

# Big Data for Labour Market Intelligence

Capacity development programme 2024

## Module 2: AI and the impact on Labour Market and Education

### Session 2

New dimensions and dashboards for skills analysis developed in 2023: analysis of Digital and Green Skills Analysis; remote work; the difficulty to fill index.



# Topics

## **New angles of analysis based on OJV databases:**

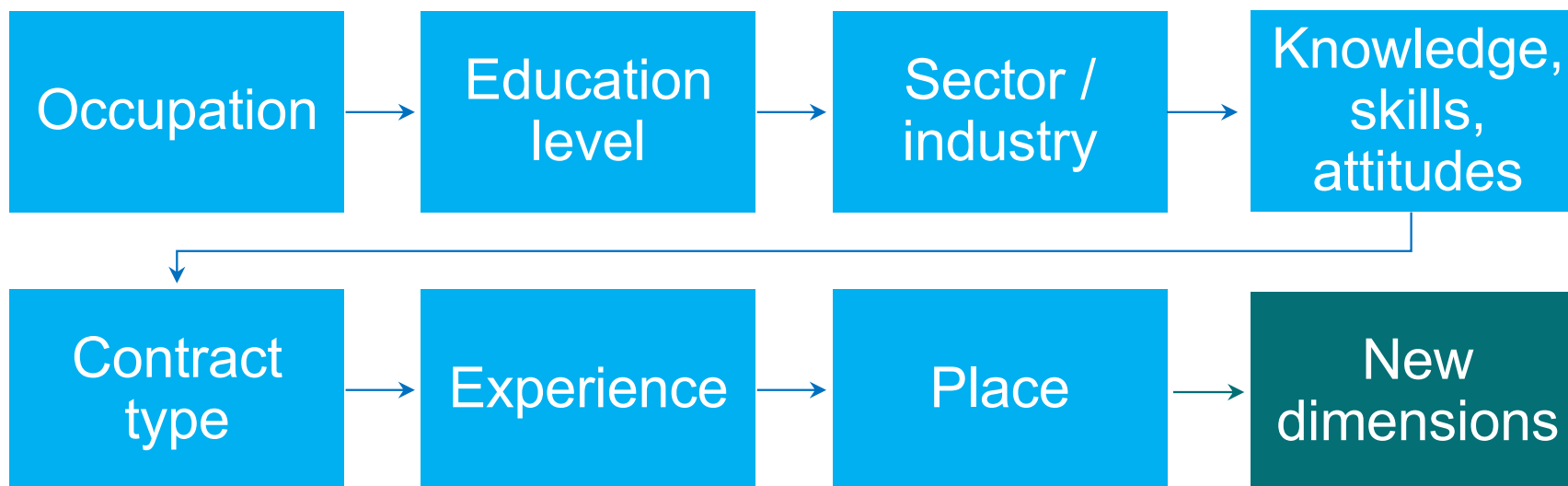
- **Demand for digital skill**
- **Demand for green skills**
- **Demand for remote work**
- **Difficulty to fill index**

# Beyond "traditional" variables

New  
analytical  
questions



How widespread is the demand for **Digital Skills**?  
How **Green Economy** is evolving in the countries of interest?  
How much **Remote Work** is present in each Labour Market?  
How **difficult** is it to find a professional? Or a skill?

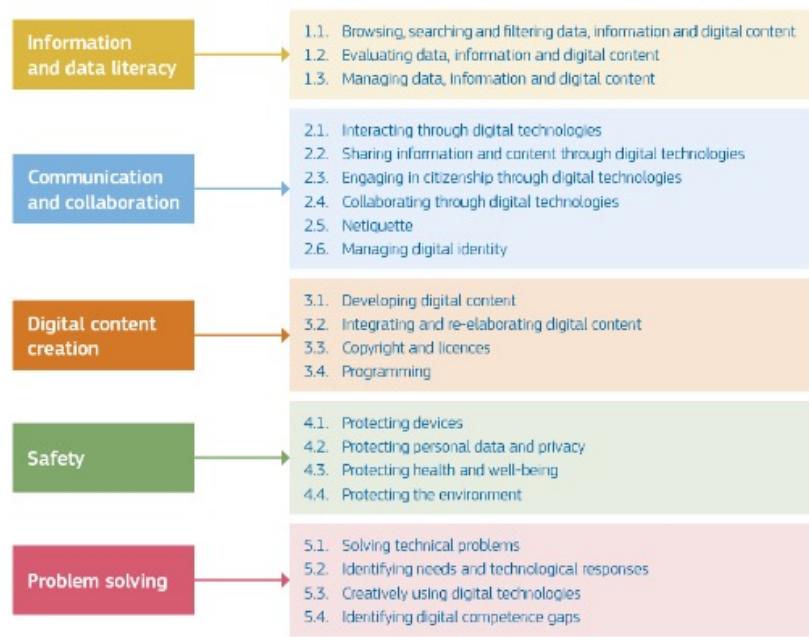


# Demand for digital skills

# Demand for digital skills



# ESCO Digital Skills and Knowledge Concepts



The work on digital skills in ESCO started with the integration of the **European Digital Competence Framework for Citizens (DigComp)** in the skills pillar in ESCO v1.0.0.

**DigComp** framework represents a complete summary of the skills needed in the digital environment

# ESCO Digital Skills and Knowledge Concepts

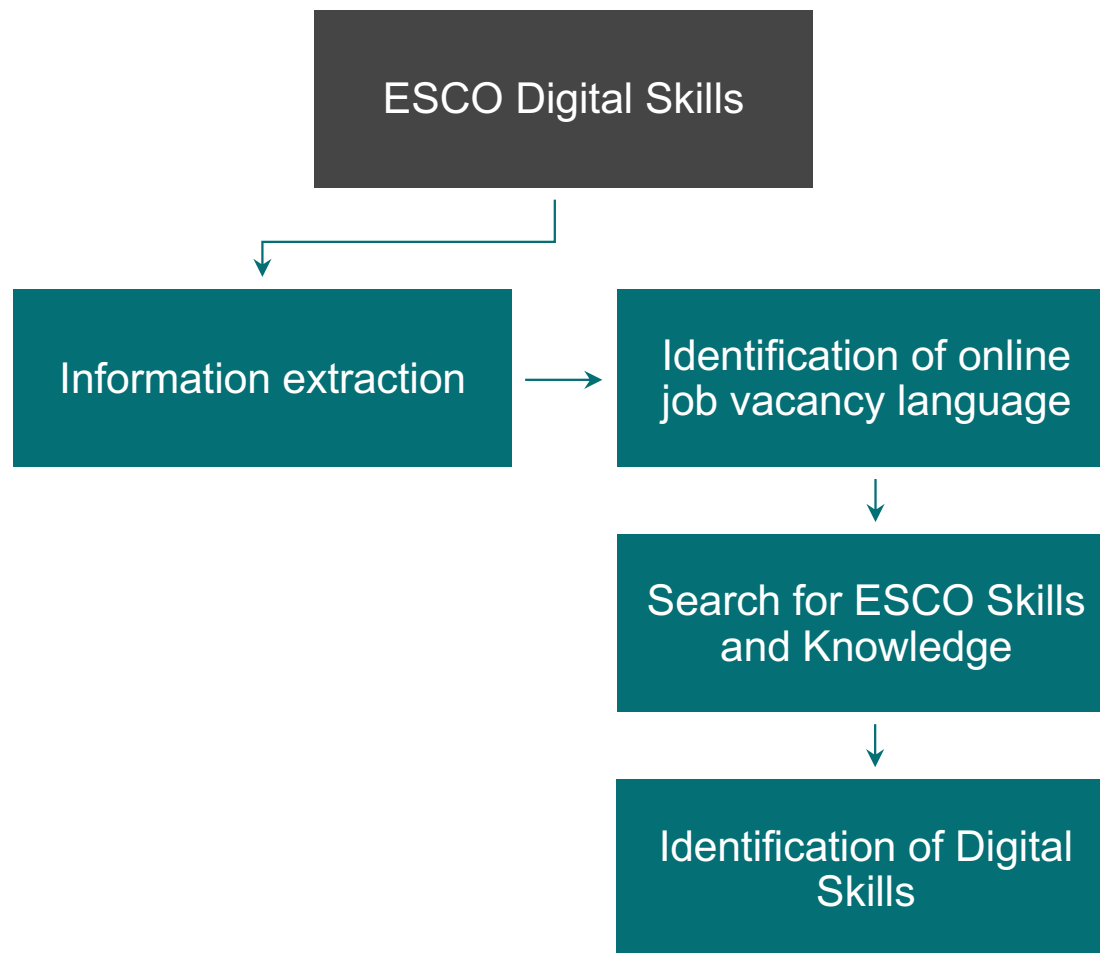


**DigComp** framework does not have the granularity of ESCO skills. For this reason, the DigComp definition of digital skills was adopted by the ESCO team to distinguish and label the digital concepts among the almost 14,000 ESCO knowledge and skills.

*Digital competence involves the confident, critical and responsible use of, and engagement with, digital technologies for learning, at work, and for participation in society. It includes information and data literacy, communication and collaboration, media literacy, digital content creation (including programming), safety (including digital well-being and competences related to cybersecurity), intellectual property related questions, problem solving and critical thinking. (Council Recommendation on Key Competences for Lifelong Learning, 22 May 2018, ST 9009 2018 INIT).*

Following this definition during 2022, **1,201 ESCO skills and knowledge** concepts was labelled as digital and released in ESCO v1.1.1 and are available in 28 languages.

# Skills extraction





# Terms extraction - example

## Job Opportunity: IT Manager

We are currently seeking an experienced IT Manager to lead our dynamic team.

### Key Responsibilities:

- Utilize Microsoft Office, Microsoft Access, and SQL for effective data management and system operations.
- Lead and motivate a team of skilled IT professionals.
- Collaborate seamlessly through digital technologies to enhance communication and workflow efficiency.
- Develop staff through training and mentorship programs.
- Adapt to change in a rapidly evolving technological landscape.
- Tolerate stress and pressure while maintaining a calm and focused demeanour.
- Demonstrate effective project management skills to ensure successful execution of IT initiatives.

### Why Join Us:

- Opportunity to lead and contribute to cutting-edge IT projects.
- A collaborative and innovative work environment.
- Professional development opportunities.
- Competitive compensation and benefits package.

If you are a seasoned IT professional with a proven track record in utilizing Microsoft Office, WordPress, Microsoft Access, and SQL, and you possess the leadership skills to motivate and develop a team, we invite you to apply. Please submit your resume and a cover letter outlining your relevant experience.

Identification of online  
job vacancy language

English

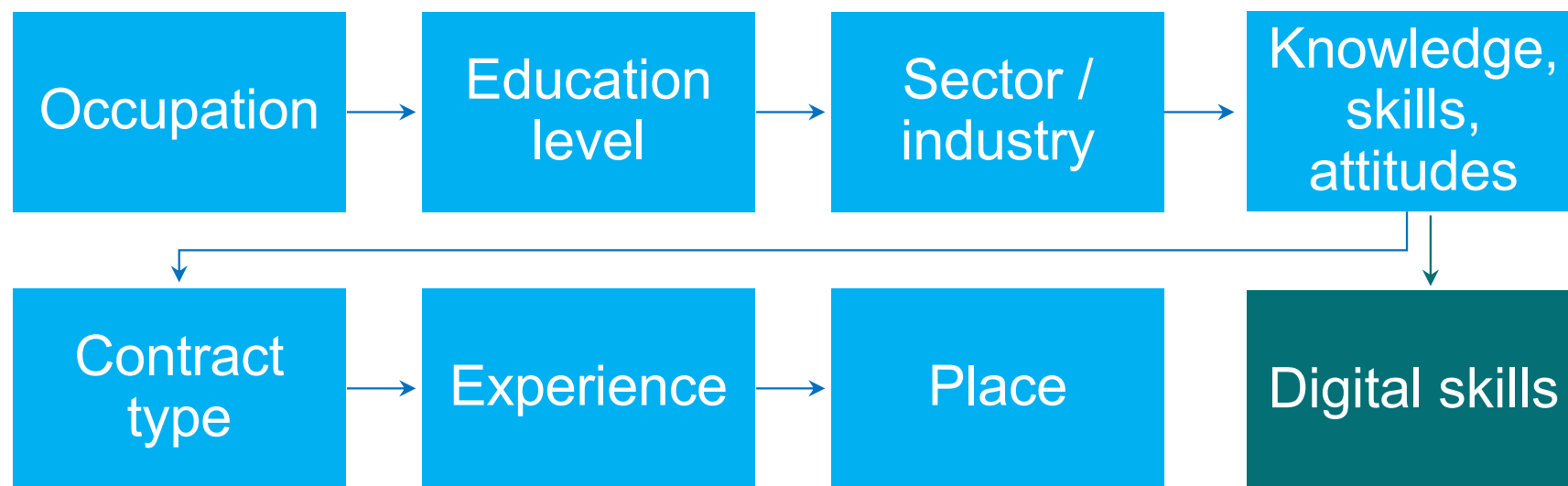
Search for ESCO  
Skills and Knowledge

Use Microsoft Office  
Microsoft Access  
SQL  
Data management  
Collaborate through  
digital technologies  
Leading and  
motivating  
Develop staff  
Adapt to change  
Tolerate stress  
Project management  
WordPress

Identification of  
Digital Skills

Use Microsoft Office  
Microsoft Access  
SQL  
Data management  
Collaborate through  
digital technologies  
WordPress

# Results: “Digital skills” is a new dimension



# Results: Digital skill dashboard

<https://solutions.lightcast.io>



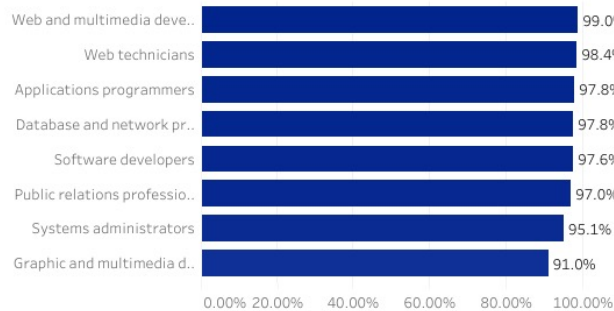
Select Release Date  
Da April 2020 a December 2023  
e valori Null

Digital Share

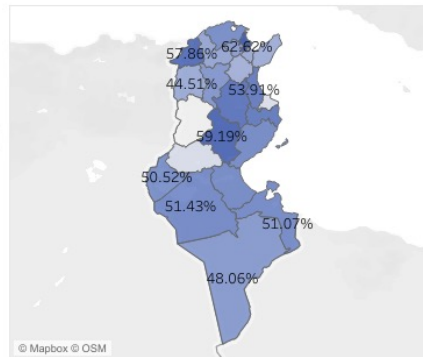
57.08%

Select the Occupation that you want to Analyze (then select it again to reset your choice)

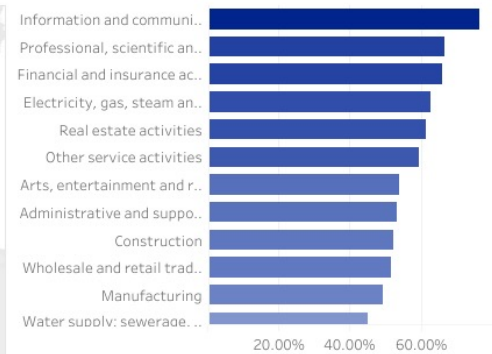
Select the Occupation that you want to Analyze (then select it again to reset your choice)



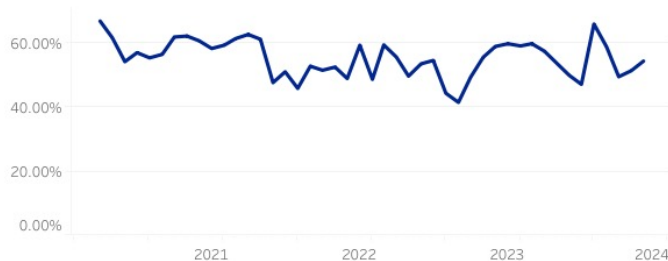
Share of digital skill by region



Share of digital skill by industry



Share of digital skill by release date



Most requested digital skill



**User:**  
**training@etf.com**  
**Password:**  
**ETF\_training\_2022**



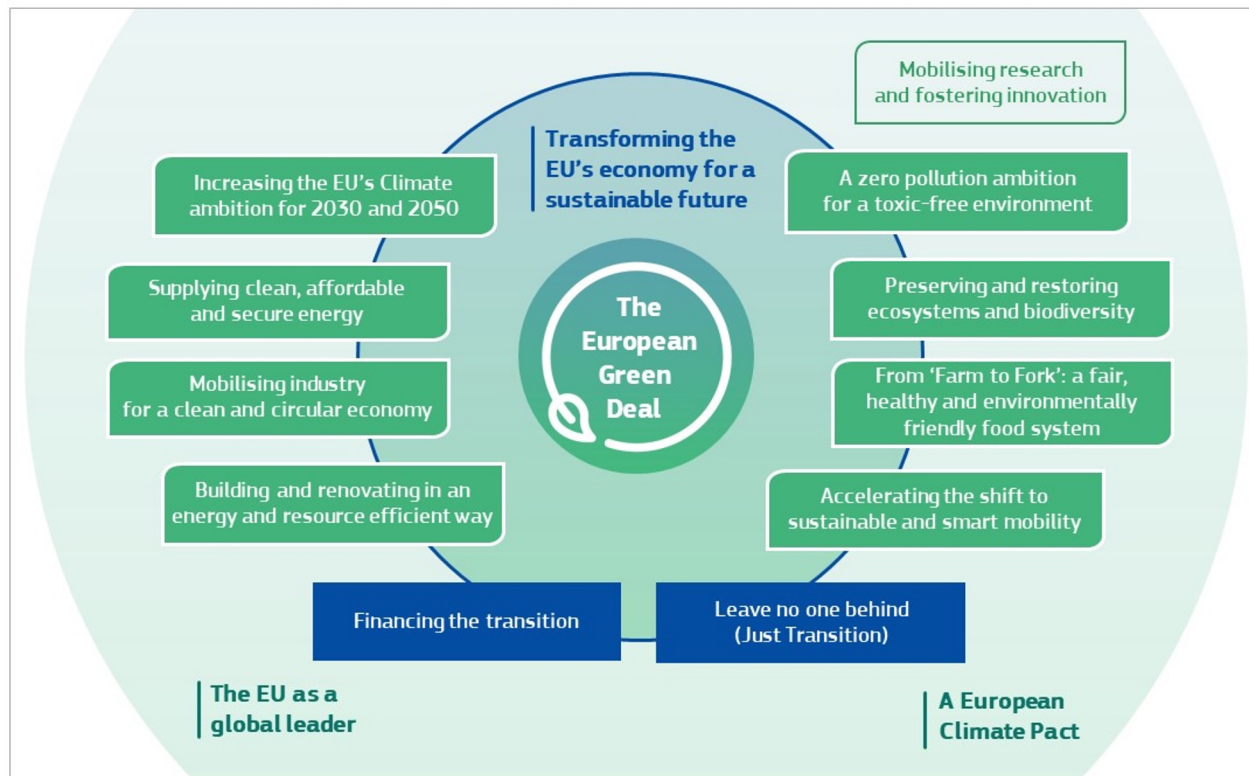
# Demand for green skills

# Demand for green skills



[https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal\\_en](https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en)

# The "European Green Deal"



Ensuring coherence with the "policy areas" in which the "European Green Deal" is articulated, we defined seven declinations of green skills for this project.



# ETF Green Skill families

- **Environment and sustainable tourism:** the skills related to the management of forests and maritime areas, environmental protection, and management of loss of species and ecosystems as well as their exploitation through sustainable forms of tourism.
- **Sustainable agriculture:** the skills necessary for the development of sustainable agriculture for producers, consumers, and the environment.
- **Sustainable construction:** the skills to initiate a process of renovation and new construction that improves the energy efficiency of buildings and brings building design in line with the circular economy.

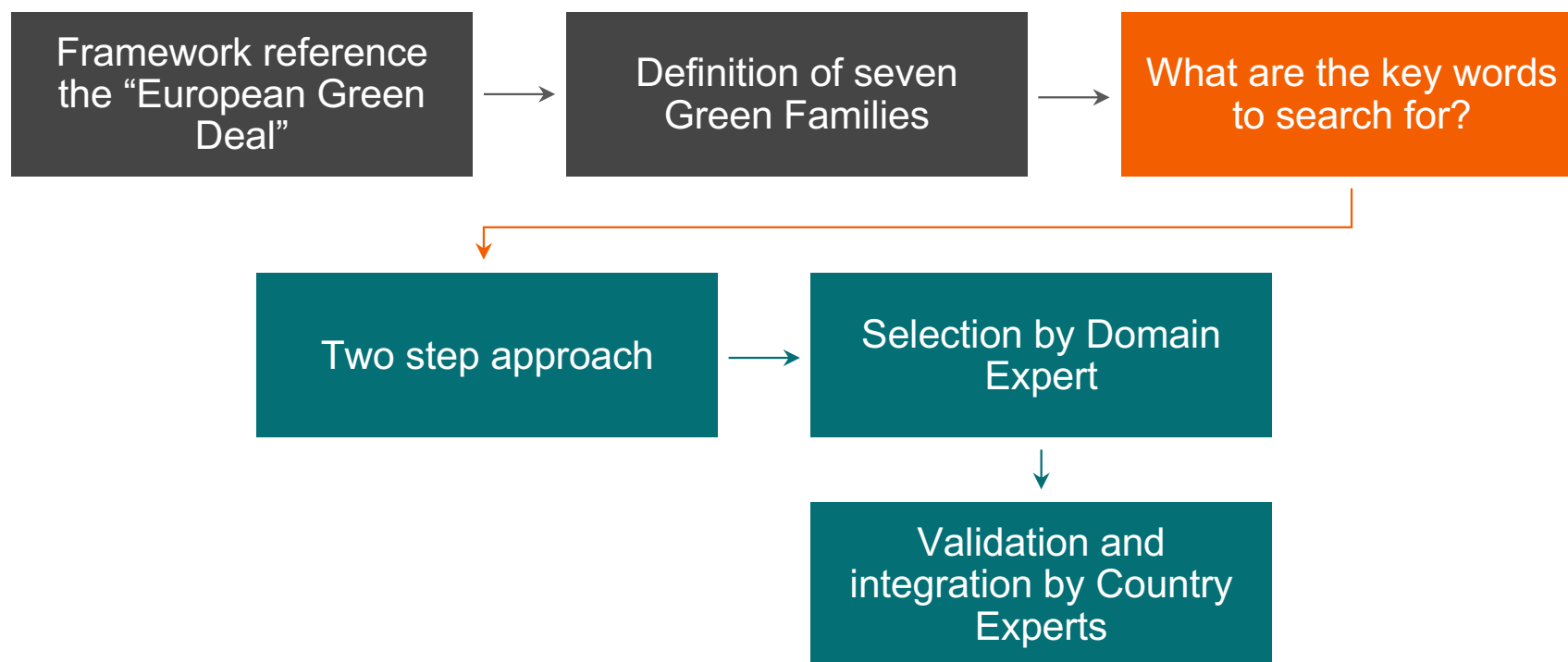


# ETF Green Skill families

- **Sustainable economy:** the skills related to the concept of circular economy.
- **Sustainable energy:** the skills needed to change energy production by replacing current energy sources with renewable energy sources.
- **Sustainable production:** the skills needed to modify current production styles by reducing the environmental impact of companies.
- **Sustainable transport:** the skills related to the reduction of emissions caused by transport both with the use of innovative fuels less polluting and with forms of mobility sharing.



# Terms set definition



# Terms set definition - example

## **Environment and sustainable tourism:**

- environmental protection
- green tourism
- habitat restoration
- sustainable tourism

## **Sustainable agriculture:**

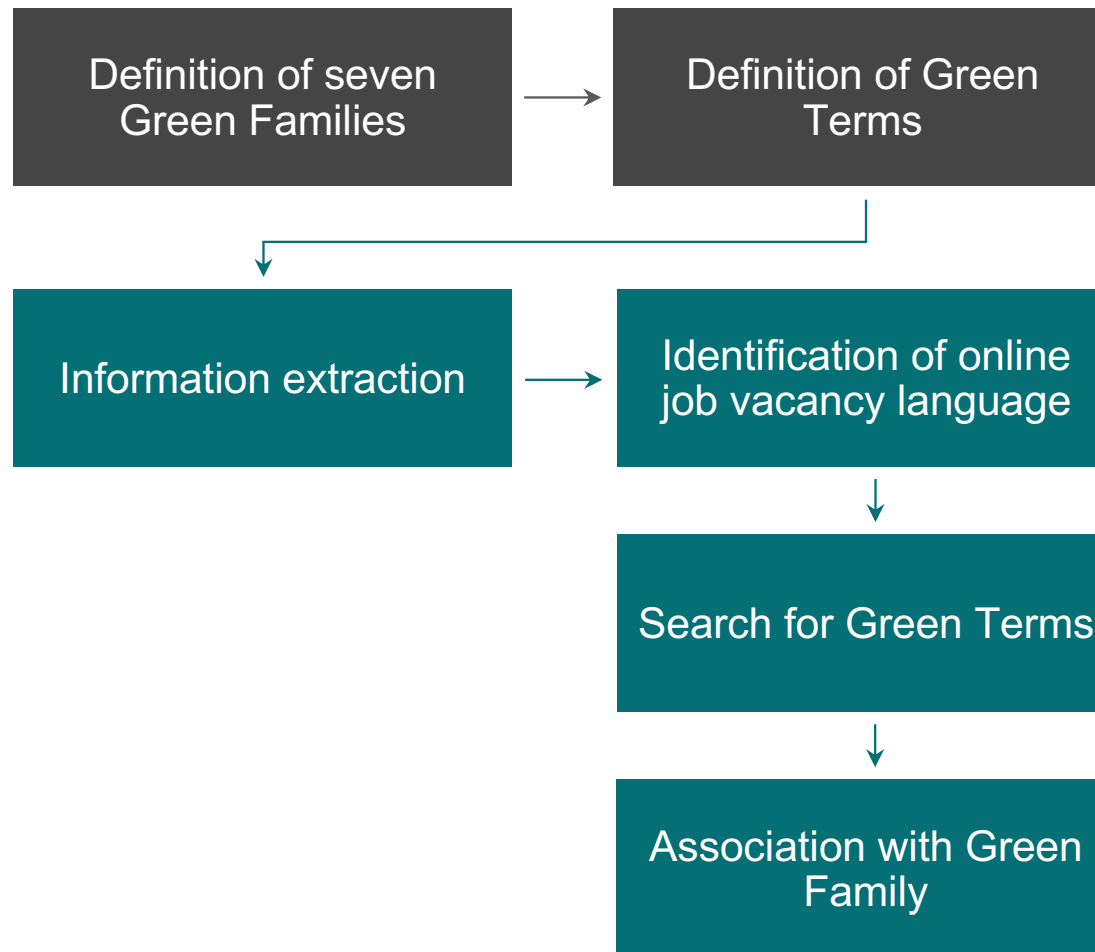
- climate smart agriculture
- conservation agriculture
- aquaponics
- precision agriculture

## **Sustainable energy:**

- carbon neutral fuel
- energy conservation
  - solar power
  - wind generator

- The set does not need to be limited to skills-like terms, but can include general terms that can be found in postings' text and can be linked to green economy (e.g., Solar power)
- The set of terms is language dependent: each language has its own terms, localized and reflecting specific terminology and culture

# Terms extraction



# Terms extraction - example

## Electrical Engineer

Brilliant opportunity to work as an Electrical Engineer for a leading global **cleantech** integrator and **renewable energy** asset developer, owner and operator.

This company is one of the leading **renewable energy** and **energy efficiency** companies with over 70 offices worldwide.

This will suit Electrical Engineers with a background in renewable systems looking to work in the renewable industry on exciting **clean technology** projects.

### Key Responsibilities

- Electrical Engineer is responsible for working on assignments covering all aspects of industrial and commercial energy usage, **energy savings**, **energy storage**, utility plant redevelopment and CO2 emission reduction
- Conceptual design of energy related projects
- Formulate, evaluate and prepare designs and specifications of industrial and commercial schemes during feasibility studies, scheme detailed design and project implementation
- Design covering **combined heat and power**, refrigeration, Air Source and Ground Source Heat pumps, HVAC, boilers, compressed air, **Solar PV**, **Wind Generation**, Industrial control schemes.

### Background Required

Experienced Electrical Engineer with minimum 3 years

Experienced with

- Battery storage,
- Solar PV,
- Power systems

Identification of online  
job vacancy language

English

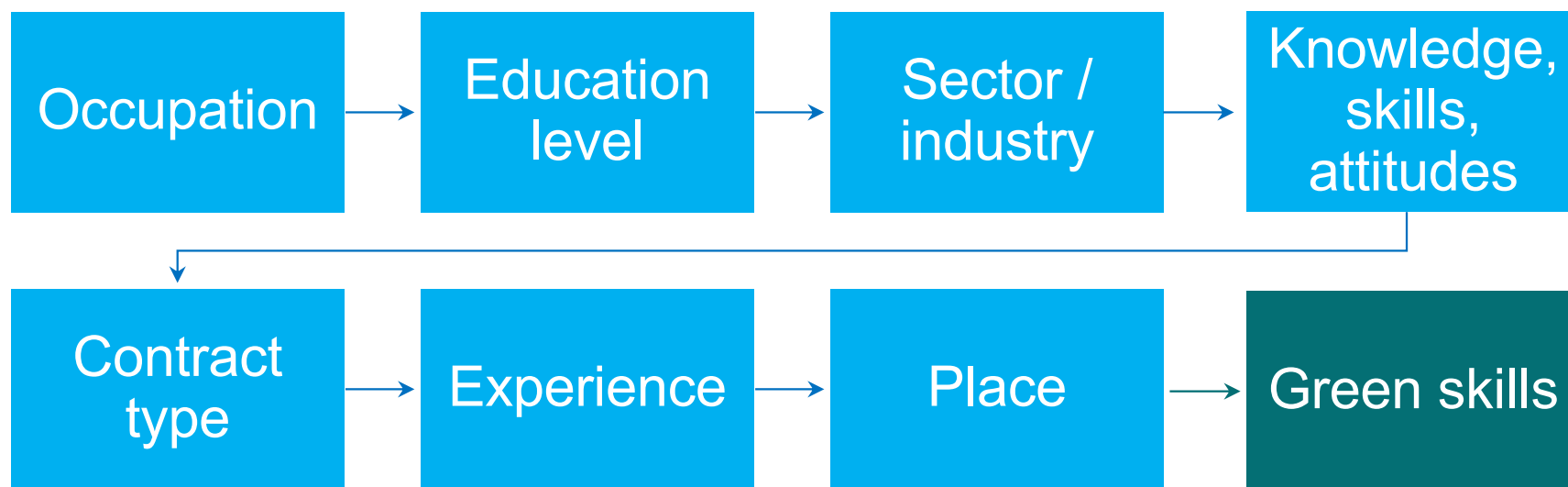
Search for Green  
Terms

Cleantech  
Renewable energy  
Energy efficiency  
Clean technology  
Energy saving  
Energy storage  
Combined heat and  
Power  
Solar PV  
Wind generator

Association with  
Green Family

Sustainable  
production  
Sustainable energy

# Results: “Green skills” is a new dimension



# Results: Green skill dashboard

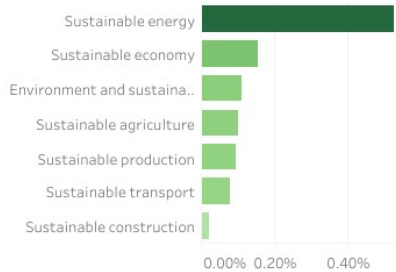
<https://solutions.lightcast.io>



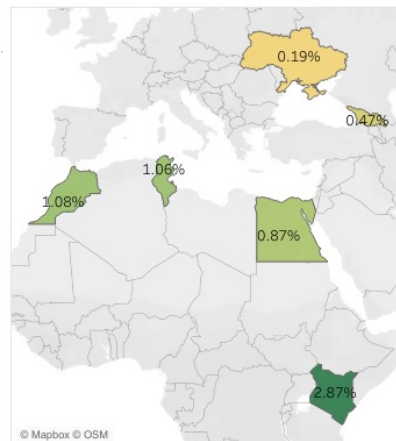
Select Release Date  
Da October 2022 a December 2023

## Green Share

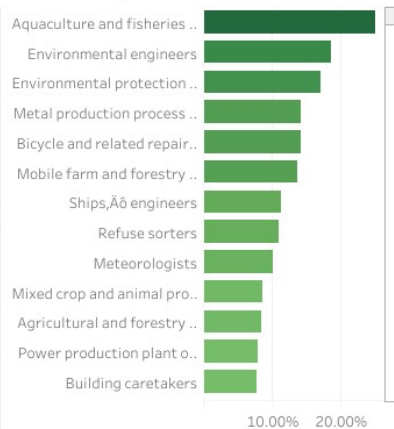
Select the Green skill family that you want to Analyze (then select it again to reset your choose)



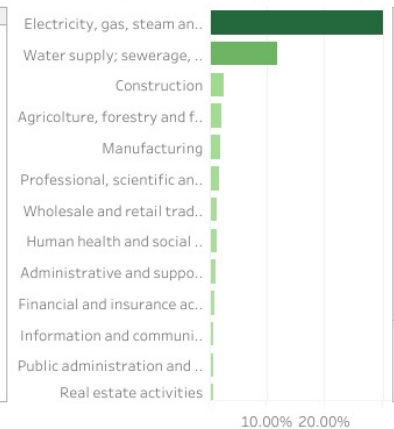
## Share of green skill by region



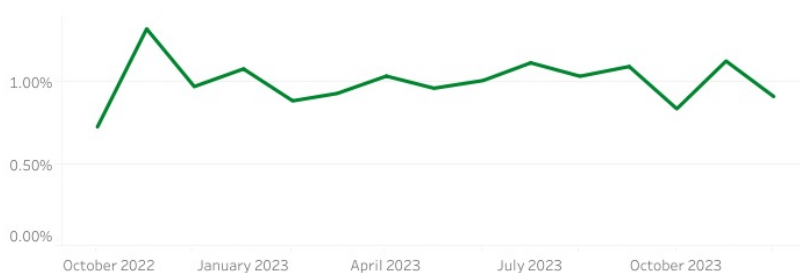
## Share of green skill by occupation



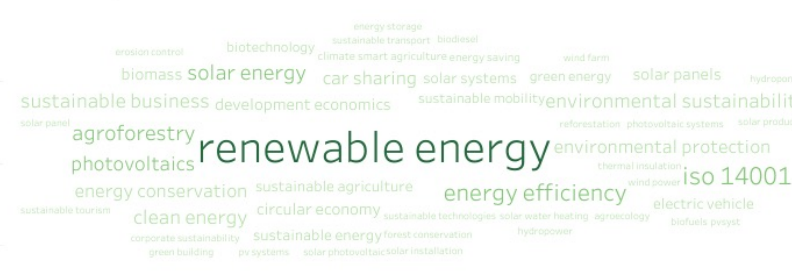
## Share of green skill by industry



## Share of green skill by release date



## Most requested Green Skill



**User:**  
**training@etf.com**  
**Password:**  
**ETF\_training\_2022**



# Demand for remote work

## Ukrainian Interpreter - Remote

Lingoland  
London  
Remote  
£1,000 - £2,000 a month - Freelance

Apply now



In the title

### Company Info

Follow

Get job updates from Lingoland

After you familiarize yourself with the following description of the position, you can click "Apply now" and send us your resume and certificate in PDF or Word files.

Job Type: Freelance

Salary: £1,000.00-£2,000.00 per month

Additional pay:

- Commission pay

Benefits:

- Flexitime
- Work from home

Schedule:

- Monday to Friday

Application deadline: 18/08/2022

Reference ID: UKR984

Is a benefit?

### Job details

#### Salary

£1,000 - £2,000 a month

#### Job type

Freelance

### Benefits

*Pulled from the full job description*

Flexitime

Work from home

### Full Job Description

#### We are hiring UKRAINIAN - ENGLISH INTERPRETERS!

We are looking for experienced interpreters who want to join an international company and be a great help to the community.

Do you have one year of experience working as an Interpreter/translator? Do you enjoy what you do? Would you like to be part of a dynamic team with solid possibilities of professional growth? While making extra cash in your spare time? If so, we want to hear from you!

#### Job Overview:

The Interpreter provides interpretation for Limited English Proficient (LEP) patients, their families, providers, and staff. The Interpreter advocates for LEP patients' access to the full range of health care services providing intercultural mediation to assist providers in delivering culturally sensitive patient care. A commitment to provide exceptional customer experience, patient privacy & safety, and teamwork spirit is required for this position.

### Hiring Insights

Hiring 5 candidates for this role

#### Job activity

- Employer reviewed job 8 days ago
- |
- Posted 15 days ago

15 days ago



new

## Software developer - UK Data Service

Jisc 3.8 ★

Remote

£33,000 a year

Is a job location?

- Salary: From £33,000 per annum negotiable depending on experience.
- We are a small team who provide access to census and international data, and evidence and...

Posted 6 days ago · More...

Flexibility?

## Software developer - UK Data Service

Jisc ★★★★★ 5 reviews

Remote · Remote

£33,000 a year - Full-time, Permanent

You must create an Indeed account before continuing to the company website to apply

Apply on company site



Pulled from the full job description

Cycle to work scheme

Employee discount

Paid volunteer time

Work from home

## Full Job Description

### More details

Software Developer - UK Data Service

Salary: From £33,000 per annum negotiable depending on experience

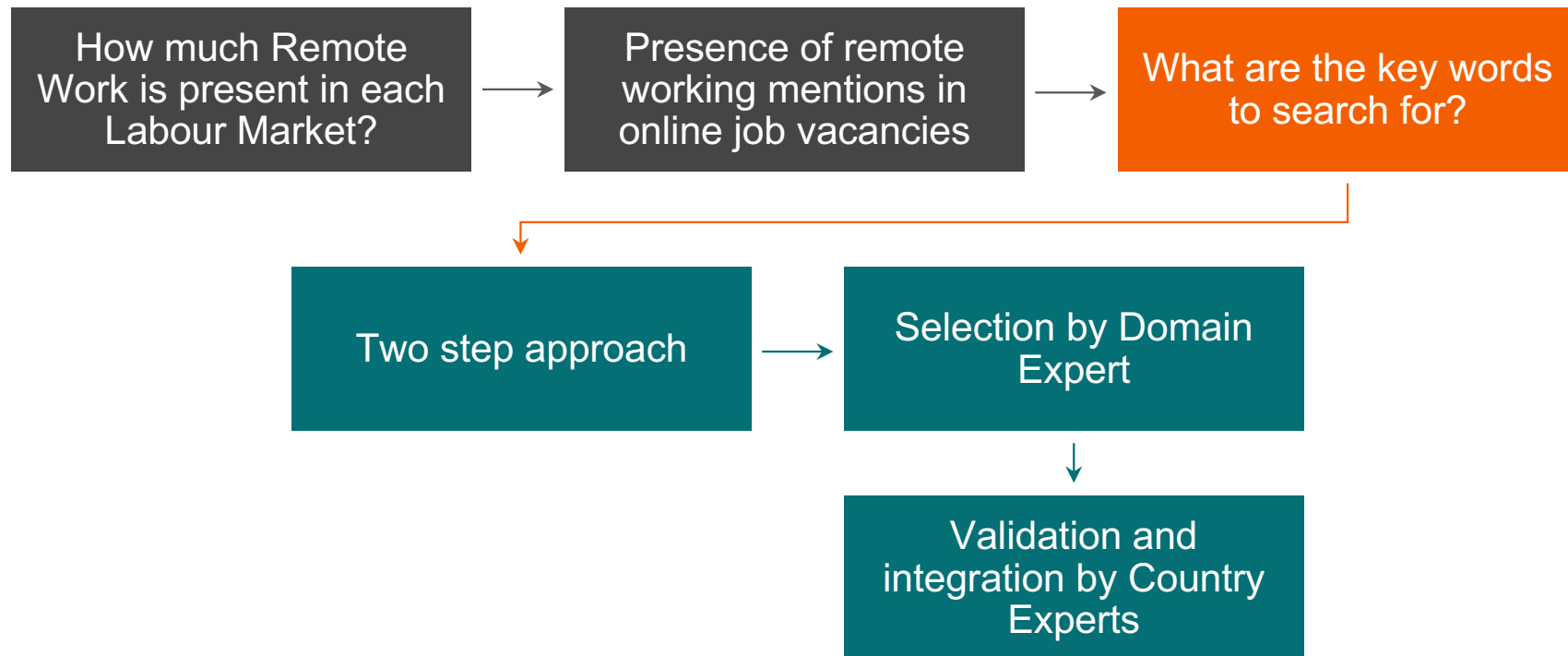
Contract: Permanent

Location: Hybrid - flexibility to work from home or at any of our main hubs (London, Bristol, Manchester and Harwell)

Jisc is the UK higher, further education and skills sectors not-for-profit organisation for digital services and solutions. We believe education and research improves lives, and technology improves education and research.

Our vision is for the UK to be a world leader in technology for education and research and

# Demand for remote work



# Terms set definition - example

## **English:**

- home based
- work from home
- remote work
- home office

## **Ukrainian:**

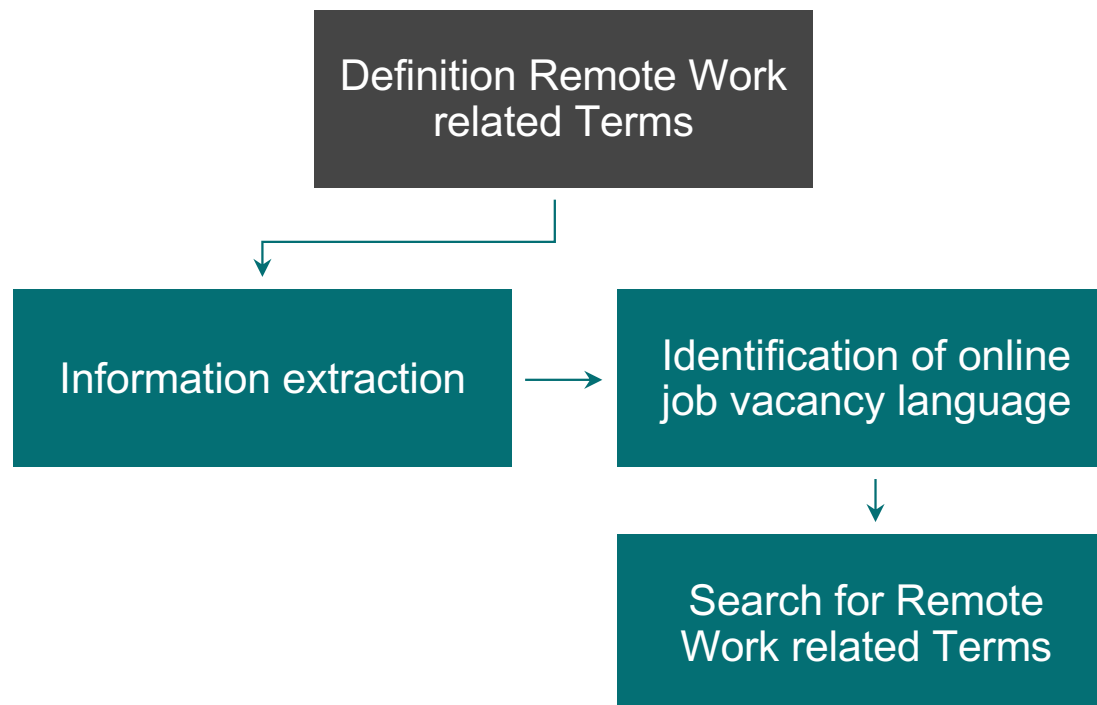
- працювати вдома
- дистанційна робота
- робота з дому
- телеробота

## **Italian:**

- smartworking
- telelavoro
- lavoro da remoto
- lavoro agile

- English, Ukrainian, Italian, Polish, Czech, Estonian, French, German, Latvian, Lithuanian, Slovak, Spanish and Russian taxonomies were defined.
- The set of terms is language dependent: each language has its own terms, localized and reflecting specific terminology and culture

# Terms extraction



# Terms extraction - example

## Software Developer

South East • Remote

£40,000 a year - Full-time, Permanent

We are looking for Software Developer to be a part of a team in THEIA.

This role can be **home based** anywhere in UK.

THEIA is a cloud-based integrity management solution, developed by Penspen. It has been designed to provide timely and critical information, initially for the safe and efficient running of pipelines.

### Main Purpose of Role:

This role will form part of a team responsible for developing engineering assessments which will predominantly be written using python programming language.

The engineering assessments developed by the team will be implemented within our cloud-based architecture, in many cases this will require development of new methodologies for solving the engineering challenges faced by energy infrastructure as identified by Penspen's global business.

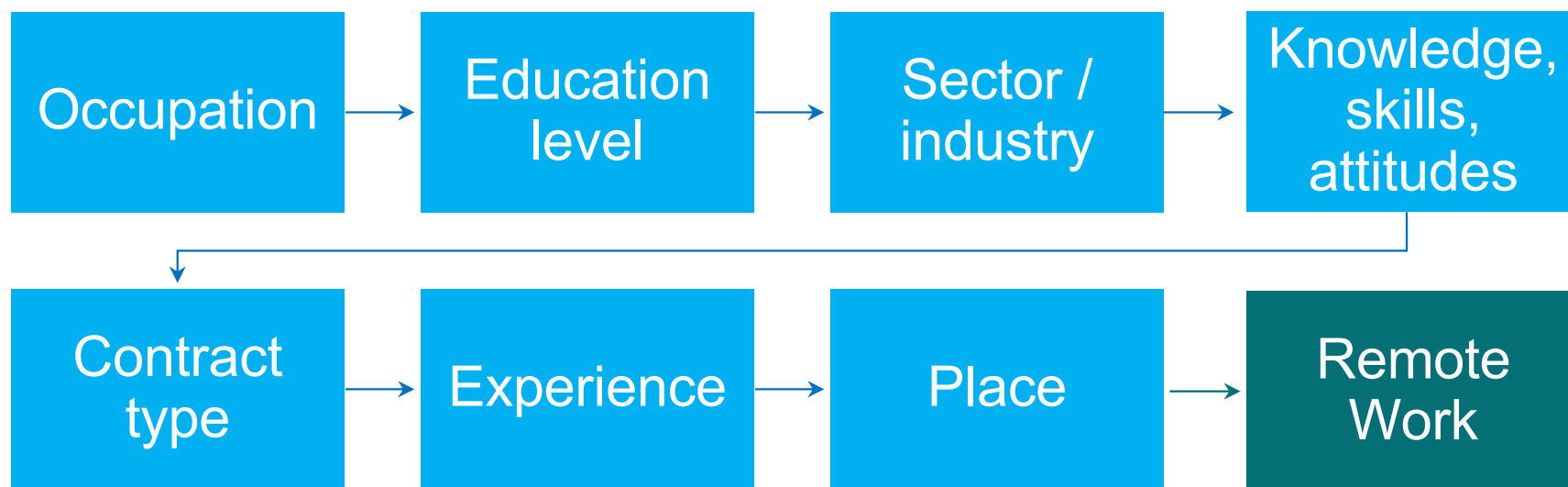
Identification of online  
job vacancy language

English

Search for Remote  
Work related Terms

Home based

# Results : “Remote work” is a new dimension



# Results: Remote work dashboard

<https://solutions.lightcast.io>



Select Release Date  
Da April 2020 a December 2023  
e valori Null

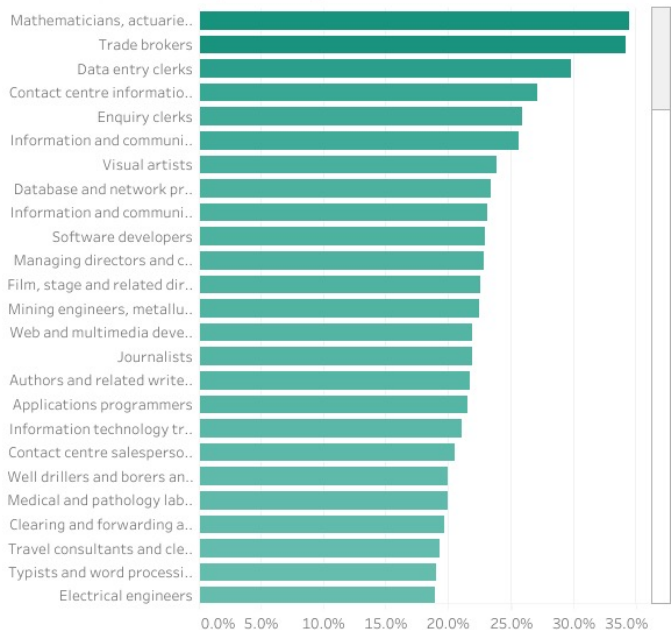
Remote Work Share

5.41%

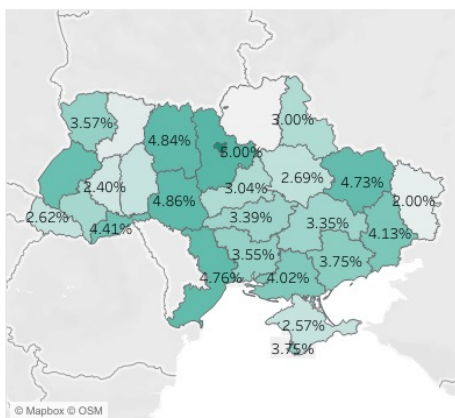
Number of remote work OJV

161,210

Select the Occupation that you want to Analyze (then select it again to reset your choice)



Share of remote work by region



Share of remote work by industry



Share of remote work by release date



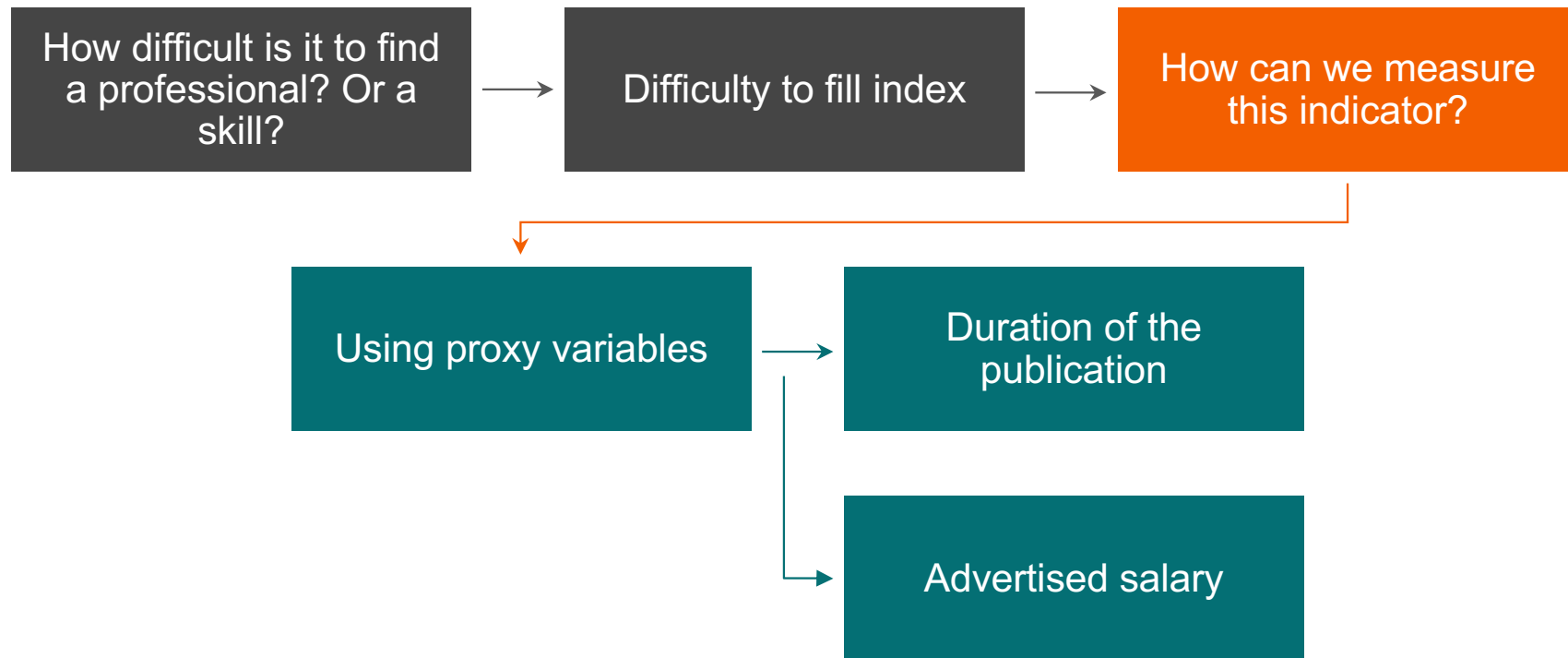
**User:**  
training@etf.com  
**Password:**  
ETF\_training\_2022



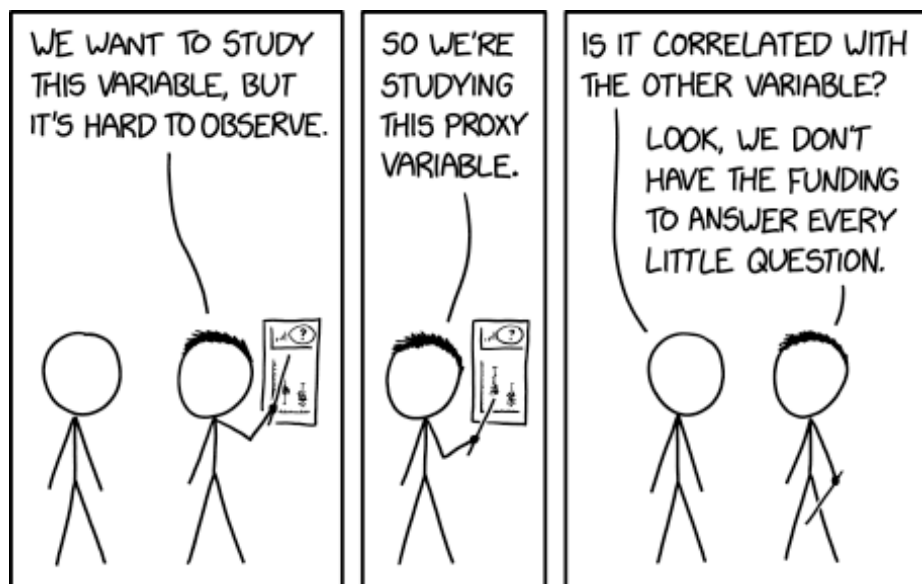
# Difficulty to fill index



# Difficulty to fill index



# Choosing the proxy variables



© xkcd.com

The **Difficulty to Fill (DTF)** methodology involves two proxy variables, **Duration of the publication** and **Advertised salary**.

With these two variables we estimate the **time to fill (TTF)** a job position and the **salary premium** of this job position due to the occupation demanded or the requirement of a particular skill.

The idea behind choosing these two variables to measure the difficulty to fill is that **an increase in the time it takes to find** the right candidate and **an increase in the salary premium** for the job position go hand in hand with **an increase in the difficulty of finding a professional or a skill**.

# Calculation of the difficulty to fill index



## 1. Time to Fill (TTF):

- Compute the duration of job postings online by occupation or skill.
- Normalize the duration using max/min scaling. This step ensures that the TTF values are within a standardized range.

## 2. Salary Premium:

- Calculate the salary premium by finding the difference between the average salary for a particular occupation or skill and the average salary in the area during the same period.
- Normalize the salary premium using max/min scaling. This step ensures that the salary premium values are within a standardized range.

# Calculation of the difficulty to fill index



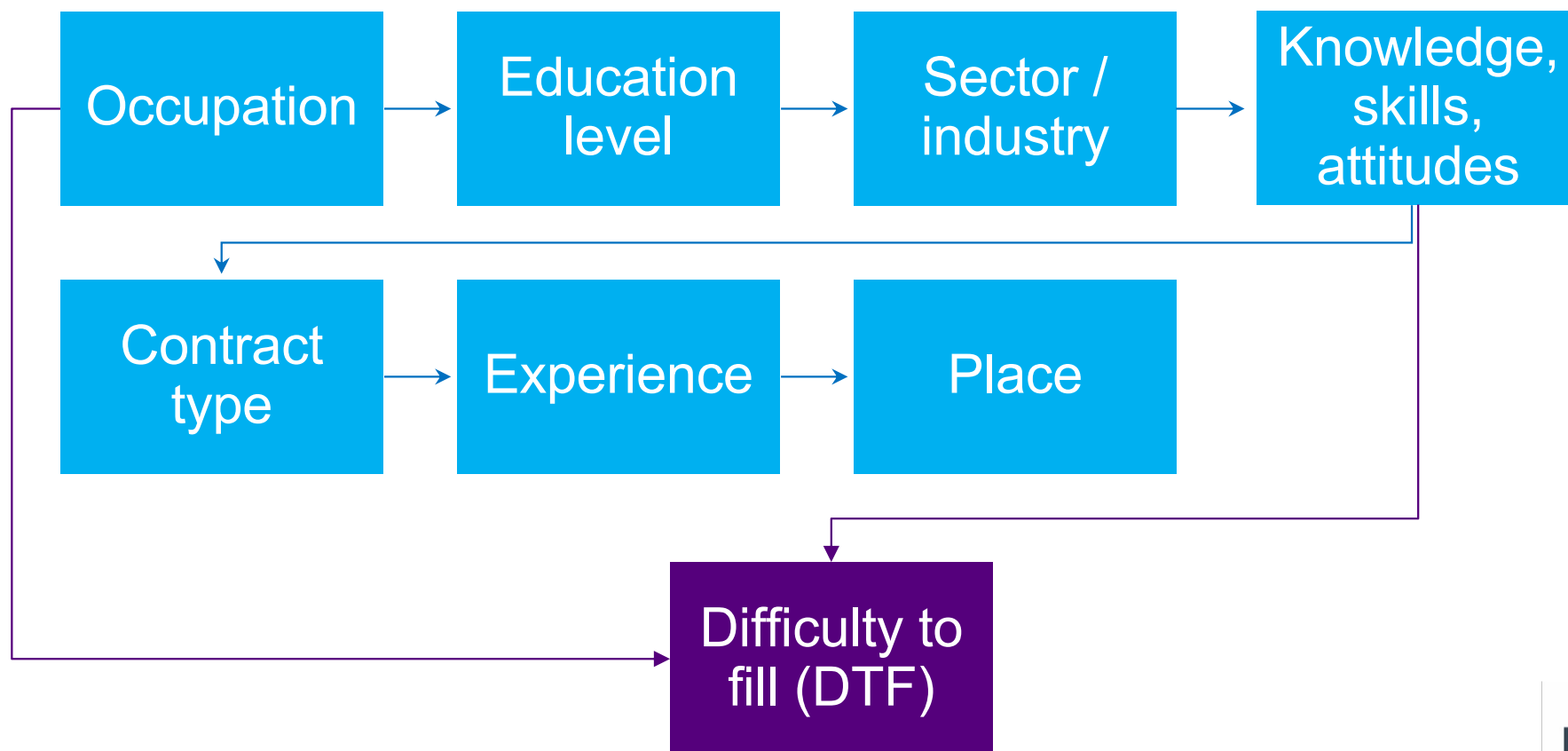
## 3. Difficulty to Fill (DTF):

- Multiply the normalized salary premium by the normalized time to fill.
- This step gives a combined metric for each job position or skill, representing both the salary aspect and the time it takes to fill the position.

## 4. Percentile Rank Distribution:

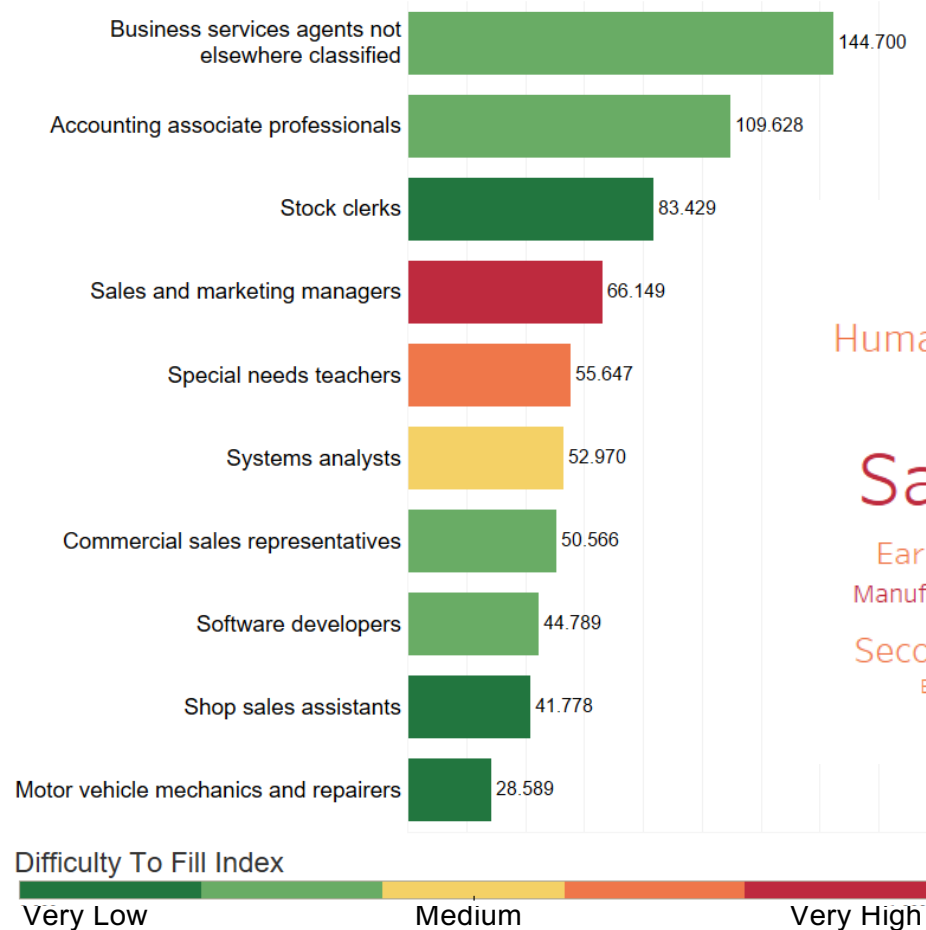
- Distribute the DTF values based on a percentile rank distribution.
- This step categorizes the DTF values into percentiles, providing a relative ranking of job positions or skills in terms of difficulty to fill.

# Results : “Difficulty to fill” is a new index



# Results: Difficulty to fill Index - Occupation (Ukraine)

## Most in-demand occupations



## Most difficult to fill occupations



# Challenges and Considerations



## 1. Data Quality and Availability:

- The accuracy of the methodology depends on the availability and quality of data related to job postings, salary information, and time-to-fill metrics.

## 2. Normalization Techniques:

- The choice of normalization techniques (in this case, max/min scaling) can impact the results but permit us to compare results.

## 3. Interpretability:

- Interpreting the significance of the normalized DTF values is not straightforward. To facilitate understanding, we can use a quadrant approach, combining the DTF with other variables.

# Quadrant approach (Italy - Cyber Security, skills analysis)

