The LinkedIn AI Talent Index

Tracking the global AI talent ecosystem

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Key Findings

- We present a new Artificial Intelligence (AI) Talent metric: the LinkedIn AI Talent Index. This is a measure of overall AI Talent, adjusted to allow for comparisons across countries and industries, and for known differences in platform use to more accurately reflect the status of AI talent in the workforce.
- We track the LinkedIn AI Talent index across members with AI Engineering skills, like machine learning and natural language processing, and members with AI Literacy skills, like ChatGPT and GitHub Copilot. Together, these two groups of skills support two sides of an AI talent ecosystem within a country.
- Singapore tops our ranking of AI Engineering talent, at 2.45x the global average, closely followed by the Netherlands (2.16), Luxembourg (1.99), Lithuania (1.80), and Ireland (1.69).
- Slovenia leads our ranking of AI Literacy talent, at 4.06x the global average, followed by Lithuania (3.09), Poland (2.11), Germany (1.95), and Estonia (1.88).
- We also share variants of the LinkedIn AI Talent index by gender and at the industry-level for Education; Financial Services; Manufacturing; Professional Services; and Technology, Information and Media.

Introduction

LinkedIn's AI Talent Concentration metric

We consider a LinkedIn member as AI talent if they have explicitly added at least two AI skills to their profile and/or they are or have been employed in an AI job. We then count the number of members considered as AI talent by country to measure the AI talent within a country, using the country reported by a member on their profile. To protect member privacy and ensure the accuracy of this metric, we apply a threshold based on the LinkedIn membership of a country. For countries that meet this threshold, the count of AI talent is used to calculate our LinkedIn AI Talent Concentration metric. To calculate this metric

by country, we divide the counts of AI talent at the country-level over the counts of LinkedIn members in each respective country. This metric is reported as a share:

$$AI\ Talent\ Concentration\ =\ 100 \times \frac{AI\ Talent\ Counts}{LinkedIn\ membership}$$

Equation 1: The LinkedIn AI Talent Concentration metric

We currently consider two types of AI talent: members with AI Engineering skills, like machine learning and natural language processing, and members with AI literacy skills, like ChatGPT and GitHub Copilot. These groups may of course have overlap (members having both AI engineering skills and AI literacy skills). The metrics are calculated separately. Together, these two groups of skills support a strong AI talent ecosystem within a country. Both types of AI talent use the same index metric methodology presented in this note. For the exposition of the methodology here, we will focus on members with AI Engineering Skills, although when presenting the index we discuss both groups of skills. All data shown is for 2023.

Adjusting for LinkedIn's representation

Like most privately sourced data, LinkedIn has varied levels of representation among different socioeconomic and geographical groups; for example, our coverage is greater in countries with higher incomes or that have better enabled internet access. We previously partnered with the World Bank to validate use of LinkedIn data in 78 countries[1], which highlighted this variation in representation.

Recognizing differences in member representation, we can directly leverage this information to improve our AI Talent Concentration metric. For a given country, this metric is accurate if we have 100% penetration – where penetration is defined as the percentage of the working age population that are members of the LinkedIn platform in that country. Alternatively, this metric is accurate if our data exactly captures the underlying population. We are unlikely to meet either condition in a given country for the AI talent population. Due to overrepresentation among the AI workforce with respect to the overall workforce on LinkedIn, the AI Talent Concentration will likely overestimate the true extent of AI Talent. For example, if we have 50% overall membership penetration in a country, we will likely have *greater than 50%* AI penetration, which means that if the remaining 50% of the working population were to sign up, we would not be doubling our AI talent pool. We can counter this by applying thresholds to filter out countries where we see lower penetration, but this filter decreases the risk of representation inflation without eliminating it and removes countries from our analysis of AI talent.

If we did have 100% AI penetration, then we would be able to accurately calculate AI Talent Concentration using the working population as the denominator for the concentration:

[1] World Bank (2018), *Data Insights: Jobs, Skills and Migration Trends Methodology and Validation Results*

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$$AI\ Talent\ Concentration\ =\ 100\ \times \frac{AI\ Talent\ Counts}{Working\ age\ population}$$

Equation 2: AI Talent concentration using the working age population

Using this definition of AI Talent Concentration, we expect it to underestimate due to it undercounting AI talent counts, as AI penetration is expected to be less than 100%. To address this issue, we can scale by a factor that compensates for lower AI penetration.

One solution is to proportionately scale the metric by LinkedIn's overall penetration; however, this assumes a linear correlation between AI penetration and total member penetration. For example, 50% overall penetration in a country would mean that we have 50% AI penetration in that country. It is instead more reasonable to assume LinkedIn has a higher AI penetration than its overall penetration. For example, if we have 90% AI penetration and 50% overall penetration, multiplying our AI talent counts by 2x would lead to an inflation in AI talent.

Instead, we can define a non-linear relationship between AI penetration and overall penetration, where we assume that if we have over a certain overall penetration, we are near 100% AI penetration. We then scale using an "AI Scaling Factor" based on this non-linear relationship. Thus, we calculate AI Talent Concentration[2] as:

$$AI\ Talent\ Concentration\ =\ 100\ \times\ AI\ Scaling\ Factor\ \times \frac{AI\ Talent\ Counts}{Working\ age\ population}$$

Equation 3: AI Talent Concentration by working population and scaled by AI scaling factor.

Table 1 shows the Top 20 countries[3] (ordered by ranking) for AI talent as calculated by the three AI Talent Concentration metrics presented above. The first, using Equation 1, is our LinkedIn AI Talent Concentration by membership, the second, using Equation 2, calculates the AI Talent Concentration using the working age population, and the third, using Equation 3, calculates the AI Talent Concentration using the working age population and scales by our AI scaling factor.

[2] We outline our methodology to calculate this metric with respect to AI Literacy, Women, and Industry in the Appendix.
[3] We consider the following countries in our analysis: Argentina, Australia, Austria, Belgium, Brazil, Canada, Chile, Costa Rica, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hong Kong SAR, Hungary, Iceland, India, Indonesia, Ireland, Israel, Italy, Latvia, Lithuania, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Saudi Arabia, Singapore, Slovenia, South Africa, South Korea, Spain, Sweden, Switzerland, Türkiye, United Arab Emirates, United Kingdom, United States, and Uruguay.

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Top 20	LinkedIn AI Talent Concentration (Eq. 1)	By working age population (Eq. 2)	By working population and scaled (Eq. 3)
1	Israel	Singapore	Singapore
2	Singapore	Netherlands	Netherlands
3	Luxembourg	Luxembourg	Luxembourg
4	Estonia	Ireland	Lithuania
5	Switzerland	Israel	Ireland
6	Finland	Switzerland	Israel
7	South Korea	Canada	Switzerland
8	Netherlands	United Kingdom	Germany
9	Germany	United States	Canada
10	Ireland	Sweden	United Kingdom
11	Lithuania	Australia	United States
12	Poland	Denmark	Austria
13	Hungary	Finland	Sweden
14	Japan	France	Greece
15	Sweden	New Zealand	Czechia
16	Canada	Norway	Australia
17	Cyprus	Belgium	Denmark
18	United Kingdom	Estonia	Slovenia
19	France	United Arab Emirates	Poland
20	Greece	Cyprus	Finland

Table 1: Comparing 3 AI Talent Concentration metrics (Equations 1-3)

From the above table, we see that our current LinkedIn AI Talent Concentration (Equation 1) leads to high rankings for some countries compared to dividing by the working population (Equation 2) instead of LinkedIn's membership for that country. For example, using working population introduces the United States to Table 1, which we would expect to rank high globally given recent AI investments.[4] Scaling by our AI scaling factor also changes the rankings, for example, we see Austria in Table 1. Thus, our proposed solution utilizes LinkedIn's penetration to provide the weighting, a more accurate compensation for our coverage.

Calculating the Index

Using our new AI Talent Concentration metric, we create an index comparing to the global average:

$$AI\ Talent\ Index\ = AI\ Penetration \times \frac{AI\ Talent\ Concentration}{Global\ Average\ AI\ Talent\ Concentration}$$

[4] OECD.AI (2023), "Live data: Investments in AI and data", OECD.AI Policy Observatory (database)

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Equation 7: The LI AI Talent Index using the Global average

This allows us to identify, for example, investment in AI beyond the global average, compared to the organic growth of AI globally. We include 87 countries in the global average, although not all are reported on in this report. In Table 2, we compare the LinkedIn AI Talent Concentration metric (Equation 1) to the LinkedIn AI Talent Index (Equation 7) for 2023.

Top 20	LinkedIn AI Talent Concentration		LinkedIn AI Talent Index	
1	Israel	1.96%	Singapore	2.45
2	Singapore	1.47%	Netherlands	2.16
3	Luxembourg	1.35%	Luxembourg	2.00
4	Estonia	1.15%	Lithuania	1.80
5	Switzerland	1.09%	Ireland	1.69
6	Finland	1.09%	Israel	1.65
7	South Korea	1.07%	Switzerland	1.58
8	Netherlands	1.06%	Germany	1.57
9	Germany	1.05%	Canada	1.52
10	Ireland	1.03%	United Kingdom	1.43
11	Lithuania	1.03%	United States	1.38
12	Poland	0.96%	Austria	1.36
13	Hungary	0.90%	Sweden	1.35
14	Japan	0.89%	Greece	1.34
15	Sweden	0.87%	Czechia	1.29
16	Canada	0.86%	Australia	1.26
17	Cyprus	0.84%	Denmark	1.24
18	United Kingdom	0.82%	Slovenia	1.18
19	France	0.80%	Poland	1.17
20	Greece	0.79%	Finland	1.10

Table 2: AI Talent Index metrics compared to the LinkedIn AI Talent Concentration

This index can be used to measure trends such as:

> The United States has a LinkedIn AI Talent Index of 1.38 in 2023, meaning its AI talent supply was 1.38x the global average in 2023.

Results

We utilize the AI Talent Concentrations outlined in Equation 3 (by country), and Equations 4 (by AI Literacy), 5 (by women in AI), and 6 (by industry) in the Appendix. For the purposes of this report, we analyze member data from 2023 and present yearly AI Talent Index metrics. We present data on the first 20 countries ranked.

The LinkedIn AI Talent Index: Overall

The LinkedIn AI Talent Index is inclusive of AI Engineering and AI Literacy talent. For example, the United States has a LinkedIn AI Talent Index of 1.38, that is 1.38x above the global average. Table 3 outlines the first 20 countries ranked.

LI AI Talent Index: Overall		
1	Singapore	2.45
2	Netherlands	2.16
3	Luxembourg	1.99
4	Lithuania	1.80
5	Ireland	1.69
6	Israel	1.65
7	Switzerland	1.58
8	Germany	1.57
9	Canada	1.52
10	United Kingdom	1.43
11	United States	1.38
12	Austria	1.36
13	Sweden	1.35
14	Greece	1.34
15	Czechia	1.29
16	Australia	1.26
17	Denmark	1.24
18	Slovenia	1.19
19	Poland	1.18
20	Finland	1.10

Table 3: The LinkedIn AI Talent Index: overall

The LinkedIn AI Talent Index

The LinkedIn AI Talent Index: By AI Engineering Skills

The LinkedIn AI Talent Index by AI Engineering skills is an index composed of talent with AI Engineering skills. For example, by AI Engineering skills, the United States has a LinkedIn AI Talent Index of 1.38, that is 1.38x the global average for AI Engineering skills.

LI AI Talent Index: By AI Engineering Skills		
1	Singapore	2.45
2	Netherlands	2.16
3	Luxembourg	2.00
4	Lithuania	1.80
5	Ireland	1.69
6	Israel	1.65
7	Switzerland	1.58
8	Germany	1.57
9	Canada	1.52
10	United Kingdom	1.43
11	United States	1.38
12	Austria	1.36
13	Sweden	1.35
14	Greece	1.34
15	Czechia	1.29
16	Australia	1.26
17	Denmark	1.24
18	Slovenia	1.18
19	Poland	1.17
20	Finland	1.10

Table 4: The LinkedIn AI Talent Index: By AI Engineering Skills

The LinkedIn AI Talent Index: By AI Literacy Skills

The LinkedIn AI Talent Index by AI Literacy skills is an index composed of talent with AI Literacy Skills. For example, by AI Literacy skills, the United States has a LinkedIn AI Talent Index of 1.24, that is 1.24x the global average for AI Literacy skills.

LI AI Talent Index: By AI Literacy Skills		
1	Slovenia	4.06
2	Lithuania	3.09
3	Poland	2.11
4	Germany	1.95

5	Estonia	1.88
6	Singapore	1.85
7	Austria	1.83
8	Israel	1.63
9	Finland	1.58
10	Netherlands	1.54
11	Switzerland	1.52
12	Hungary	1.46
13	Cyprus	1.39
14	Canada	1.34
15	Greece	1.25
16	United States	1.24
17	Sweden	1.22
18	Czechia	1.13
19	Denmark	1.07
20	United Arab Emirates	0.99

Table 5: The LinkedIn AI Talent Index: By AI Literacy Skills

The LinkedIn AI Talent Index: By Industry

The LinkedIn AI Talent Index by industry creates a LinkedIn AI Talent Index for a given industry. We create the Index for the following industries: Education; Financial Services; Manufacturing; Professional Services; Technology, Information and Media. For example, in the Technology, Information, and Media sector the United States has a LinkedIn AI Talent Index of 1.13, that is 1.13x the global average for the sector.

LI AI Talent Index: By Industry						
	Education		Financial Services		Manufacturing	
1	Israel	2.70	Israel	2.09	Israel	3.54
2	Singapore	2.30	Singapore	1.78	Singapore	1.95
3	Luxembourg	1.82	Netherlands	1.57	Luxembourg	1.64
4	Estonia	1.60	Ireland	1.56	Sweden	1.56
5	Sweden	1.59	Lithuania	1.51	Germany	1.52
6	India	1.50	United Kingdom	1.47	Finland	1.50
7	Hong Kong SAR	1.37	Estonia	1.46	Switzerland	1.43
8	Finland	1.31	Hong Kong SAR	1.31	Netherlands	1.37
9	Greece	1.30	Australia	1.25	Ireland	1.35
10	Switzerland	1.26	Latvia	1.21	France	1.30
11	Ireland	1.24	Poland	1.17	United States	1.25
12	Canada	1.19	Costa Rica	1.15	Poland	1.18

13	Lithuania	1.12	Cyprus	1.15	Costa Rica	1.17
14	United Arab Emirates	1.08	Switzerland	1.15	Austria	1.11
15	Australia	1.08	Canada	1.13	Canada	1.09
16	Cyprus	1.05	United States	1.11	Belgium	1.08
17	Germany	1.05	Greece	1.06	Romania	1.07
18	Austria	1.05	India	1.06	United Kingdom	1.04
19	Czechia	1.03	Sweden	1.00	India	1.01
20	France	0.99	New Zealand	0.99	Lithuania	1.00

Table 6a: The LinkedIn AI Talent Index: By Industry

LI AI Talent Index: By Industry				
	Professional Services		Technology, Information and Media	
1	Singapore	1.62	Israel	2.27
2	Israel	1.61	Luxembourg	2.03
3	India	1.57	Singapore	1.76
4	Greece	1.40	Estonia	1.34
5	France	1.35	India	1.29
6	Netherlands	1.31	Lithuania	1.28
7	Switzerland	1.29	Ireland	1.25
8	Poland	1.28	Cyprus	1.25
9	Ireland	1.27	Switzerland	1.19
10	Germany	1.27	Finland	1.19
11	Finland	1.19	Canada	1.18
12	Luxembourg	1.18	United States	1.13
13	Lithuania	1.17	Germany	1.13
14	Estonia	1.13	Poland	1.13
15	Sweden	1.10	Greece	1.12
16	Austria	1.09	Costa Rica	1.03
17	Spain	1.09	Croatia	1.03
18	United Kingdom	1.05	Czechia	1.02
19	Portugal	1.04	United Kingdom	1.00
20	Romania	1.02	Sweden	0.99

Table 6b: The LinkedIn AI Talent Index: By Industry (continued)

The LinkedIn AI Talent Index: By Gender

The LinkedIn AI Talent Index by gender creates a LinkedIn AI Talent Index for women and men. For example, men in the United States have an index of 1.23, that is 1.23x over the global average for men in AI.

LI AI Talent Index: By Gender				
	Women		Men	
1	Israel	2.95	Netherlands	2.14
2	Singapore	2.37	Luxembourg	1.94
3	Netherlands	1.80	Finland	1.88
4	Cyprus	1.63	Singapore	1.70
5	Estonia	1.63	Switzerland	1.64
6	Luxembourg	1.60	Germany	1.64
7	Ireland	1.53	Estonia	1.63
8	Lithuania	1.36	Ireland	1.60
9	Canada	1.35	Israel	1.60
10	United States	1.31	United Kingdom	1.39
11	Costa Rica	1.26	Canada	1.34
12	United Arab Emirates	1.22	Lithuania	1.32
13	United Kingdom	1.19	Sweden	1.29
14	Switzerland	1.14	Greece	1.29
15	Sweden	1.12	Denmark	1.27
16	Australia	1.09	United States	1.23
17	Germany	1.09	Australia	1.15
18	Poland	0.98	Czechia	1.12
19	Croatia	0.97	France	1.05
20	France	0.96	Poland	1.05

Table 7: The LinkedIn AI Talent Index: By Gender

Closing Remarks

The LinkedIn AI Talent Index expands on our efforts to build a metric that reflects the global AI talent ecosystem. With the rise in AI, we are at a turning point in what it means to be a member of the AI workforce and tracking this talent is crucial for understanding its evolution. The LinkedIn AI Talent Index allows us to identify growth opportunities in a country's infrastructure, measure the role of AI literacy in this evolving ecosystem, and expand as well as support women in the AI talent pool. It also has the advantage of expanding our understanding of AI Talent across more countries while also addressing differences in LinkedIn's representation relative to the overall population.

Appendix

Definitions

Our metrics have been developed to measure AI technology adoption and AI talent characteristics based on LinkedIn data. We define the following:

AI Jobs or Occupations: LinkedIn member titles are standardized and grouped into over 16,000 occupations. These are not sector or country specific. An AI job is an occupation that requires AI skills to perform the job. Examples of such occupations include (but are not limited to): Machine Learning Engineer, Artificial Intelligence Specialist, Data Scientist, Computer Vision Engineer etc.

AI Skills: LinkedIn categorizes AI skills into 2 mutually exclusive groups: "AI Engineering" and "AI Literacy" skills, where, broadly, AI Engineering skills refer to the technical expertise and practical competencies required to design, develop, deploy, and maintain artificial intelligence systems, and AI Literacy skills refer to the knowledge, abilities, and critical thinking competencies needed to understand, evaluate, and effectively interact with artificial intelligence technologies. As skills are ever evolving, we maintain and refresh these classifications on a periodic basis.

AI Talent: A LinkedIn member is considered AI talent if they have explicitly added at least two AI skills to their profile and/or they are or have been employed in an AI job.

Applying our methodology to additional segments

Applying our methodology to members with AI Literacy skills

This metric can also be applied to members with AI Literacy skills, where:

$$AI\ Literacy\ Talent\ Concentration\ =\ 100\ \times\ AI\ Scaling\ Factor\ \times \frac{AI\ Literacy\ Talent\ Counts}{Working\ age\ population}$$

Equation 4: AI Talent Concentration by working population and scaled by an AI scaling factor.

and where we assume the non-linear relationship between AI penetration and overall penetration, used in Equation 3, holds for members with AI Literacy skills as well as AI Engineering Skills. This metric can also be aggregated with members with AI Engineering skills to produce an AI "readiness" metric, where these two groups of skills combined represent a country's AI talent ecosystem. It should be noted that as AI Literacy skills are a relatively new concept (ChatGPT was launched in November 2022), the combined AI readiness metric is likely to mimic the AI Talent concentration metric for members with AI Engineering skills.

Applying our methodology to women in AI

Similar to Equation 3, we also need to apply a scaling factor to AI women talent to obtain our AI Talent Concentration metric for women. This metric is key in assessing how AI infrastructure can be improved to support women advancing in AI.

For our gender metric, we use the World Bank's Population ages 15-64, female data set for the working population of women, so that:

$$AI\ Women\ Talent\ Concentration = 100 \times AI\ Women\ Scaling\ Factor \times \frac{AI\ Talent\ Counts}{Women\ working\ age\ population}$$

Equation 5: AI Women Talent concentration using the women working age population

where our previous AI scaling factor derived is now with respect to women.

Applying our methodology to AI in industry

We calculate our AI Talent Concentration metric for the following industries: Education; Financial Services; Manufacturing; Professional Services; Technology, Information and Media.

These industries typically have higher penetrations on LinkedIn, therefore we assume that in these industries members with AI skills sign up at a similar rate to members without AI skills. Thus, we do not adjust for our representation as the AI penetration in that industry is assumed to equal the overall penetration in that industry such that:

$$AI\ Industry\ Talent\ Concentration = 100 \times \frac{AI\ Talent\ Counts}{Industry\ LinkedIn\ Membership}$$

Equation 6: AI Industry Talent concentration using LinkedIn membership