



GLOBAL SKILLS TRACKER

Methodological Note

Introduction

In today's rapidly evolving global landscape, labour markets are becoming increasingly complex and unpredictable. Economic, geopolitical, demographic, technological, environmental and societal shifts are converging to reshape not only the structure of employment but also the skills required to access the world of work. The green and digital transitions, coupled with the expanding role of artificial intelligence (AI), are transforming industries and sectors at an unprecedented pace. These changes are simultaneously creating new jobs while eliminating others, thereby intensifying labour market polarization.

At the core of these megatrends is the increasing demand for new and transferable skills. Workplaces and job structures are evolving due to rapid technological advancements, compelling workers to upskill or reskill throughout their lives. Moreover, the urgency of climate change is driving a substantial shift toward sustainable industries and green jobs, which requires the development of new technical and cross-cutting skills.

What is the Global Skills Tracker?

The [Global Skills Tracker](#) is an innovative labour market intelligence tool designed to monitor real-time online job advertisements (hereafter referred to as OJA) data, mapping global demand for skills and identifying emerging trends. Developed by the Section of Youth, Literacy and Skills Development (YLS) at UNESCO in collaboration with [Lightcast](#), the tool aims to support evidence-based policymaking and curricula particularly in the field of Technical and Vocational Education and Training (TVET).

Traditionally, census data, administrative records, and individual and enterprise surveys have served as primary sources for labour market analysis. While these methods are crucial for understanding long-term structural economic trends and employment dynamics, particularly in the informal economy and among underrepresented groups in online job markets, they frequently encounter challenges concerning timeliness, frequency and granularity.

The Global Skills Tracker complements traditional data sources by providing real-time insights into the emerging demand for skills across various countries, occupations and sectors. By integrating information extracted from OJAs with broader labour market intelligence, it contributes to a more comprehensive and responsive understanding of the skills landscape. The tool also illustrates how big data, AI and machine learning can be leveraged to anticipate skills demand in rapidly evolving labour markets. This approach aims to improve skills governance, enhance evidence-based decision-making, and increase the responsiveness of education and training systems to current and future labour market needs.

The Global Skills Tracker includes dynamic features that allow users to identify trends and patterns in the demand for specific skills over time.

Online job advertisements (OJA)

An OJA refers to employment opportunities posted on online platforms, including job boards, recruitment services and company websites. OJAs have become an increasingly valuable source of information on the labour market, as they provide near real-time indications of labour market demand.

Collecting and analyzing OJAs provides valuable insights into the skills, education and professional levels that are in demand, as well as the relevant sectors, locations, and, when available, contract types and

remuneration. OJAs support evidence-based decision-making in workforce planning, educational and training design and policy development.

Why develop a Global Skills Tracker?

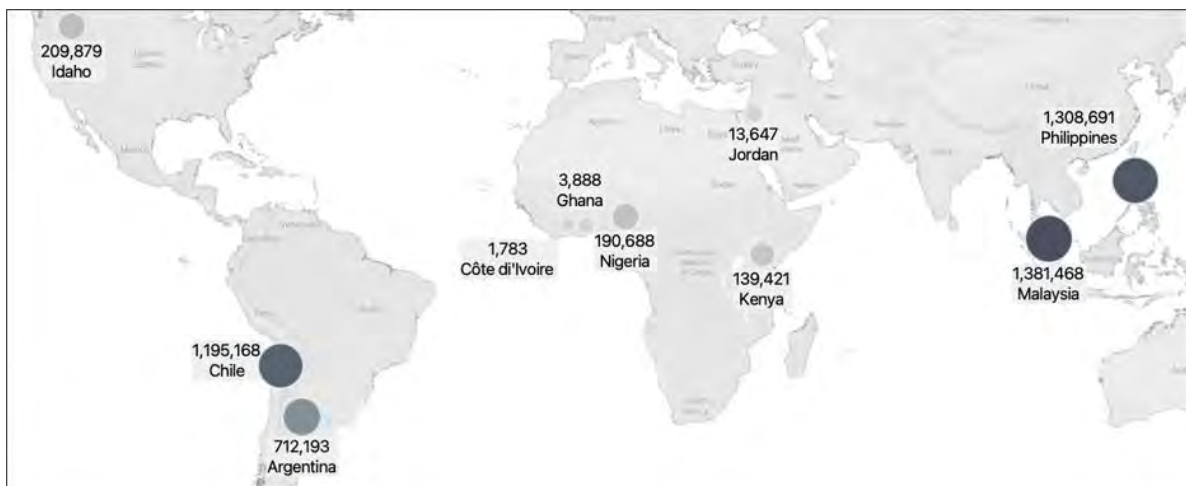
The Global Skills Tracker equips policymakers, educators, employers and learners with the tools needed to navigate the complexities of transitions in the labour market, additionally it:

- Provides **real-time, data-driven, and comprehensive insights** into global and regional labour market dynamics, including information about job profiles, trades, occupations and sectors.
- Identifies **emerging skill demands and trends** across various geographical regions and sectors, particularly rapidly evolving areas such as digital and green transformations.
- Supports TVET and higher education systems in **aligning curricula and qualifications** with labour market demands.
- Contributes to **Sustainable Development Goal (SDG) 4**, which aims to ensure inclusive and equitable quality education and promoting lifelong learning opportunities for all.

Countries covered in the initial phase

Currently, the Global Skills Tracker focuses on the following countries:

- **Africa:** Côte d'Ivoire, Ghana, Kenya and Nigeria
- **Asia:** Malaysia and the Philippines
- **LAC:** Argentina and Chile
- **Middle East:** Jordan
- **North America:** One U.S. state, Idaho, serves as a benchmark for a well-developed agricultural economy.



Source: Lightcast Global Job Advertisements (OJAs) - 2024

Countries have been selected based on their alignment with UNESCO's ongoing projects, ensuring uptake and usability of the tool.

Data processing and methodology

Identifying reliable online job boards

To ensure data quality, a **landscaping and source selection phase** precedes data collection in the covered countries. This phase involves identifying major job portals and assessing their volume, structure, sectoral coverage and update frequency. Each source is then scored to determine its reliability by an international labour market expert.

Country	Number of sources	OJAs (per day/month) ¹	Languages ²
Argentina	1,026	87,228	Spanish, English, German, Portuguese, French, Italian
Chile	817	119,556	Spanish, English, German, Portuguese, French
Côte d’Ivoire	219	562	French, English
Ghana	338	891	English, French, German
Jordan	346	1,765	English, Arabic, French, German
Kenya	645	10,487	English, Arabic, Italian, French, German
Malaysia	1,589	110,986	English, Indonesian, Malay, Chinese, Japanese, French
Nigeria	605	13,239	English, French, German, Portuguese, Dutch
Philippines	1,614	109,856	English, Spanish, French, Tagalog
U.S. (Idaho)	5,348	21,592	English, Spanish

Source: Lightcast, 2025

Data collection

OJA data includes the following fields extracted from original online job boards:

- Posting data (date, month and year)
- Posting duration (or expiration/related field)
- Market/Job location
- Employer name
- Job title
- Experience (number of years of experience required, if applicable)
- Original posting language
- Education level (ISCED)
- Occupation categorized to the ISCO (up to 4-digit levels) and ESCO classification at the 5-digit levels
- Occupation according to the Lightcast occupation taxonomy

¹ Average number of OJAs collected by year / month since 2021

² Languages from OJAs: only the top languages are reported

- Salary offered (if present in the job postings text)
- Industry sector categorized into the ISIC, NACE, NAICS or SIC at to the most detailed categorization available
- Skill keywords and categorization of skills using Lightcast taxonomies and ESCO taxonomy.

Information extraction and data processing

OJA data is processed through a **five-step pipeline**:

- **Data ingestion**: activities related to data collection, including crawling, fetching, scraping and storing data from selected online sources.
- **Pre-processing**: activities involved in preparing data for analysis, which include data preparation, data cleaning and text processing.
- **Information extraction**: activities related to the extraction and structuring of data, including occupation, skills, location, industry, from unstructured texts.
- **Extraction, Transformation and Loading (ETL)**: refers to the process involved in preparing data for visualization in the dashboard.
- **Presentation**: delivering results through the Global Skills Tracker dashboard, which is integrated with UNESCO's systems and accessible via a web browser.

Information extraction in natural language processing focuses on extracting structured, factual data from unstructured OJAs. This process employs AI techniques to classify job and content into standardized categories (e.g., ISCO/ESCO for occupations, ISIC for industries, ISCED for education, ISO/NUTS for location) and custom attributes (e.g., contract type, experience, salary, working hours).

Information extraction employs dedicated data pipelines; each tailored to a specific attribute and language. These pipelines analyze job vacancies and classify relevant information.

Deduplication processes

To mitigate the risk of the same job advertisements being counted multiple times in the Global Skills Tracker database due to its publication on various platforms, three main deduplication processes are implemented:

- **Physical deduplication**: involves identifying postings extracted from the same URL, even if they originate from different sources, and classifying them as duplicates. This deduplication process is implemented prior to the information extraction phase.
- **Content deduplication**: involves identifying postings with similar text and classifying them as duplicates. This deduplication process is applied before the information extraction phase.
- **Logical deduplication**: involves identifying postings that refer to the same period, occupation, region, industry and skill requirements as duplicates. This deduplication process is implemented after the information extraction phase.

Analysis Period

The Global Skills Tracker will provide **continuous, real-time tracking**.

The analysis period starts in 2023 and will be updated regularly (every six months) to reflect new data inflows. By July 2025, data will be updated to include data from July 2024 and June 2025.

Key analytical dimensions

1. Country-level analysis

- **Countries and occupations:** Showcases the distribution and prevalence of different occupations within each country. This information helps in identifying which jobs are most common or emerging in specific national contexts.
- **Countries and sectors:** It analyzes the distribution and prevalence of dominant or emerging economic sectors, highlighting sectoral strengths and trends across various countries.

2. Occupation analysis

- **Occupations and sectors:** It examines which sectors employ specific occupations, revealing cross-sectoral demand.
- **Occupations and skills:** It examines the skill sets required for various occupations, highlighting both core and emerging skills within various job categories.
- **Occupations and educational levels:** This analysis examines the typical educational levels associated with different occupations, providing insights into the qualification requirements.
- **Demand for occupations:** It assesses the current and projected demand for specific occupations, highlighting labour market trends and workforce needs.

3. Sector analysis

- **Sectors and occupations:** It analyzes the occupations that are most prevalent or in demand within each sector, thereby enhancing our understanding of workforce composition.
- **Sectors and skills:** It explores the key skills required across various sectors, emphasizing skills that are specific to each sector.
- **Sectors and educational levels:** It analyses the educational levels typically found or required in each sector.
- **Demand for sectors:** It assesses the labour market demand across various sectors, indicating growth areas and economic priorities.

4. Skills analysis

Green Skills

- **Greenness by sector and occupations:** Refers to the proportion of unique green skills relative to the total number of unique skills observed in a given group (occupations, sector).
- **Green pervasiveness by sector and occupations:** Refers to the share of OJAs that require at least one green skill, relative to the total number of OJAs observed. This metric indicates the extent to which green skills are present across job postings.

Digital Skills

- **Digital-ness by sector and occupations:** Represents the proportion of unique digital skills in relation to the total number of unique skills identified within a specific group, such as an occupation or sector.
- **Digital pervasiveness by sector and occupations:** Refers to the share of OJAs with at least one digital skill in their skillset, relative to the total number of OJAs. It highlights the extent to which digital skills are present across job postings.

AI Skills

- **AI-ness by sector and occupations:** represents the proportion of unique A.I.-related skills relative to the total number of unique skills observed within a given group, such as occupation or sectors.

- **AI pervasiveness by sector and occupations:** is the share of OJAs with at least one A.I. related skill in their skillset, relative to the total number of OJAs: this metric tells how widespread A.I. related skills are across job postings.

Taxonomies and their use in the Global Skills Tracker

A taxonomy is a systematic classification or structured framework used to categorize and organize concepts related to work, jobs, skills, tasks, sectors and occupations. It provides standardized labels and hierarchical relationships that enable consistent understanding, comparison, and analysis across different datasets, regions, industries and time periods. The Global Skills Tracker is implemented on internationally recognized taxonomies to classify and organize information about occupations, industries, skills, education and geographic areas. These taxonomies are essential because they allow the Global Skills Tracker to harmonize data from diverse sources and regions, ensuring that the analyses is comparable and meaningful across countries and sectors.

For occupations, the Global Skills Tracker uses the International Standard Classification of Occupations (ISCO), developed by the International Labour Organization (ILO). ISCO provides a structured way to categorize jobs based on the tasks and duties performed, enabling the tracker to analyze employment trends and occupational dynamics consistently around the world.

To classify **economic sectors**, the Global Skills Tracker adopts the International Standard Industrial Classification of All Economic Activities (ISIC), maintained by the United Nations. ISIC allows us to link jobs and skills to specific industries and examine how economic changes in different sectors influence labour market demand.

When it comes to **skills**, the Global Skills Tracker employs the Lightcast Open Skills Taxonomy. Unlike static lists, this is a dynamic, data-driven taxonomy built from millions of job postings, professional profiles, and other labour market signals. It enables the Global Skills Tracker to track both established and emerging skills in real time, offering a nuanced picture of how skill requirements evolve across different occupations, industries, and regions.

For **education levels**, the Global Skills Tracker uses the International Standard Classification of Education (ISCED), developed by UNESCO. ISCED provides a common framework to describe educational qualifications and attainment levels, which helps us map the relationship between education and job requirements, and to analyze workforce qualifications across countries.

Finally, **for geographic information**, the Global Skills Tracker relies on standardized codes such as ISO country codes and the NUTS (Nomenclature of Territorial Units for Statistics) system used in Europe. These standards ensure that we can precisely locate and analyze labour market data at global, national, and regional levels, supporting location-specific insights and comparisons.

Challenges and limitations

While OJA data provides timely and detailed insights into the labour market, certain limitations remain:

- **Incomplete representation of informal markets:** In certain countries, a significant portion of economic activity is informal, including work that is unregistered, untaxed, and not covered by labour regulations. Thus, these jobs are seldom advertised online and are typically filled through personal networks or informal hiring practices. This results in a systematic underrepresentation of informal employment sectors, such as domestic work, day labor, agricultural seasonal work, and street vending, in OJA datasets, skewing the overall picture of labour demand in favour of formal job markets.

- **Differing internet penetration and the maturity of digital ecosystems:** The quality and representativeness of OJA data are significantly influenced by a country's level of digital infrastructure development and usage. In regions with low internet penetration, both job seekers and employers may refrain from utilizing online platforms, resulting in geographical and socioeconomic biases within OJA datasets. Consequently, remote or rural areas with inadequate connectivity may display artificially low labor demand, despite ongoing local economic activity. Conversely, countries with well-established digital ecosystems, such as those in Western Europe, North America, and parts of Asia, are more likely to possess robust OJA markets, while data from other regions may be limited or unrepresentative.
- **Varying levels of maturity of online job markets across countries and sectors:** The norms and practices surrounding job advertising can differ significantly across countries and sectors. Large companies and public sector organizations often publish comprehensive job postings online, whereas small and medium-sized enterprises, as well as certain industries, may either underutilize these job boards or regard them with skepticism. The skills demand reflected in OJA data may skew towards sectors that are already heavily engaged in online postings. Therefore, cross-country comparisons should be contextualized with information regarding the level of labour market digitalization in each country.
- **Limited availability of certain variables:** Depending on the formats of job postings and the contexts of OJAs, structured data regarding job characteristics may be lacking. For example, information such as salary, contract type, working hours, and benefits is often presented inconsistently. This inconsistency hinders a more comprehensive analysis of jobs and required skills.
- **Heavy reliance on employer-provided information:** The insights derived from OJAs data are contingent upon the details employers choose to include in job postings. Employers often highlight only selected skills - typically those they find hardest to source - while assuming others to be implicit. For instance, a plumber's technical skills may go unstated (as taken for granted) whereas interpersonal or customer service skills might be explicitly emphasized. Moreover, the structure and content of postings vary across cultural and national contexts: in some countries, OJAs may prioritize formal qualifications over detailed skills, while in others, the length and depth of postings can differ significantly. These variations shape the visibility and interpretation of skills demand across countries and sectors.

About UNESCO

The Section of Youth, Literacy and Skills Development (YLS) at Headquarters leads and supports the implementation of the Global Skills Tracker. The UNESCO-UNEVOC International Centre functions as the hub of the Global Skills Tracker. UNESCO's designated centre for TVET, UNESCO-UNEVOC supports Member States in their efforts to strengthen and upgrade their TVET systems.

About Lightcast

Lightcast is a global pioneer in the collection and big-data analysis of information on the labor market, as well as taxonomy development and complex modeling. Their data infrastructure aggregates real-time job postings from over 100,000 sources every day, contributing to a database with over three billion job advertisements with additional data from social profiles, government statistics and academic sources.