and France: definitions differ. See the source metadata (Labour Force survey) for more details.



# Women in science and technology, 2022

(% of total people employed in science and technology, NUTS 1)



Czechia, Denmark, Estonia, Ireland, Croatia, Cyprus, Latvia, Lithuania, Luxembourg, Malta, Slovenia, Slovakia, Iceland, Norway and Switzerland: single regions at this level of detail.

Administrative boundaries: © EuroGeographics © UN-FAO © Turkstat  
Cartography: Eurostat - IMAGE, 05/2023

Across the EU regions (NUTS 1), the highest shares of women employed in #science and technology in 2022 were in:

LT Lithuania and FR Corsica (both 64%)  
LV Latvia (63%)

Lowest in:

IT North-West (45%)  
MT Malta and IT South and IT North-East (all 46%)



# Malta in numbers

POPULATION  
**0.5 million**



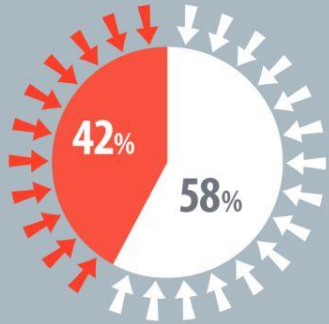
**0.1%** of total EU population

AREA  
**316 km<sup>2</sup>**

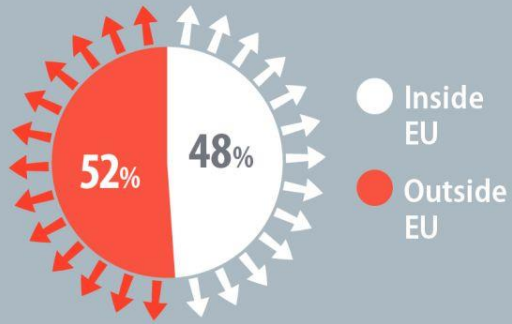


**0.01%** of total EU area

## IMPORTS OF GOODS



## EXPORTS OF GOODS

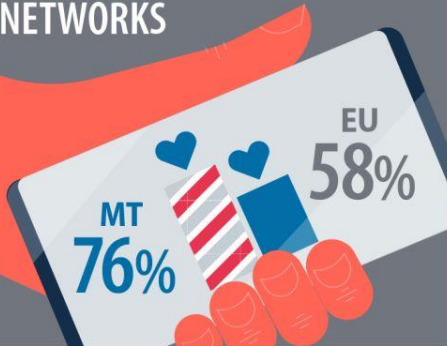


## GDP



Per capita:  
**€ 32 430**

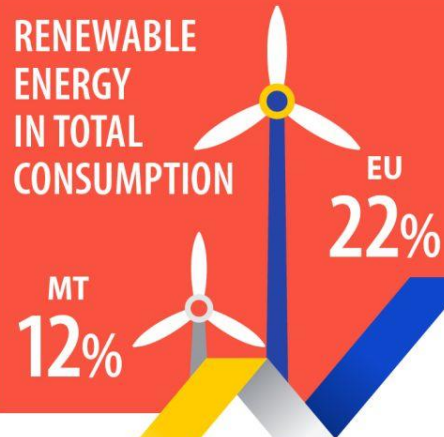
## PARTICIPATION IN SOCIAL NETWORKS



## MUNICIPAL WASTE RECYCLING

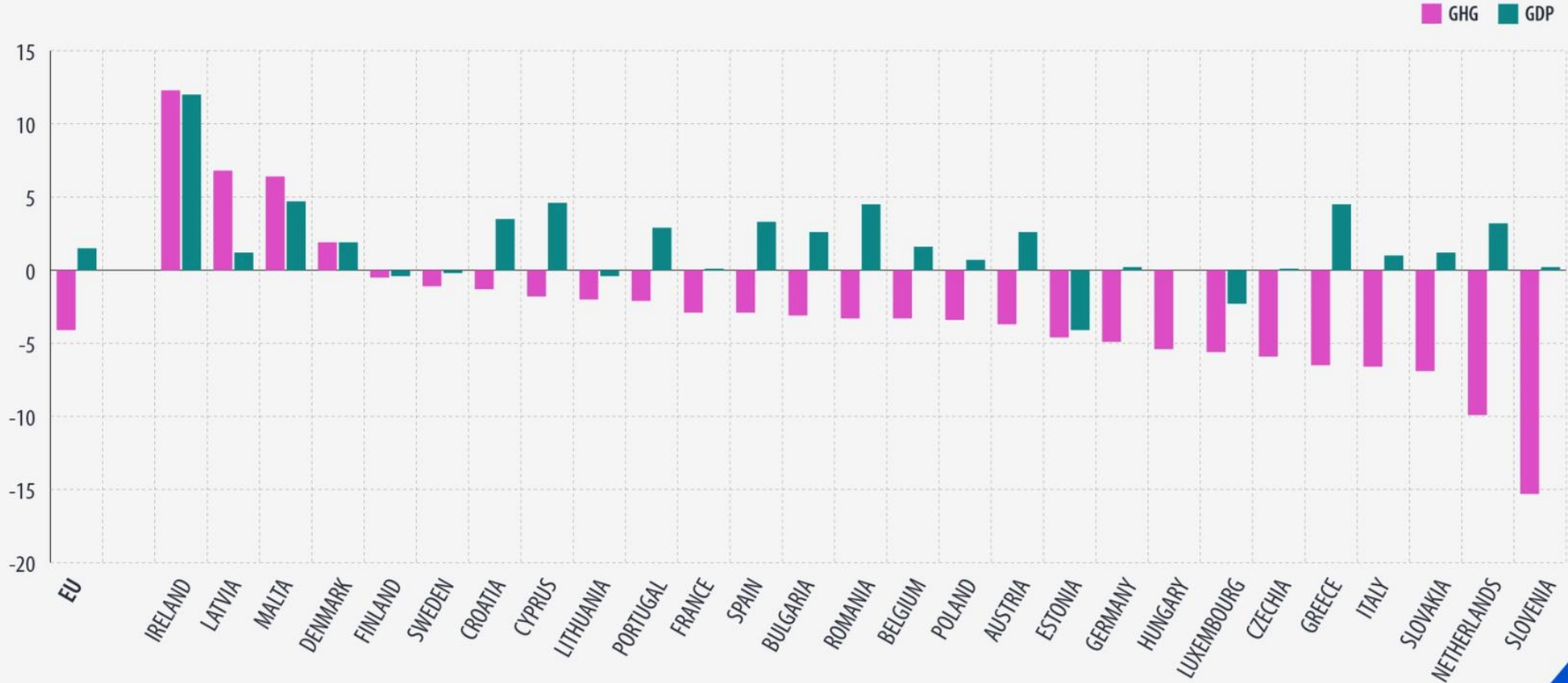


## RENEWABLE ENERGY IN TOTAL CONSUMPTION



# Growth rates of greenhouse gas emissions by the economy and GDP, Q4 2022

(% change compared with the same quarter of the previous year)



All data are estimated by Eurostat, except the Netherlands and Sweden



Emissions in Q4 2022 decreased in almost all EU countries when compared with the same quarter of 2021, except for:

- IE Ireland (+12.3%)
- LV Latvia (+6.8%)
- MT Malta (+6.4%)
- DK Denmark (+1.9%)



# Transport & Logistics

*Transport & Logistics - digital literacy, data analysis, and innovation (DHL, 2021).*

*Health & Social Care - digital literacy, data analysis, and interpersonal skills such as empathy and communication (WHO, 2021).*



# Health & Social Care

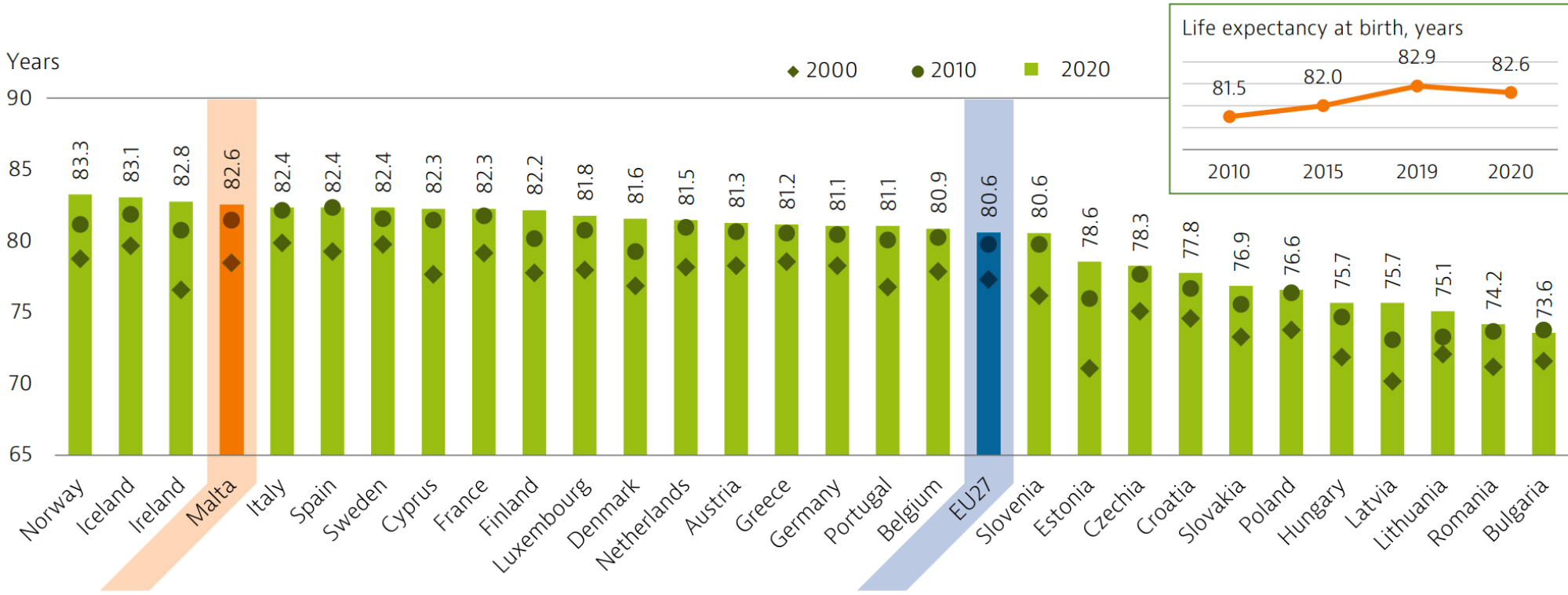
*The healthcare sector is facing significant changes due to technological advancements and changing patient needs. Future skills needed in this sector include **digital literacy, data analysis, and interpersonal skills such as empathy and communication** (WHO, 2021).*

*In addition, there is a growing need for healthcare professionals who can work with new technologies and adapt to changing patient needs.*





**Figure 1. Life expectancy in Malta is among the highest in the EU**



Note: The EU average is weighted. Data for Ireland refer to 2019  
 Source: Eurostat Database.



# STEM & Digital Services

*The STEM and digital services sector is rapidly evolving with the implementation of new technologies. Future skills needed in this sector include **coding, data analysis, and digital literacy** (IBM, 2020).*

*In addition, there is a growing need for professionals who can work with emerging technologies such as blockchain and artificial intelligence.*



# Hospitality

*According to a report by Deloitte, future skills needed in the hospitality sector include **digital marketing, data analysis, and customer service** (Deloitte, 2021).*

*In addition, there is a growing need for professionals who can provide personalized customer service and create unique experiences for guests.*

*Non-tradable services, like **food preparation, elementary services and hospitality will all likely grow in importance**. Such occupations may be ripe for job redesign and employee skills upgrading to emphasise further product variety, a development heralded by the re-emergence of artisanal employment in occupations like barbering, brewing and textiles.*



# Built Environment

*The built environment sector is facing significant changes due to new technologies and sustainable development goals. Future skills needed in this sector include **digital literacy, data analysis, and sustainability** (World Economic Forum, 2020).*

*In addition, there is a growing need for professionals who can work with new materials and construction techniques.*

***Skilled trades and construction occupations**, exhibit pockets of opportunity throughout the skills ladder.*



# Manufacturing

*The manufacturing sector is rapidly evolving with the implementation of Industry 4.0 technologies. Future skills needed in this sector include robotics, automation, and the ability to work with big data.*

*Transversal skills such as teamwork and adaptability are also increasingly important in this sector (PwC, 2019).*



# Education & Training

*The education and training sector is facing significant changes due to digital transformation and changing student needs. Future skills needed in this sector include **digital literacy, problem-solving, and creativity** to prepare for Education 4.0 (OECD, 2020).*

*In addition, there is a growing need for educators who can help students develop transversal skills, such as emotional intelligence and communication. Heavy investment in Educator CPD on innovative pedagogies for 21st century skills is required.*



# Retail

*The retail sector is facing major changes due to the rise of e-commerce and changing consumer behaviour. Future skills needed in this sector include **digital marketing, data analysis, and supply chain management** (Capgemini, 2018).*

*In addition, there is a growing need for sales associates who can provide personalized customer service and create unique in-store experiences.*

*Although there is a **predicted decline in many sales occupations, consistent with an expansion in digital commerce, niche roles like sales engineers and real estate agents may buck this trend.***



# Admin & Support Services

*According to a report by Adecco, future skills needed in the administrative and support sector include **digital literacy, problem-solving, and communication skills** (Adecco, 2019).*

*In addition, there is a growing need for professionals who can work with new technologies and adapt to changing work environments.*

***Predicted decline in administrative, secretarial and some sales occupations is also consistent with recent trends.***





# Culture & the Arts

*The culture and arts sector is facing significant changes due to digital transformation and changing audience needs. Future skills needed in this sector include **digital literacy, creativity, and entrepreneurship** (World Economic Forum, 2018).*

*In addition, there is a growing need for professionals who can work with emerging technologies such as virtual and augmented reality.*



# Public Administration

*The public administration sector is facing significant changes due to digital transformation and changing citizen needs. Future skills needed in this sector include **digital literacy, data analysis, and innovation** (European Commission, 2021).*

*In addition, there is a growing need for professionals who can work with new technologies, such as blockchain, artificial intelligence, and cloud computing, and who can adapt to changing work environments.*

*They are further consistent with the view that public sector roles are more resistant to automation.*



*Effective communication skills* are also becoming more important in the public administration sector, as citizens demand transparency, accountability, and responsiveness from public organisations. Interpersonal communication, media relations, and public speaking (European Commission, 2021).

As public organizations face complex policy challenges, future skills needed in the public administration sector include *policy analysis, evidence-based decision-making, and program evaluation* (OECD, 2019). In addition, there is a growing need for professionals who can work with data and information to develop and implement effective policies and programs.



*The public administration sector also places a strong emphasis on **ethics and integrity**, as public organizations must uphold high standards of transparency, accountability, and ethical conduct. Future skills needed in this area include ethical decision-making, conflict resolution, and stakeholder engagement (OECD, 2019).*



# Influencing Factors



**ENVIRONMENTAL  
SUSTAINABILITY**

**DEMOGRAPHIC  
CHANGE**

**POLITICAL  
UNCERTAINTY**

**URBANISATION**

**TECHNOLOGICAL  
CHANGE**

**GLOBALISATION**

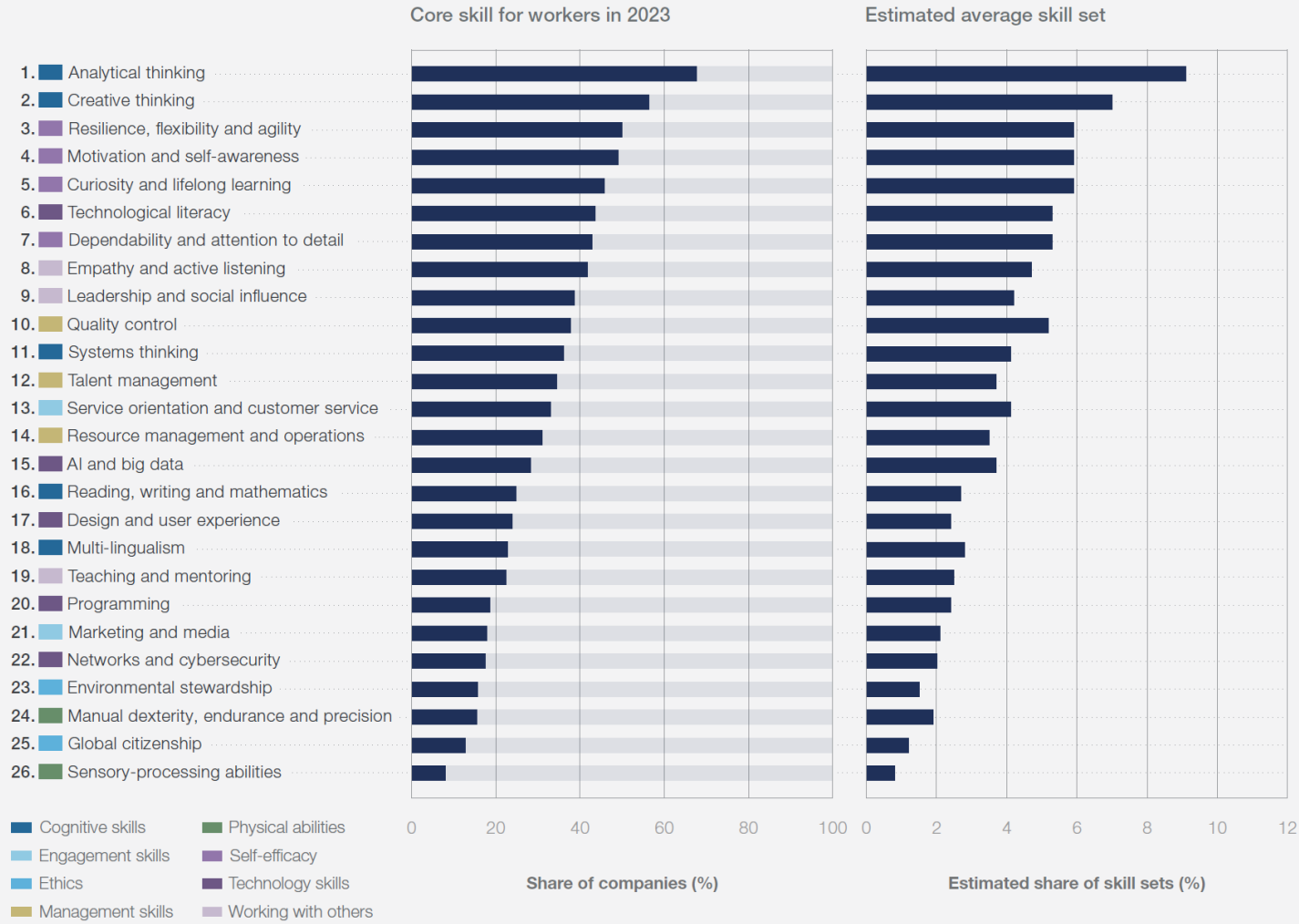
**INCREASING  
INEQUALITY**



FIGURE 4.2

**Core skills in 2023**

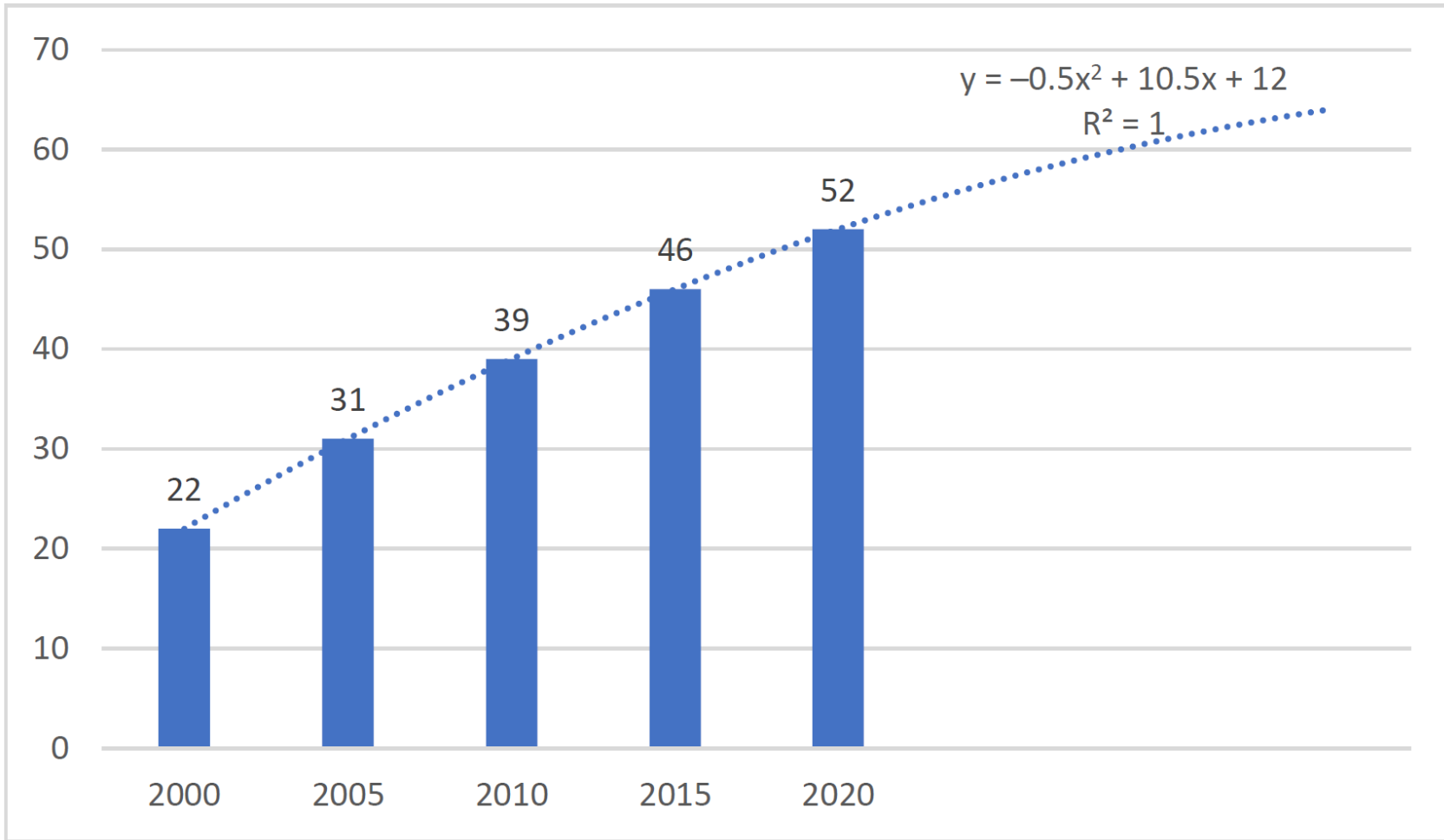
Share of organizations surveyed which consider skills to be core skills for their workforce. Estimated average composition of the skill sets of workers in organizations surveyed. Skills are ranked and ordered by the share of organizations surveyed which consider the skill as core to their workforce.



Source  
World Economic Forum, Future of Jobs Survey 2023.

Note  
The Future of Jobs Survey uses the World Economic Forum's Global Skills Taxonomy.





**Figure 3.** The forecast of the need for soft skills in the workplace. Source: the authors based on data from (Rasli et al. 2020).



# Key Challenges



The lack of a strategic direction:  
economic & skills development

Rate of Change: Education vs Industry

Talent Management

The resistance of some stakeholders to change





# Skills Development

*Homogenous development of 21st century skills may not be effective in preparing students for workforce entry. This assertion is supported by research, which showed differential demand of some skills by education level and degree field requirements.*



# Innovative Pedagogies and Teacher Upskilling

*Employability skills must be integrated into every subject area so that the skill development becomes inseparable from knowledge sharing because soft skills cannot be taught in isolation.*

*It is obviously crucial to make a joint partnership between the educational institution and the industry area to create an effective curriculum.*



# Innovative Pedagogies to foster Transversal Skills



Flipped Classroom

Design Thinking

Experiential Learning

Inquiry-Based Learning

Project-Based Learning (PBL)

Collaborative Learning

Gamification

Figure 12: 'Closest' occupations to hypothetical new high demand occupations for the US

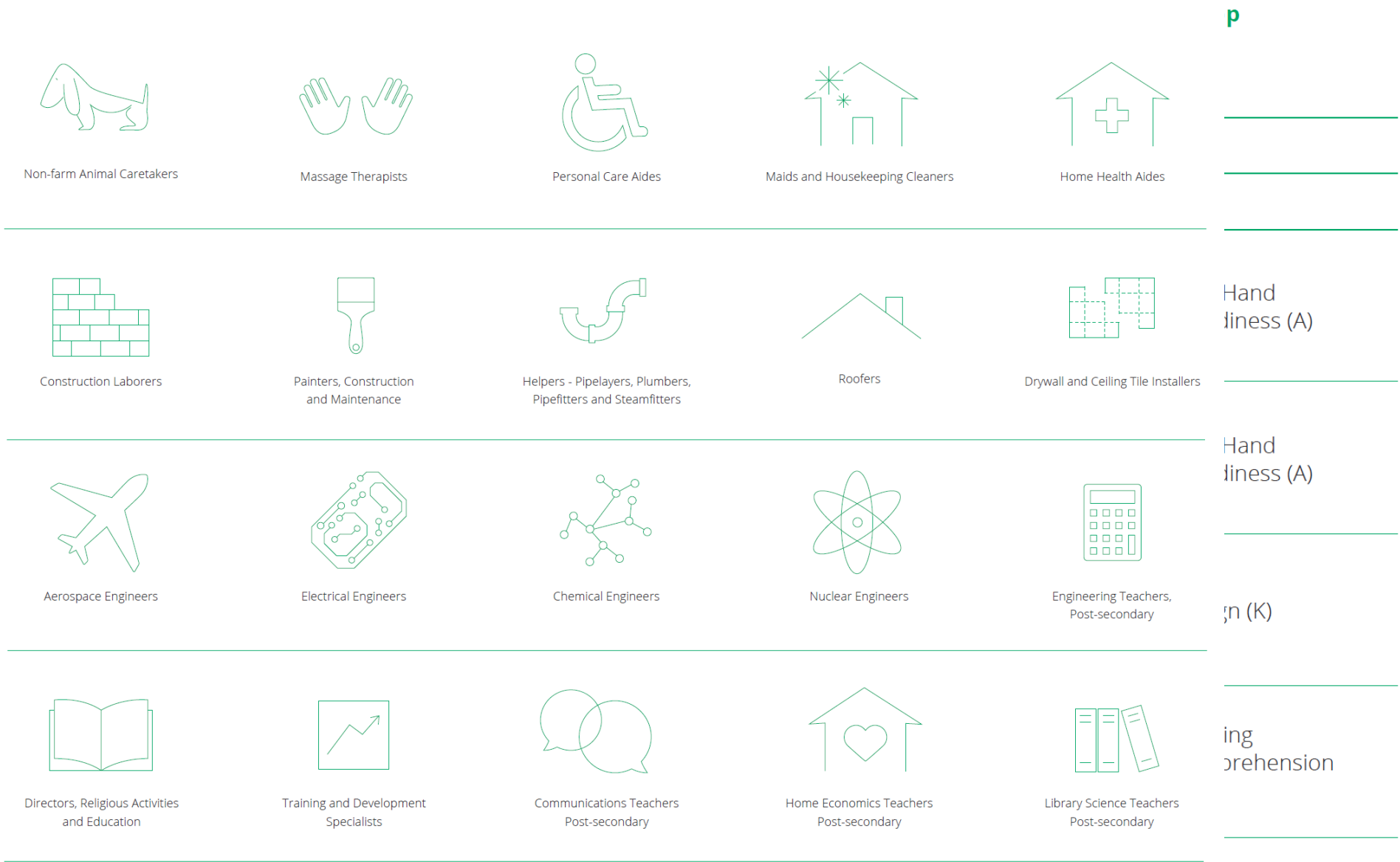


Figure 14: The 'closest' occupations to hypothetical new high demand occupations for the UK.

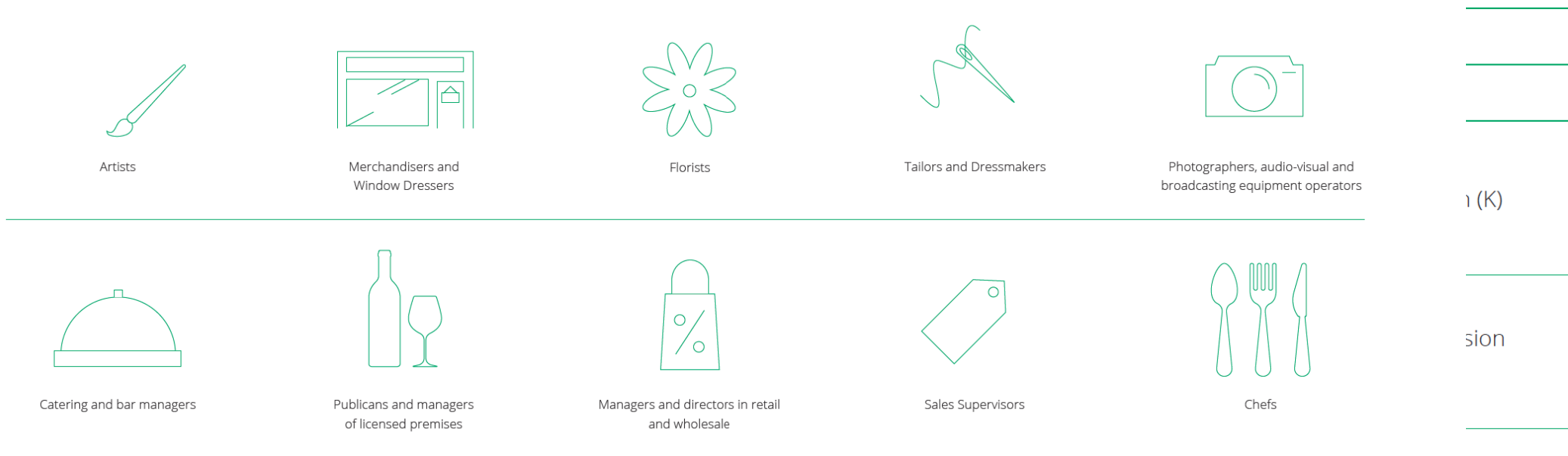
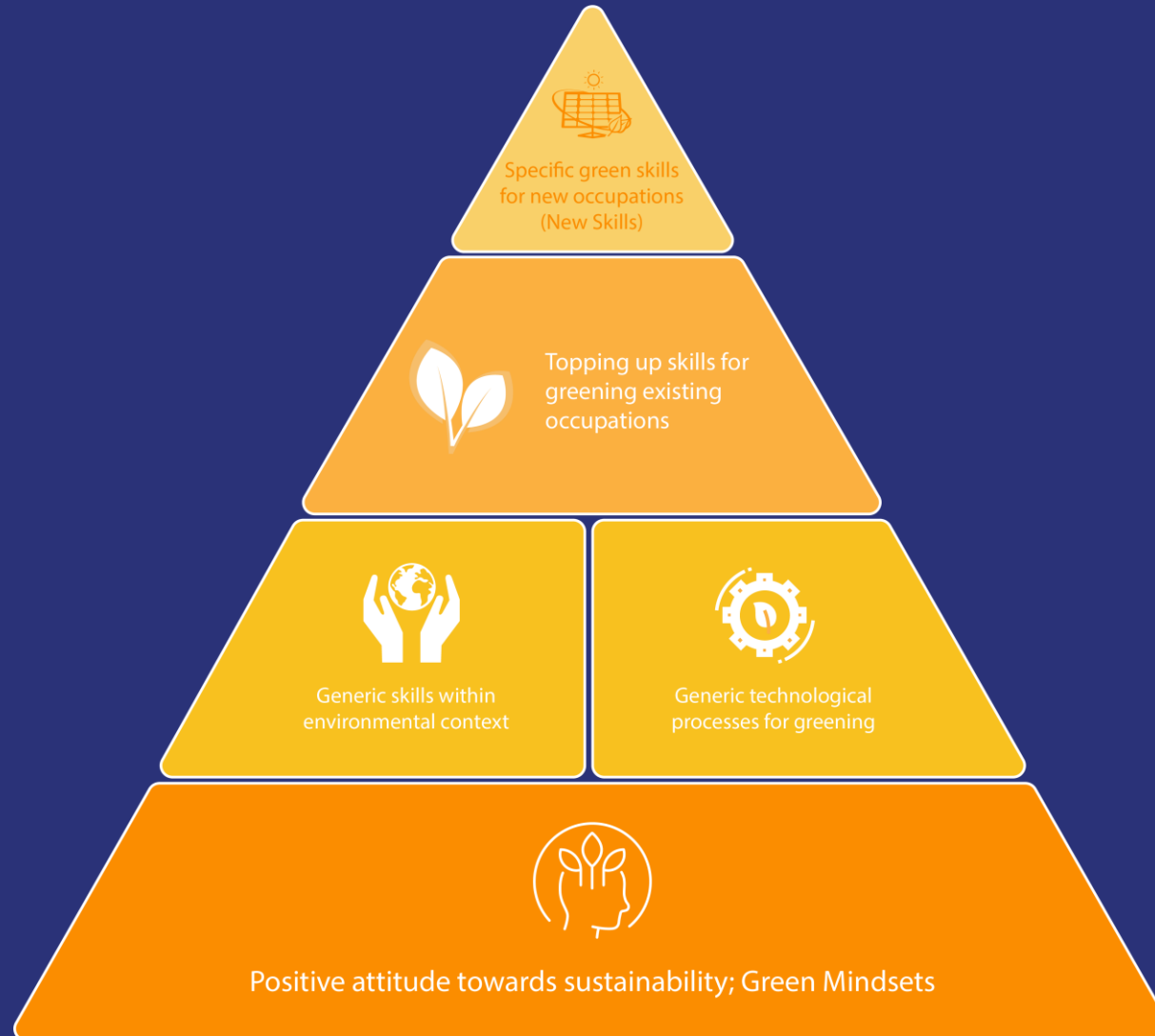


Figure 15: Time-series of employment for two of the 'closest' occupations to new UK occupations, as tabulated in Figure 14



# Typology of Green Skills



# Most Requested



NATIONAL  
**Skills**  
COUNCIL

Thank you.