Understanding the Circular Economy Job Market Globally through the Lens of LinkedIn

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Outline

- Introduction
- Methodology
- Results
- Conclusions

Introduction

The effect of Social Networks

- **Business-oriented Social Networks**
  - play a powerful role in effectively connecting businesses with job seekers from around the world
  - can be used for gathering competitive intelligence
  - pose risks of accidental data leakage, e.g. see Bradbury (2011)

Bradbury, D. (2011). Data mining with LinkedIn. *Computer Fraud & Security*, *2011*(10), 5-8.

- **LinkedIn**
  - The most popular of this kind of social networks
  - > 1 billion members in more than 200 countries (https://about.linkedin.com/)
  - Mission: *"connect the world's professionals to make them more productive and successful"*

Existing literature exploiting LinkedIn

- Various studies explore **LinkedIn's influence** on:
  - personnel selection (Sallach et al., 2024)
  - career development (Baruffaldi et al., 2017)
  - personality assessment (Fernandez et al., 2021)
  - talent development (Ecleo and Galido, 2017)
  - professional networking (Kauffman et al., 2022)
  - ….

- Other works study aspects like:
  - influence of social media on hiring decisions (Demir & Günaydın, 2023)
  - the significance of data science in the business landscape (Barata et al., 2023)
  - the skills demanded across different industries (Deming & Kahn, 2017; Brumberger & Lauer, 2015)
  - …

Existing literature exploiting LinkedIn

- More recently, research studies have demonstrated the significance of LinkedIn data in examining topics like the **Circular Economy (CE)**
  - Examining the relationship between CE and sustainability (Daglis et al., 2023)
  - Assessing company engagement in CE activities (Tsironis et al., 2022, 2024; Knäble and Tsagarakis, 2023; Caferra et al., 2023)
  - Studing CE re-strategies and activities in the apparel, fashion, and textiles industry sectors (Tsironis and Tsagarakis, 2023)

recycle → make → use → reuse → remake → recycle
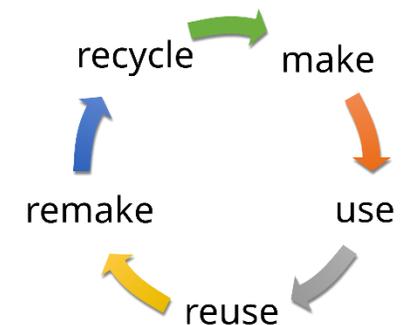
Our contribution

- We explore the **circular economy job market** using **LinkedIn** data
  - by providing an understanding of job postings, trends, and disparities across different regions
  - by identifying key trends that reflect the demand for sustainable practices but also indicate areas of growth within specific regions and industries
  - by offering rich analytical insights into the nature of circular economy jobs

- We develop a **data extraction approach** from LinkedIn that ensures a comprehensive dataset, providing a foundation for subsequent analyses

It has the potential to **guide both job seekers and policymakers** in navigating the emergent field of sustainable employment

Methodology

Searching for jobs in LinkedIn

Searching for jobs in LinkedIn

Location

Job filters

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Data fetching process

The data collection took place on the 16th of January 2024.

List of considered countries

- We considered all **EU countries** and several **non-EU countries**, selected based on the increased number of circular economy jobs offered.

- We also gathered results for the region '**Worldwide**', which is offered as an option in the location search field of LinkedIn.

EU countries		Non-EU countries
Austria	Italy	UK
Belgium	Latvia	USA
Bulgaria	Lithuania	Switzerland
Croatia	Luxembourg	Norway
Cyprus	Malta	Turkey
Czechia	Netherlands	Canada
Denmark	Poland	Australia
Estonia	Portugal	China
Finland	Romania	India
France	Slovakia	Singapore
Germany	Slovenia	Japan
Greece	Spain	Brazil
Hungary	Sweden	
Ireland		

List of considered LinkedIn filters (job attributes)

Filter	Values
Remote job or not	i. on site, ii. remote, iii. hybrid
Job type	i. full time, ii. part time, iii. contract, iv. temporary, v. internship, vi. volunteer
Job experience level	i. internship, ii. entry level, iii. associate, iv. mid-senior level, v. director, vi. executive
Job function	i. Information Technology, ii. Project Management, iii. Sales, iv. Business Development, v. Engineering, vi. Consulting, vii. Manufacturing, viii. Management, ix. Research, x. Strategy/Planning, xi. Marketing, xii. Other
Job industry	i. IT Services and IT Consulting, ii. Industrial Machinery Manufacturing, iii. Business Consulting and Services, iv. Environmental Services, v. Renewable Energy Semiconductor Manufacturing, vi. Retail, vii. Construction, viii. Civil Engineering, ix. Research Services, x. Staffing and Recruiting, xi. Human Resources Services, xii. Wholesale, xiii. Chemical manufacturing
Job commitment	i. Diversity, equity and inclusion, ii. Environmental sustainability, iii. Work-life balance, iv. Social impact, v. Career growth and learning. This is a fixed list of commitments provided by LinkedIn.
Date posted	i. past month, ii. past week, iii. past 24 hours

Data analysis dimensions

- Number of circular economy jobs per country

- Comparison with number of circular economy companies

- Analysis of each of the considered filters

- In all cases, we first report the results returned using 'Worldwide' as the location filter and then by setting each of the considered countries

Results

Country analysis of CE job posts

- Country contribution to the global LinkedIn CE job market (using the 'Worldwide' location filter)
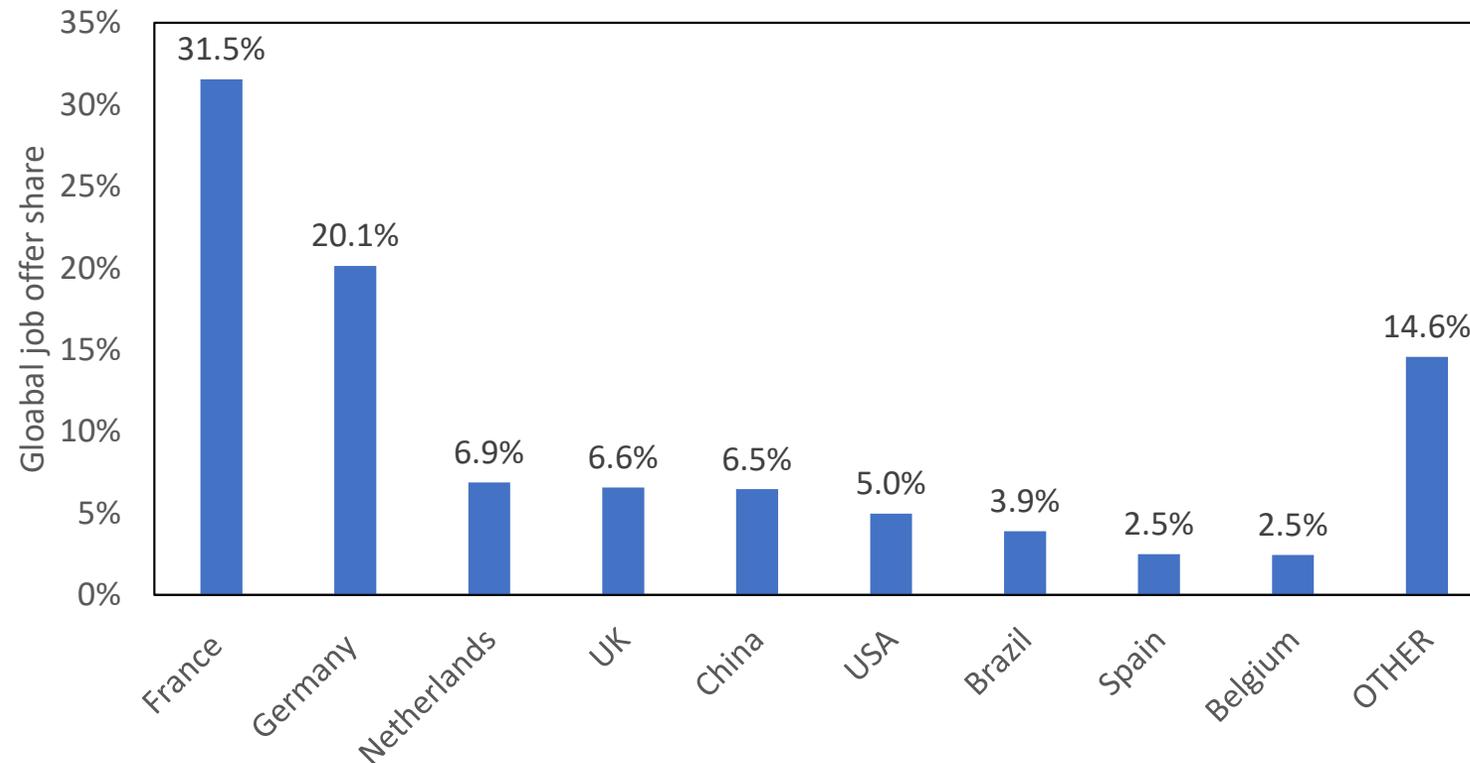
Country analysis of CE job posts

- Number of CE LinkedIn job posts per country

Country	Number
France	1232
Germany	835
Netherlands	282
UK	266
China	234
USA	217
Brazil	164
Spain	114
Belgium	95
Japan	92
Austria	87
Canada	53
Australia	44
Switzerland	42
Italy	29
India	26
Portugal	18
Singapore	18
Sweden	16
Finland	12
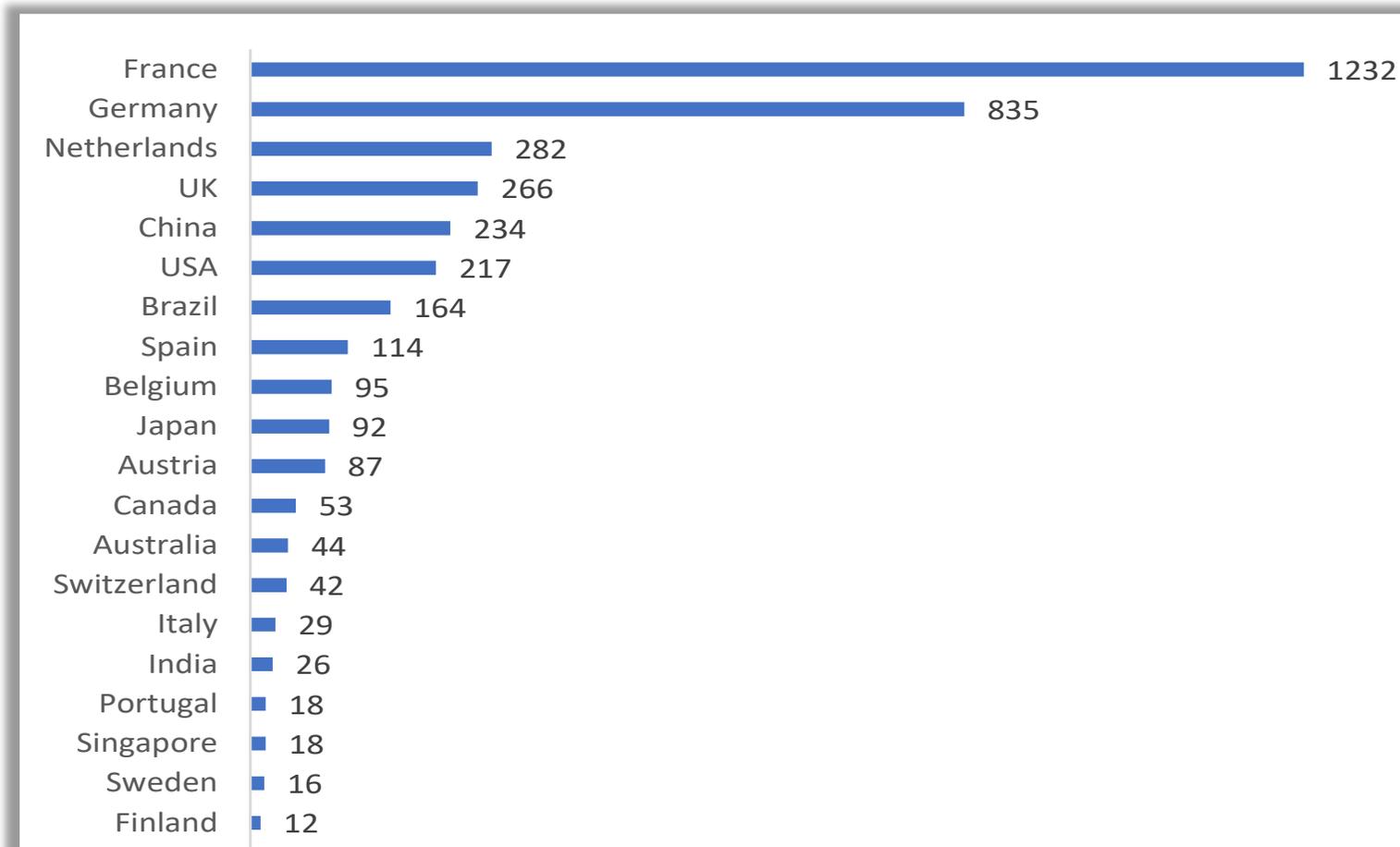
Country analysis of CE job posts

- Number of CE job posts per 1,000 country jobs posts

Country	Value
Austria	1.90
Spain	1.32
France	1.20
Finland	1.02
Belgium	0.97
Germany	0.94
Luxembourg	0.86
Netherlands	0.82
Portugal	0.65
Turkey	0.58
Cyprus	0.58
Slovakia	0.54
Switzerland	0.54
Greece	0.51
UK	0.46
Hungary	0.42
Australia	0.40
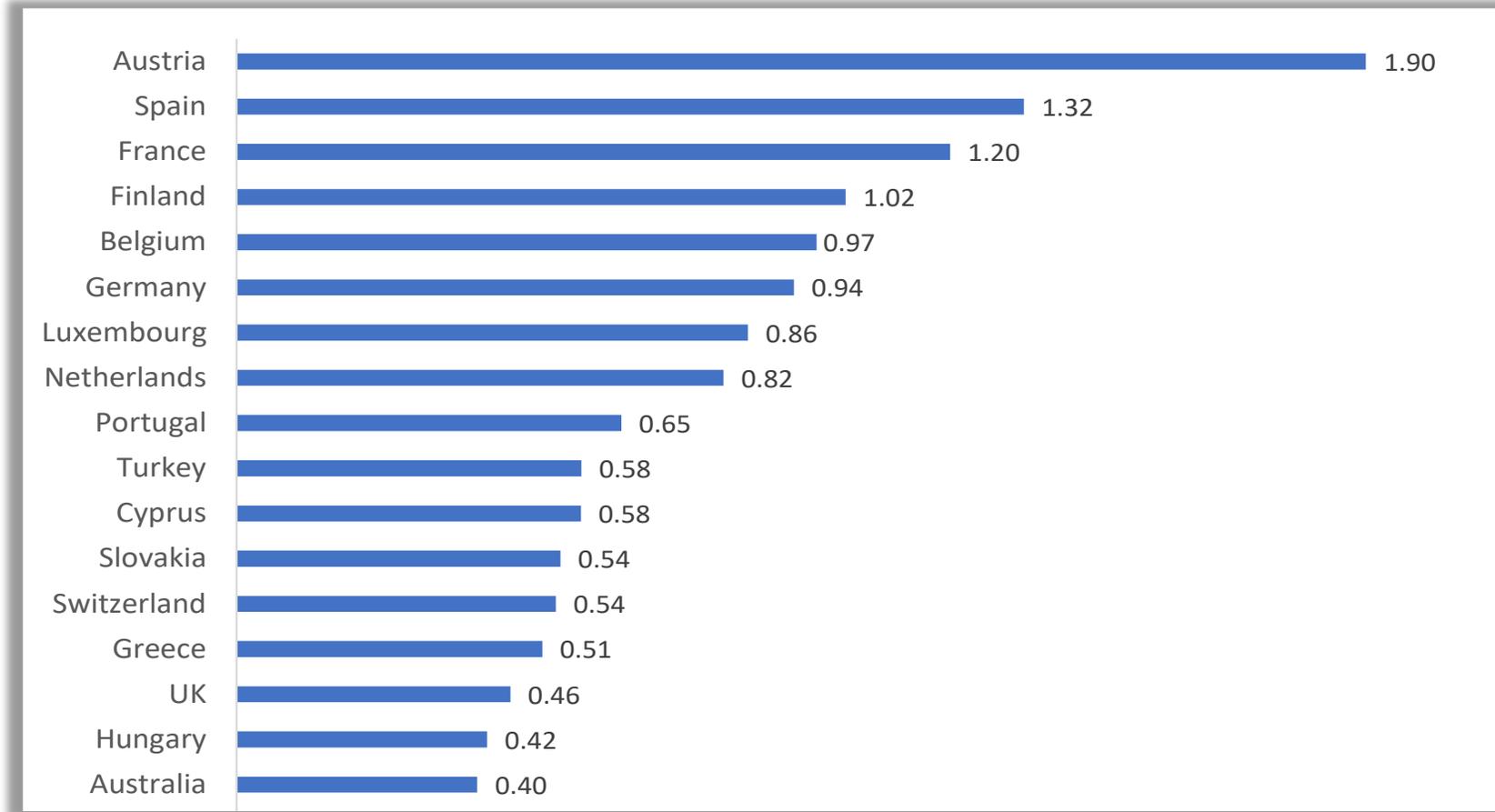
Comparison with number of CE companies

- Number of CE companies per 1,000 country companies

Country	Value
Luxembourg	4.4
Finland	3.5
Slovenia	3.3
Greece	2.5
Estonia	2.4
Latvia	2.3
Denmark	2.0
Bulgaria	1.9
Lithuania	1.7
Slovakia	1.7
Ireland	1.6
Singapore	1.6
Malta	1.5
Romania	1.3
Cyprus	1.2
Portugal	1.2
Croatia	1.1
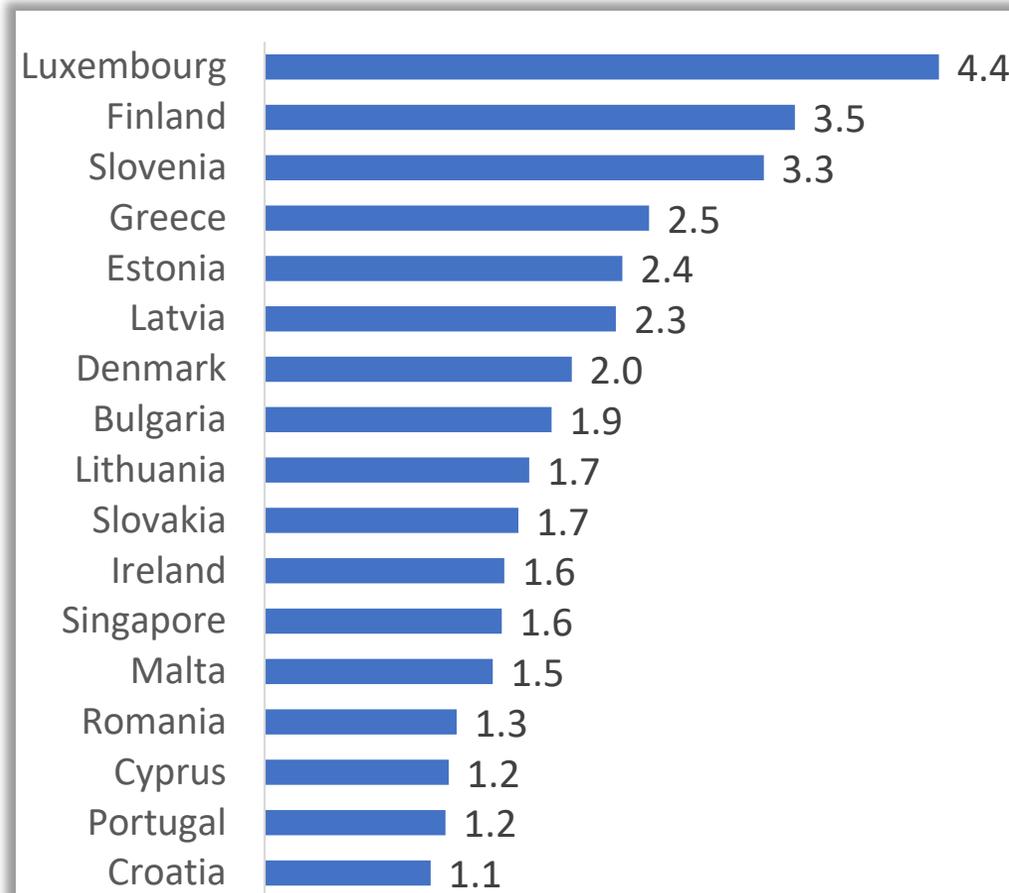
Comparison with number of CE companies

- Number of CE job posts per CE companies.

Country	Value
France	2.48
Japan	1.53
China	1.41
Germany	1.11
Brazil	1.04
Austria	0.55
Netherlands	0.36
Spain	0.19
Belgium	0.18
UK	0.18
USA	0.17
Switzerland	0.14
Canada	0.12
Luxembourg	0.11
Hungary	0.10
Cyprus	0.09
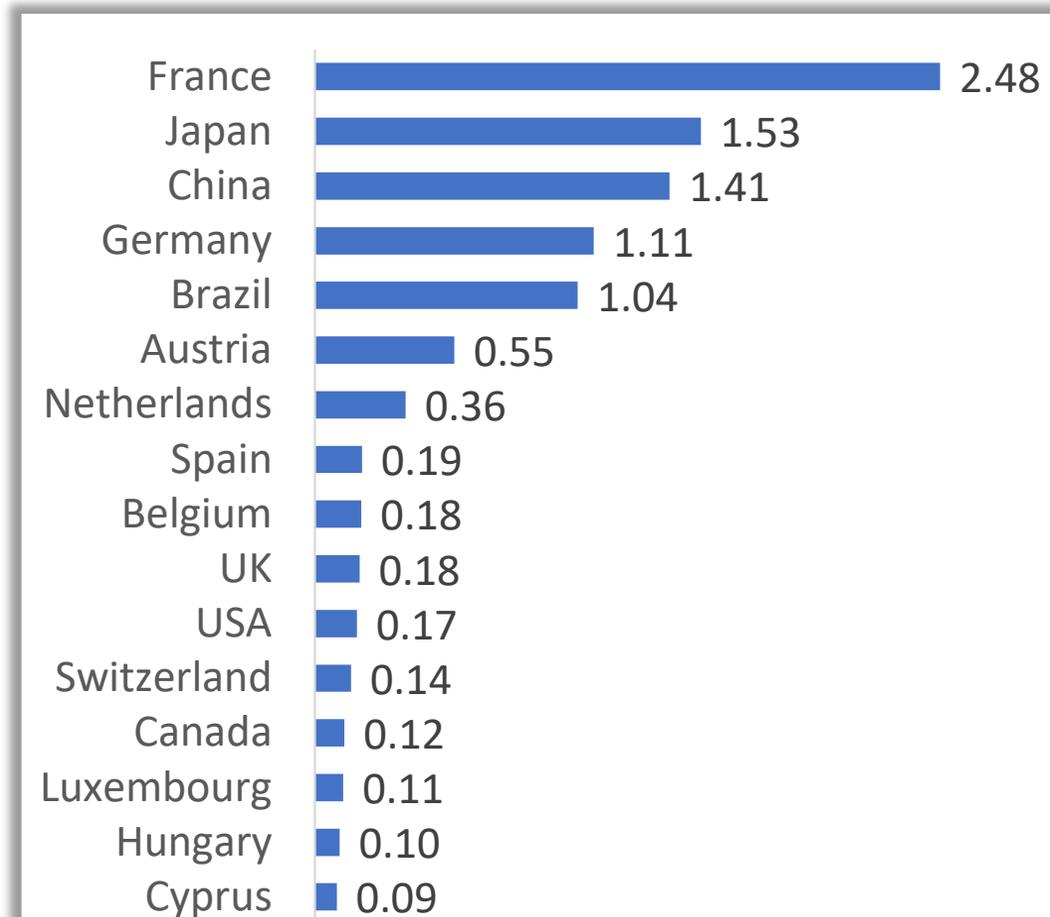
Remote and hybrid CE jobs

- Worldwide:
  - On-site employment: 79.8%
  - Remote: 3.2%
  - Hybrid: 19.0%

Remote and hybrid CE jobs

- Percentage of <u>remote</u> jobs

Brazil	38.4%
Romania	33.3%
Denmark	16.7%
Greece	16.7%
Luxembourg	14.3%
Ireland	11.1%
Italy	10.3%
USA	8.8%
Finland	8.3%
Canada	7.5%
Sweden	6.3%
Portugal	5.6%
Switzerland	4.8%
Belgium	4.2%
Japan	2.2%
Spain	1.8%
China	1.3%
Germany	1.2%
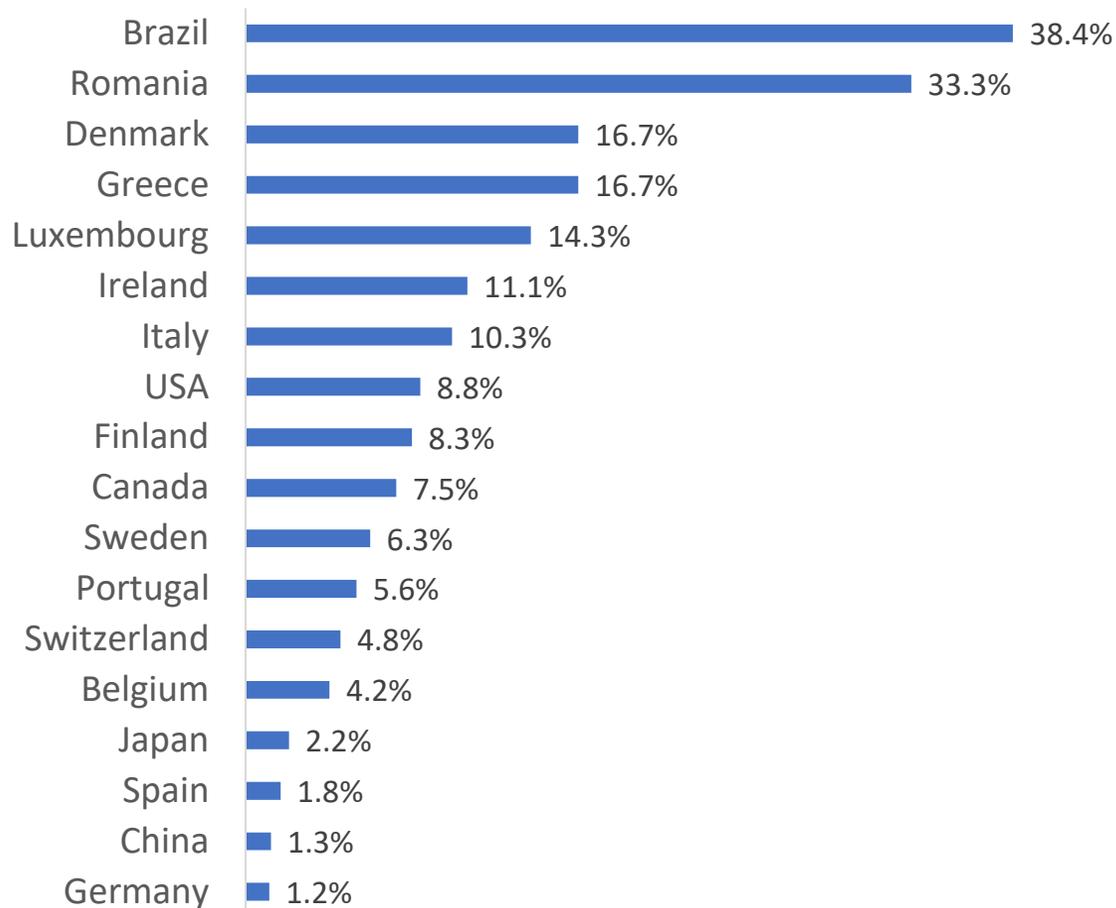
- Percentage of <u>hybrid</u> jobs

Turkey	55.6%
Greece	50.0%
Australia	45.5%
Italy	44.8%
Ireland	44.4%
Sweden	43.8%
Finland	41.7%
UK	39.8%
Romania	33.3%
Germany	32.9%
Spain	31.6%
USA	31.3%
Singapore	22.2%
Canada	20.8%
Netherlands	19.9%
Austria	18.4%
Belgium	17.9%
Switzerland	16.7%

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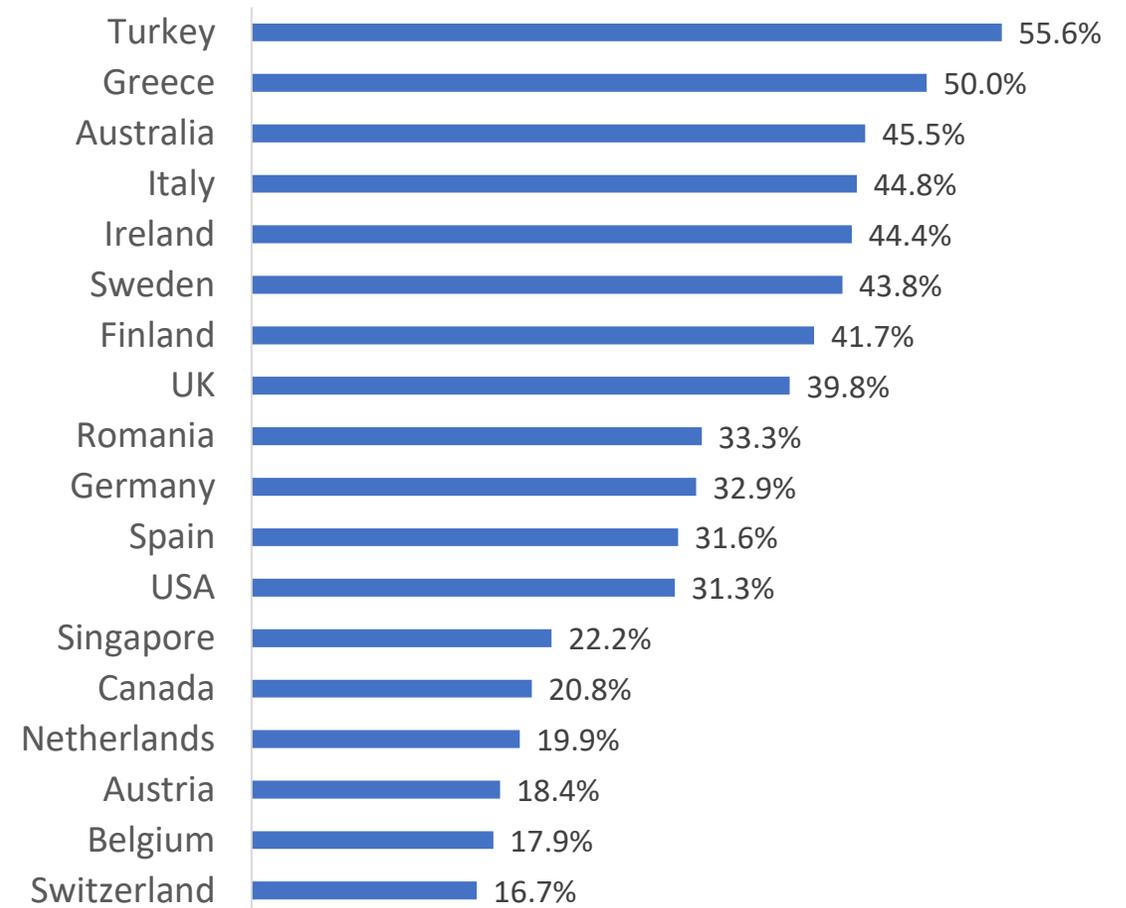
Time Employment of CE jobs

- Worldwide:
  - Full-time employment: 87.6%
  - Part-time: 3.7%
  - Internship: 3.6%
  - Contract: 2.2%
  - Temporary: 1.9%
  - Volunteering: 0.2%

Time Employment of CE jobs

- Percentage of <u>full-time</u> jobs

Country	%
Japan	100%
Ireland	100%
Greece	100%
Romania	100%
Austria	99%
China	98%
Brazil	98%
Italy	97%
Portugal	94%
Singapore	94%
Germany	94%
Belgium	92%
USA	91%
Canada	91%
Turkey	89%
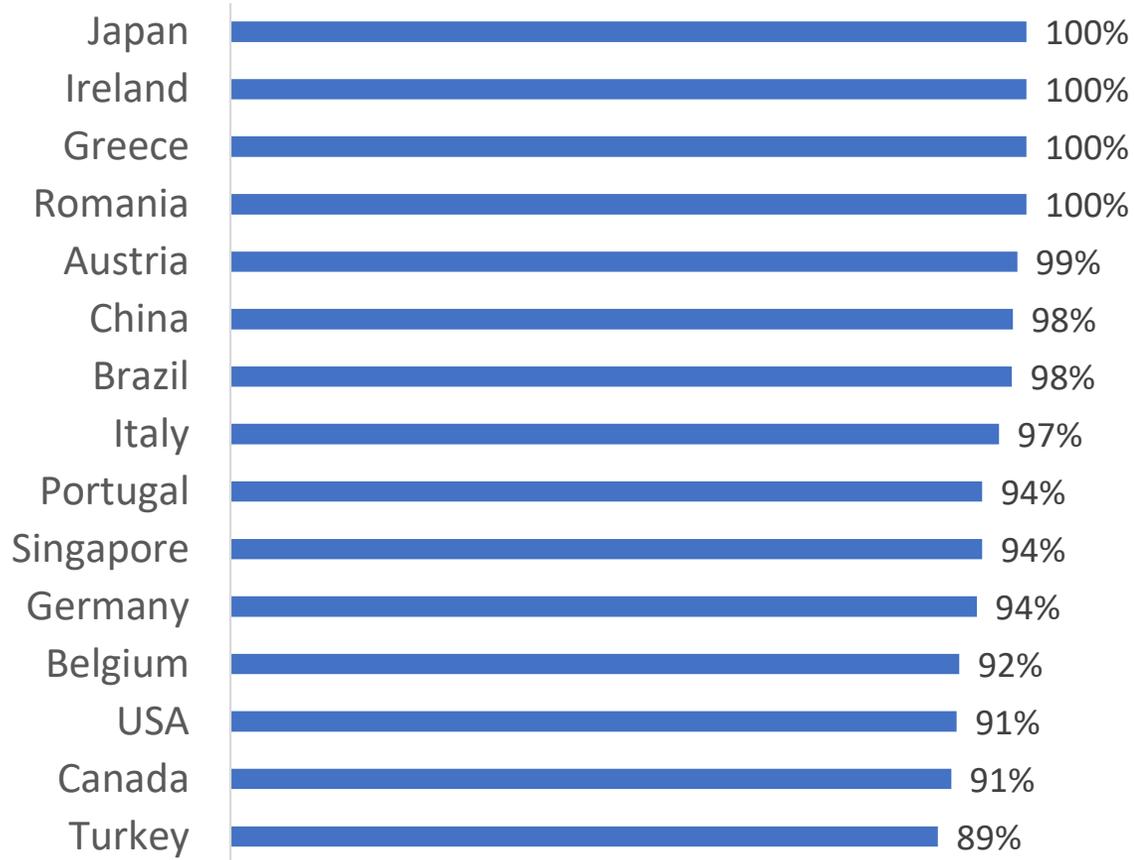
- Percentage of <u>part-time</u> jobs

Country	%
Turkey	11.1%
Australia	9.1%
Finland	8.3%
UK	7.5%
Netherlands	7.1%
Switzerland	2.4%
Germany	1.9%
USA	1.8%
Belgium	1.1%
France	0.1%
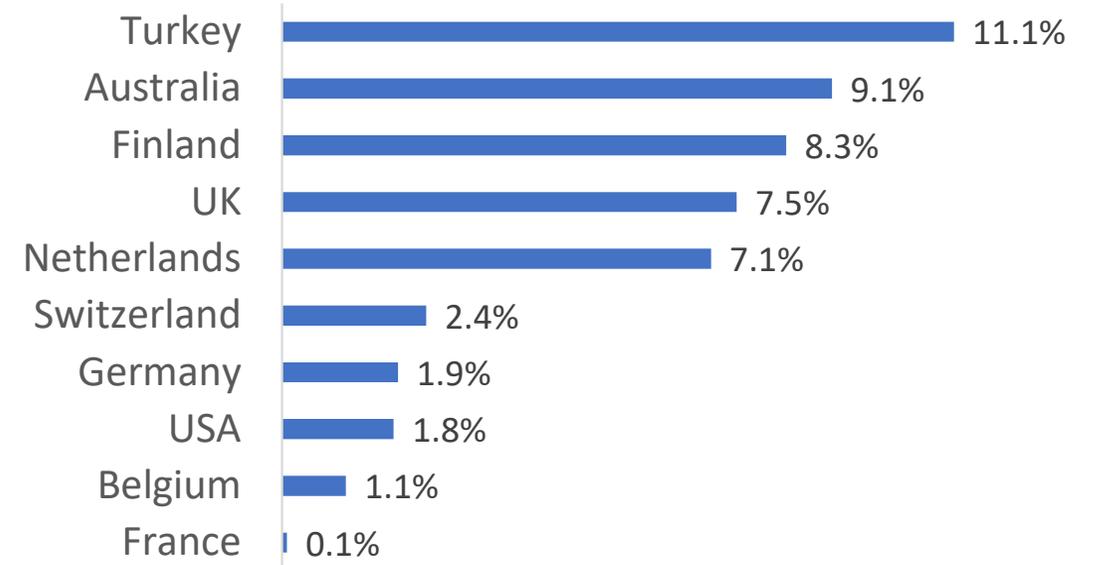
Time Employment of CE jobs

- Percentage of <u>contract</u> jobs

Country	Percentage
India	11.5%
Australia	11.4%
Spain	6.1%
Belgium	4.2%
Netherlands	3.5%
UK	3.4%
USA	3.2%
France	2.3%
Canada	1.9%
Austria	1.1%
China	0.9%
Brazil	0.6%
Germany	0.5%
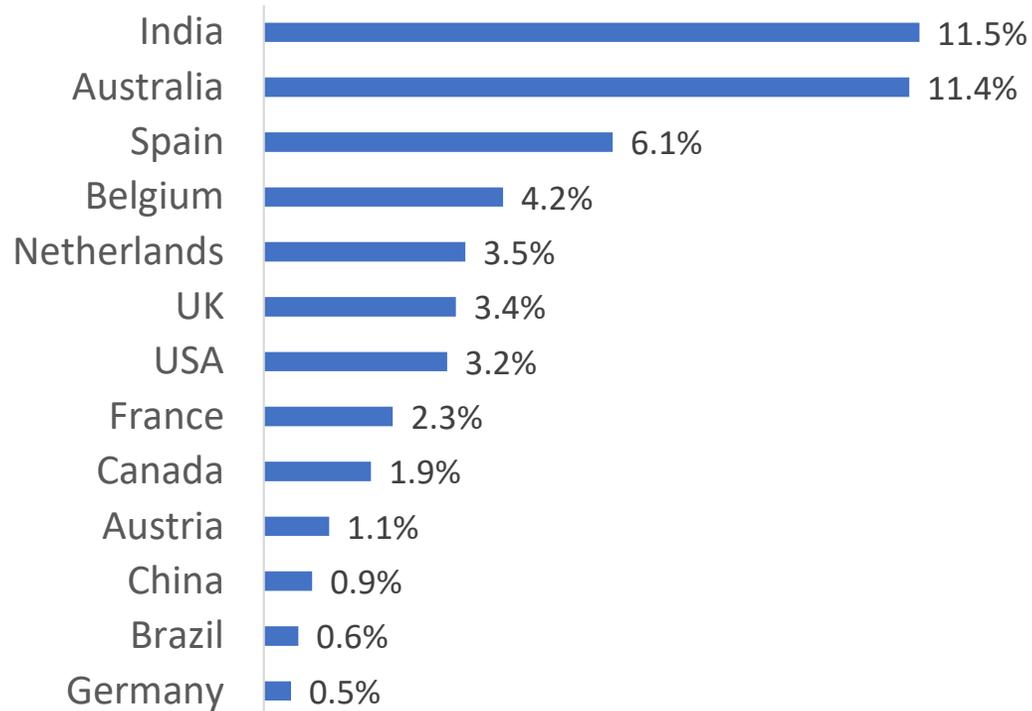
- Percentage of <u>internship</u> jobs

Country	Percentage
Denmark	16.7%
Luxembourg	14.3%
Sweden	12.5%
Switzerland	9.5%
France	6.6%
Portugal	5.6%
Singapore	5.6%
Spain	5.3%
India	3.8%
Netherlands	3.5%
Italy	3.4%
Belgium	3.2%
Germany	3.0%
USA	1.8%
Brazil	1.2%
China	0.9%
UK	0.8%
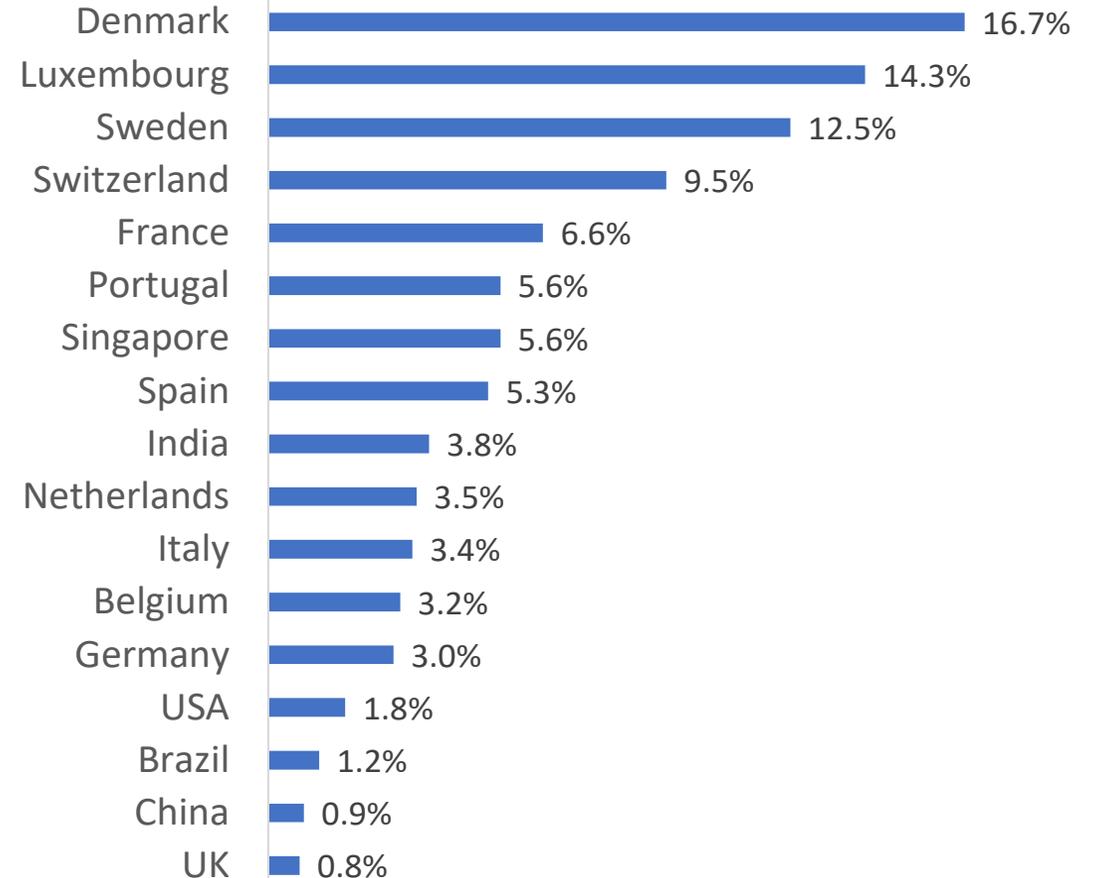
Experience level of CE jobs

- Worldwide
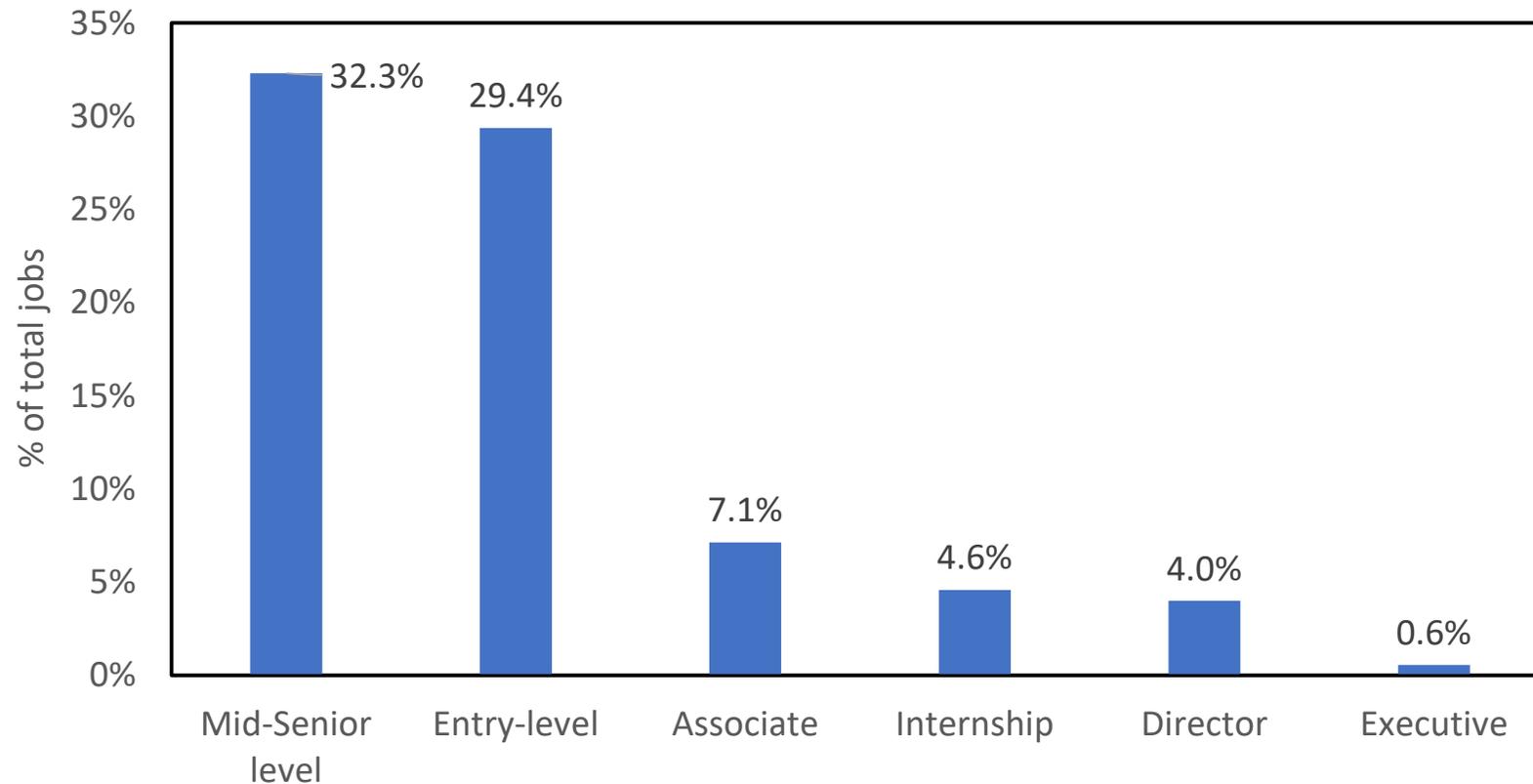
Experience level of CE jobs

- For the countries with >50 LinkedIn job posts

COUNTRY	Number of Jobs	Internship level	Entry level	Associate	Mid-Senior level	Director	Executive
France	1232	34	307	74	196	81	6
Germany	835	99	270	81	339	13	1
Netherlands	282	12	90	19	124	3	4
UK	266	0	48	6	174	20	2
China	234	3	7	1	80	18	1
USA	217	9	95	7	77	6	0
Brazil	164	4	100	2	42	0	0
Spain	114	7	19	27	44	2	0
Belgium	95	2	41	17	27	1	2
Japan	92	0	43	2	43	1	1
Austria	87	2	39	12	31	3	0
Canada	53	1	13	2	30	0	0
Australia	44	0	13	2	16	4	2
Switzerland	42	6	12	2	18	2	1

Function of CE jobs

- Worldwide

Sales, 24.7%

Information Technology, 18.0%

Manufacturing, 17.0%

Engineering, 13.0%

Business Development, 20.3%

Management, 17.2%

Other, 12.9%

Consulting, 7.9%

Project Management, 4.7%

Research, 4.0%

Marketing , 3.1%

Strategy / Planning, 2.4%
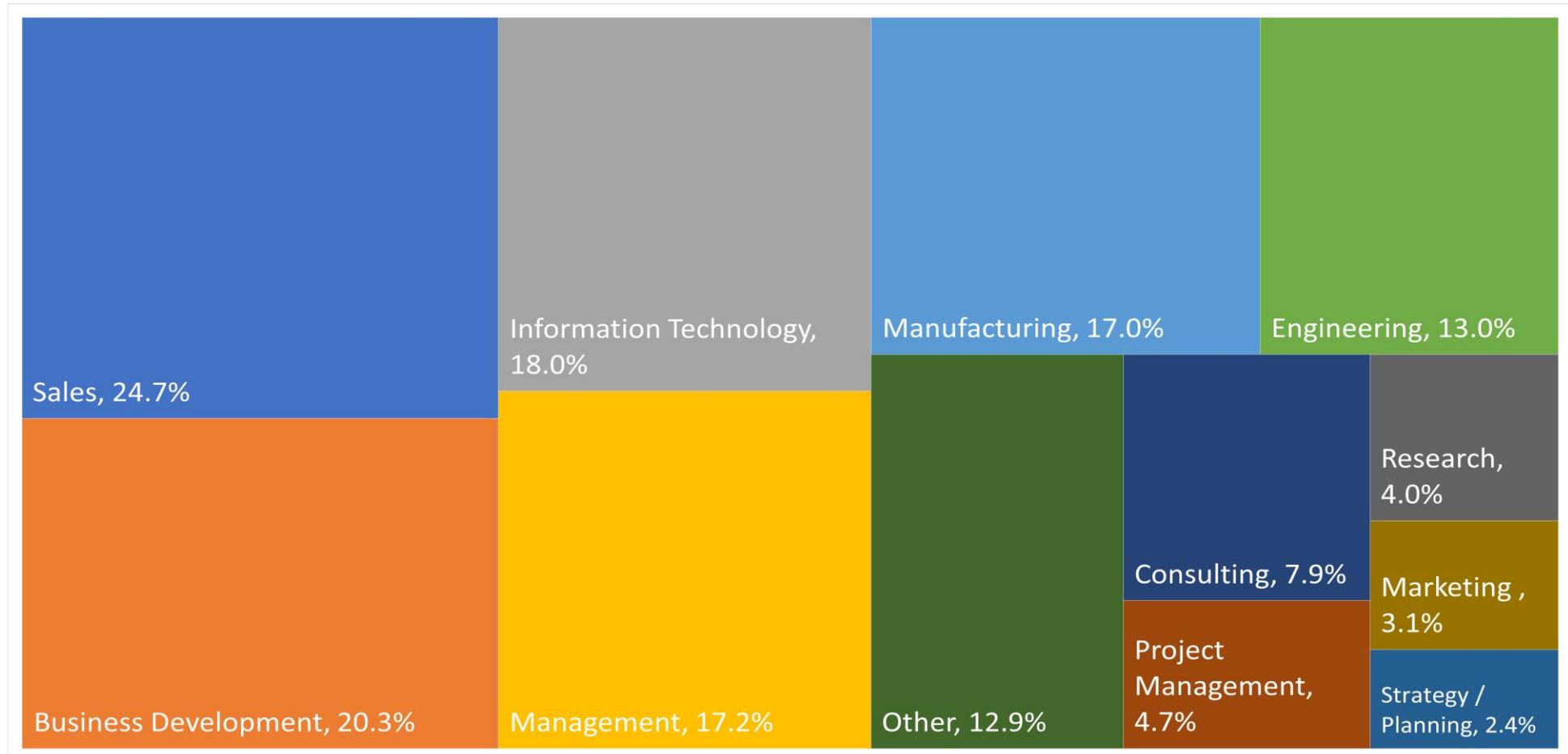
Function of CE jobs

- For the countries with >50 LinkedIn job posts

COUNTRY	Number of Jobs	Information Technology	Sales	Business Development	Engineering	Management	Manufacturing
France	1232	182	568	548	141	164	161
Germany	835	251	140	62	81	115	110
Netherlands	282	41	27	17	66	35	45
UK	266	42	34	17	25	48	46
China	234	48	50	43	28	104	105
USA	217	27	11	7	44	54	44
Brazil	164	16	63	42	5	39	37
Spain	114	21	8	6	29	9	6
Belgium	95	16	9	6	19	18	21
Japan	92	7	17	6	17	7	8
Austria	87	10	13	14	8	20	20
Canada	53	3	11	11	11	13	12
Australia	44	6	7	6	9	9	7
Switzerland	42	6	7	3	5	8	9

Industry of CE jobs

- Worldwide

Industry	Percentage
Retail	12.3%
Environmental Services	11.2%
Business Consulting and Services	8.8%
Staffing and Recruiting	5.7%
Construction	4.8%
IT Services and IT Consulting	4.1%
Civil Engineering	3.6%
Human Resources Services	3.3%
Research Services	3.1%
Industrial Machinery Manufacturing	2.9%
Renewable Energy Semiconductor Manufacturing	2.5%
Wholesale	2.0%
Chemical Manufacturing	1.9%

Industry of CE jobs

- For the countries with >50 LinkedIn job posts

COUNTRY	Number of Jobs	Retail	Environmental services	Business Consulting and Services	Staffing and Recruiting
France	1232	469	64	11	35
Germany	835	6	69	244	18
Netherlands	282	2	26	11	43
UK	266	2	33	12	90
China	234	1	27	6	0
USA	217	5	99	2	3
Brazil	164	5	4	1	0
Spain	114	1	13	10	2
Belgium	95	0	15	3	7
Japan	92	0	4	19	7
Austria	87	7	19	1	7
Canada	53	0	11	2	1
Australia	44	0	12	2	2
Switzerland	42	1	1	5	1

Commitments of CE jobs

- Worldwide
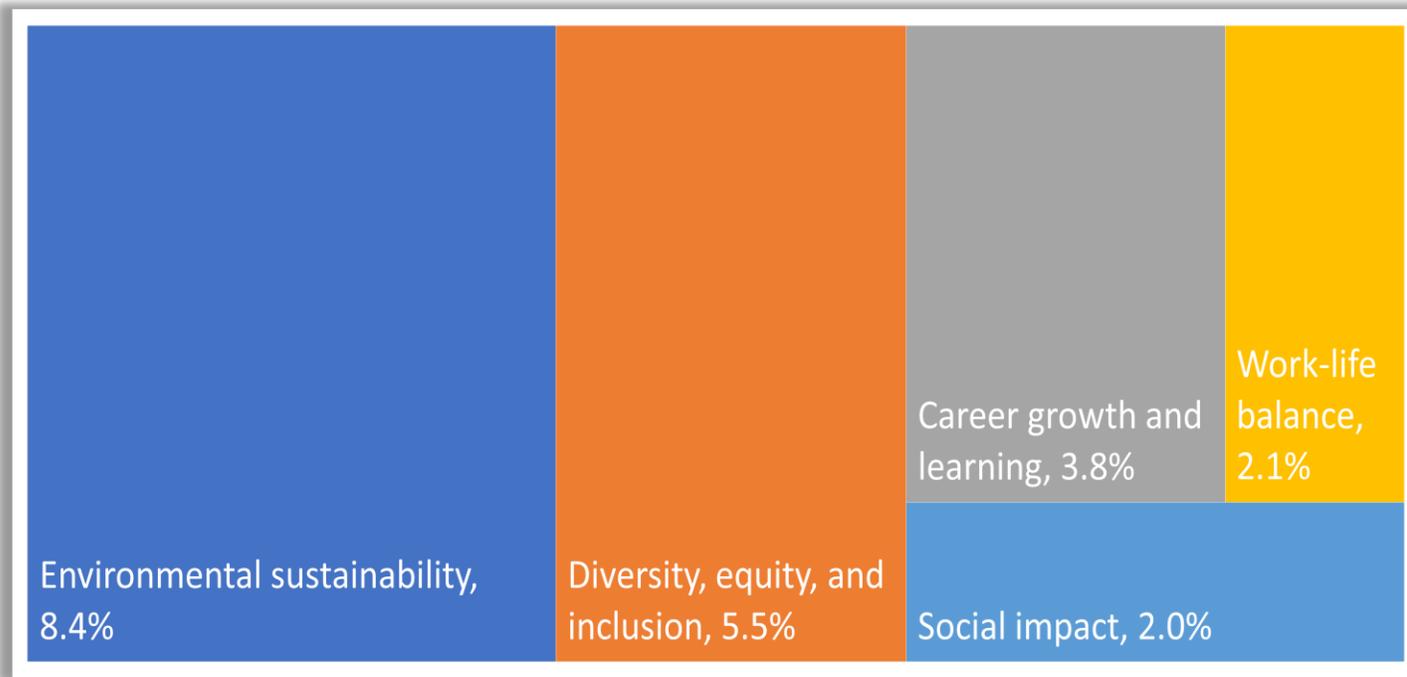
- Per country
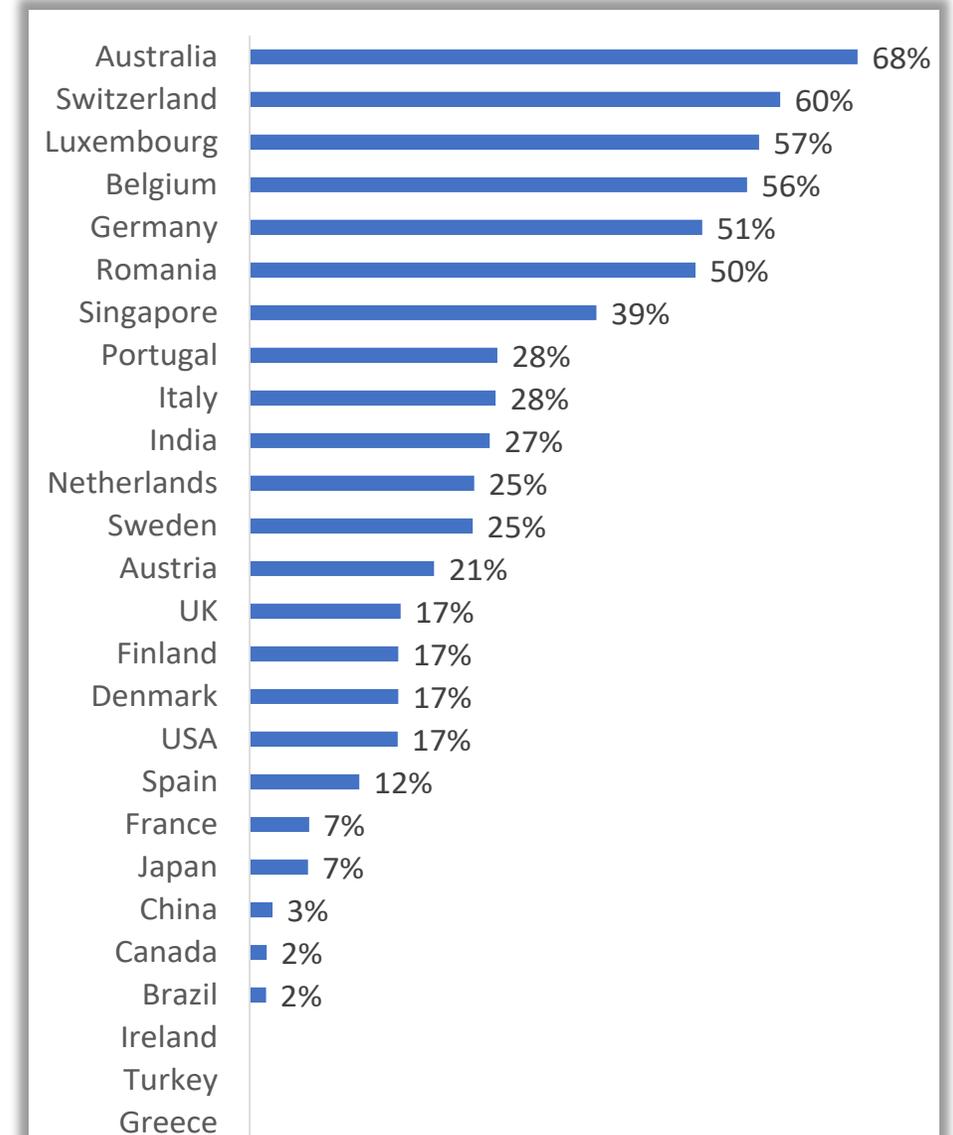
Commitments of CE jobs

- Environmental sustainability

Country	Percentage
Australia	34.1%
Germany	25.6%
Switzerland	19.0%
Denmark	16.7%
Romania	16.7%
Portugal	11.1%
Singapore	11.1%
Finland	8.3%
Austria	8.0%
Italy	6.9%
Spain	6.1%
Netherlands	6.0%
USA	4.6%
Belgium	4.2%
India	3.8%
UK	3.8%
France	2.4%
Canada	1.9%
Brazil	1.8%
China	1.7%
Japan	
Sweden	
Ireland	
Turkey	
Luxembourg	
Greece	
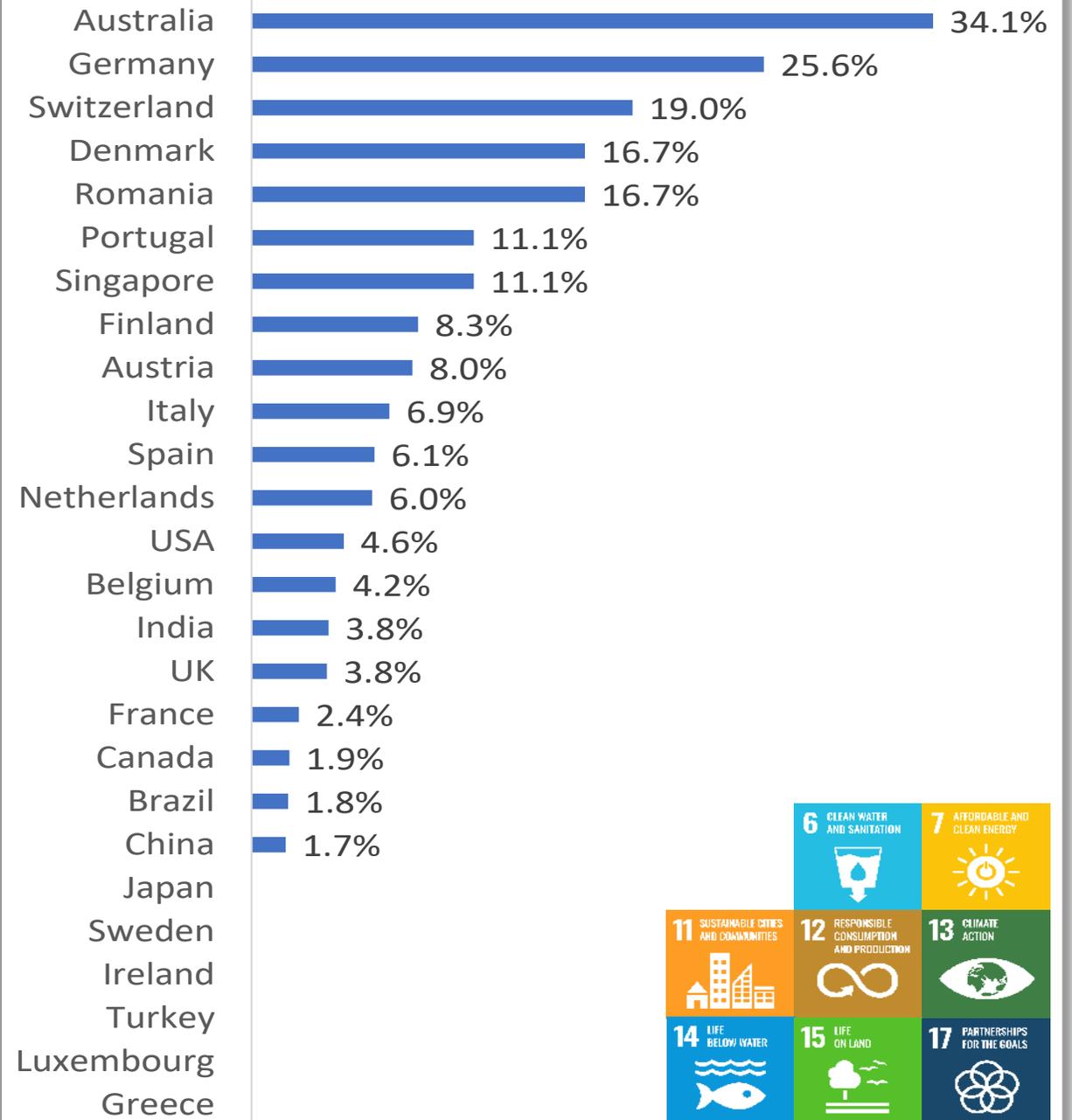
Commitments of CE jobs

- Diversity, equity, and inclusion

Country	Percentage
Luxembourg	28.6%
Sweden	25.0%
Belgium	21.1%
Romania	16.7%
Germany	13.9%
Switzerland	11.9%
Australia	9.1%
Finland	8.3%
India	7.7%
Portugal	5.6%
Singapore	5.6%
Austria	4.6%
Japan	4.3%
Netherlands	4.3%
UK	4.1%
Italy	3.4%
USA	2.8%
France	1.9%
Spain	1.8%
China	
Brazil	
Canada	
Ireland	
Turkey	
Denmark	
Greece	
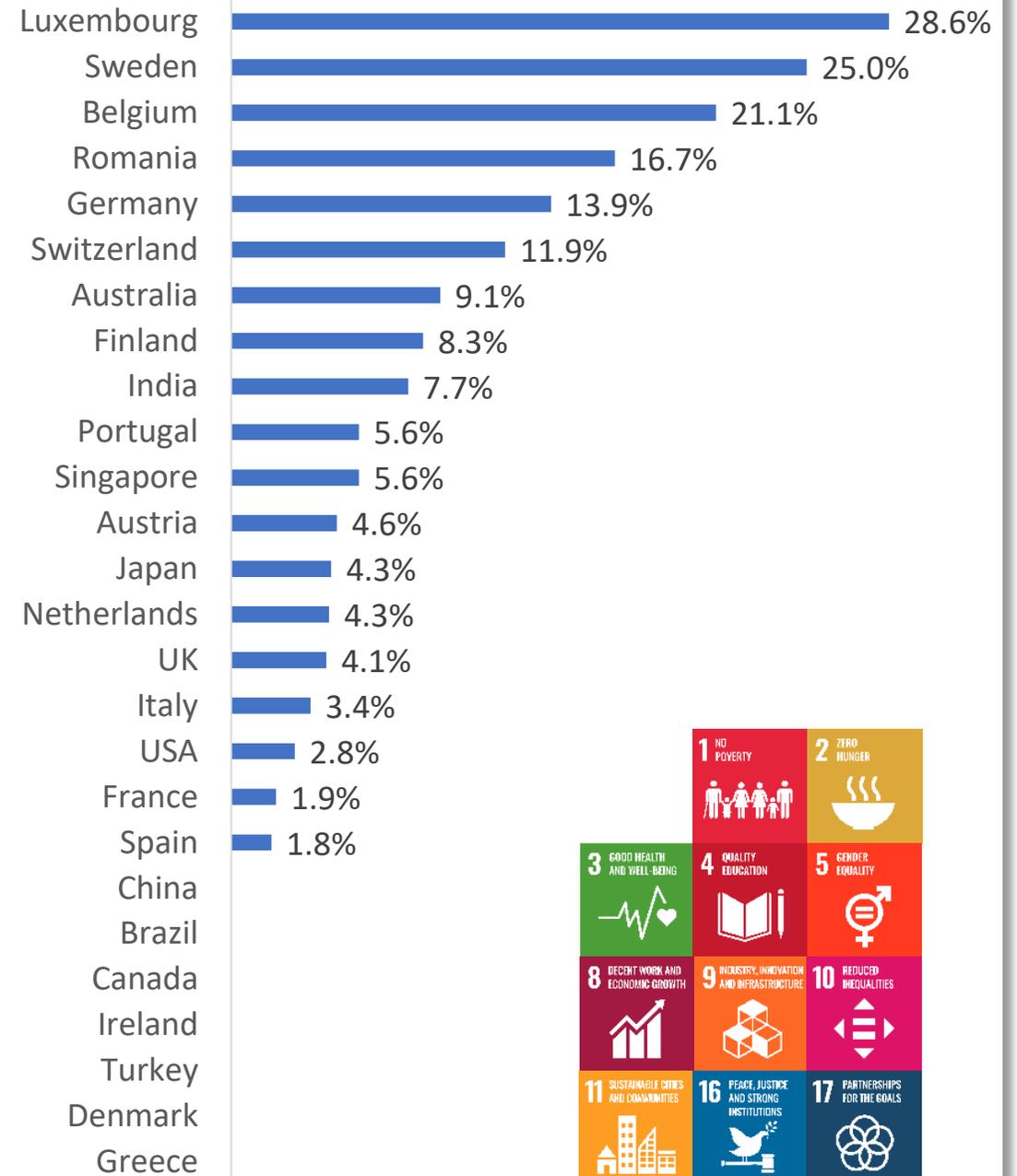
Commitments of CE jobs

- Work-life balance

Singapore — 11.1%
Australia — 6.8%
Netherlands — 5.0%
Switzerland — 4.8%
Belgium — 4.2%
India — 3.8%
Germany — 3.8%
Italy — 3.4%
USA — 3.2%
UK — 3.0%
Austria — 2.3%
Spain — 0.9%
France — 0.5%
China — 0.4%
Brazil
Japan
Canada
Portugal
Sweden
Finland
Ireland
Turkey
Luxembourg
Denmark
Greece
Romania
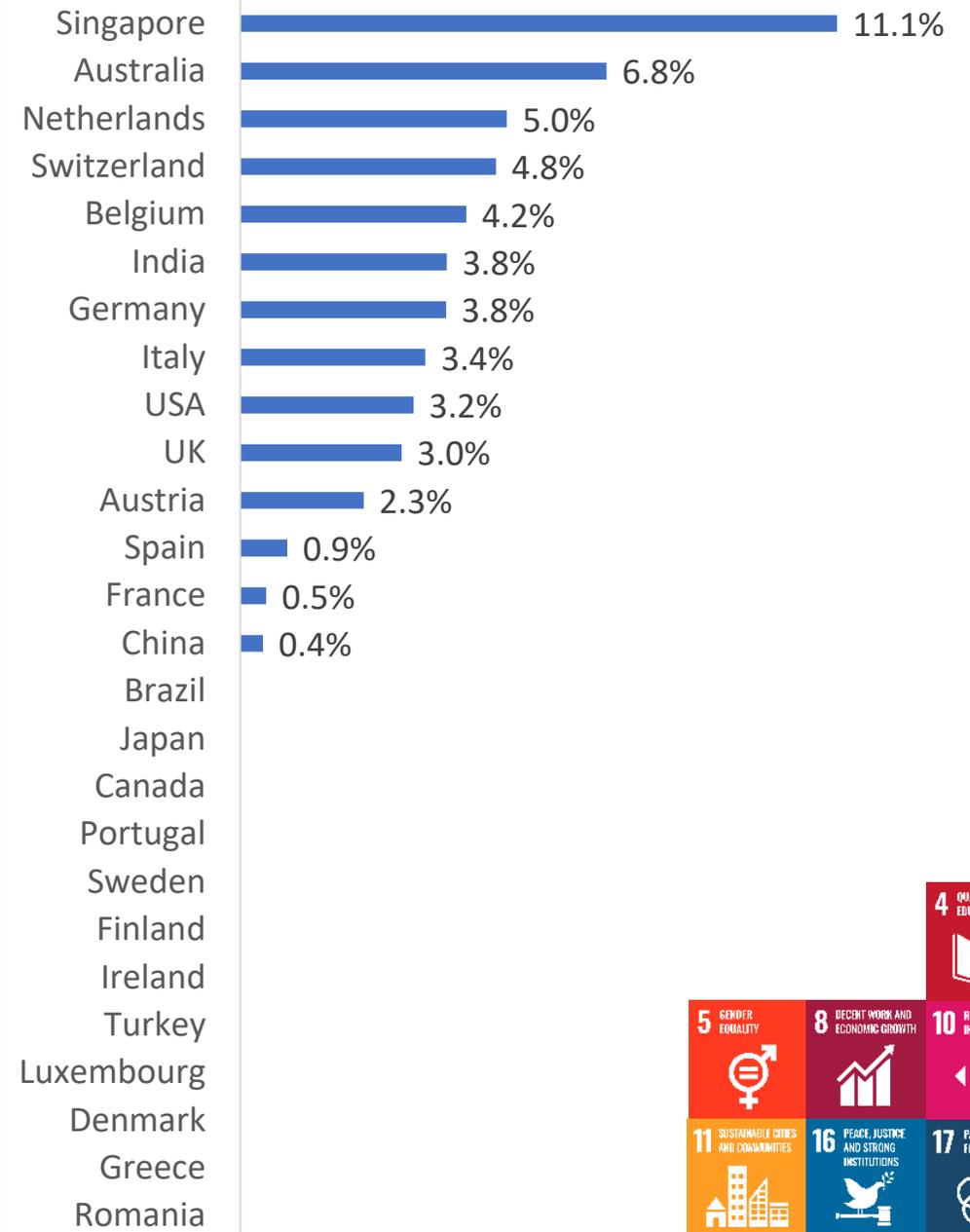
Commitments of CE jobs

- Social impact

Australia — 11.4%
Italy — 6.9%
Portugal — 5.6%
Singapore — 5.6%
UK — 4.9%
Switzerland — 4.8%
India — 3.8%
Netherlands — 3.5%
USA — 2.8%
Germany — 2.4%
Spain — 1.8%
Austria — 1.1%
Belgium — 1.1%
France — 1.0%
China
Brazil
Japan
Canada
Sweden
Finland
Ireland
Turkey
Luxembourg
Denmark
Greece
Romania
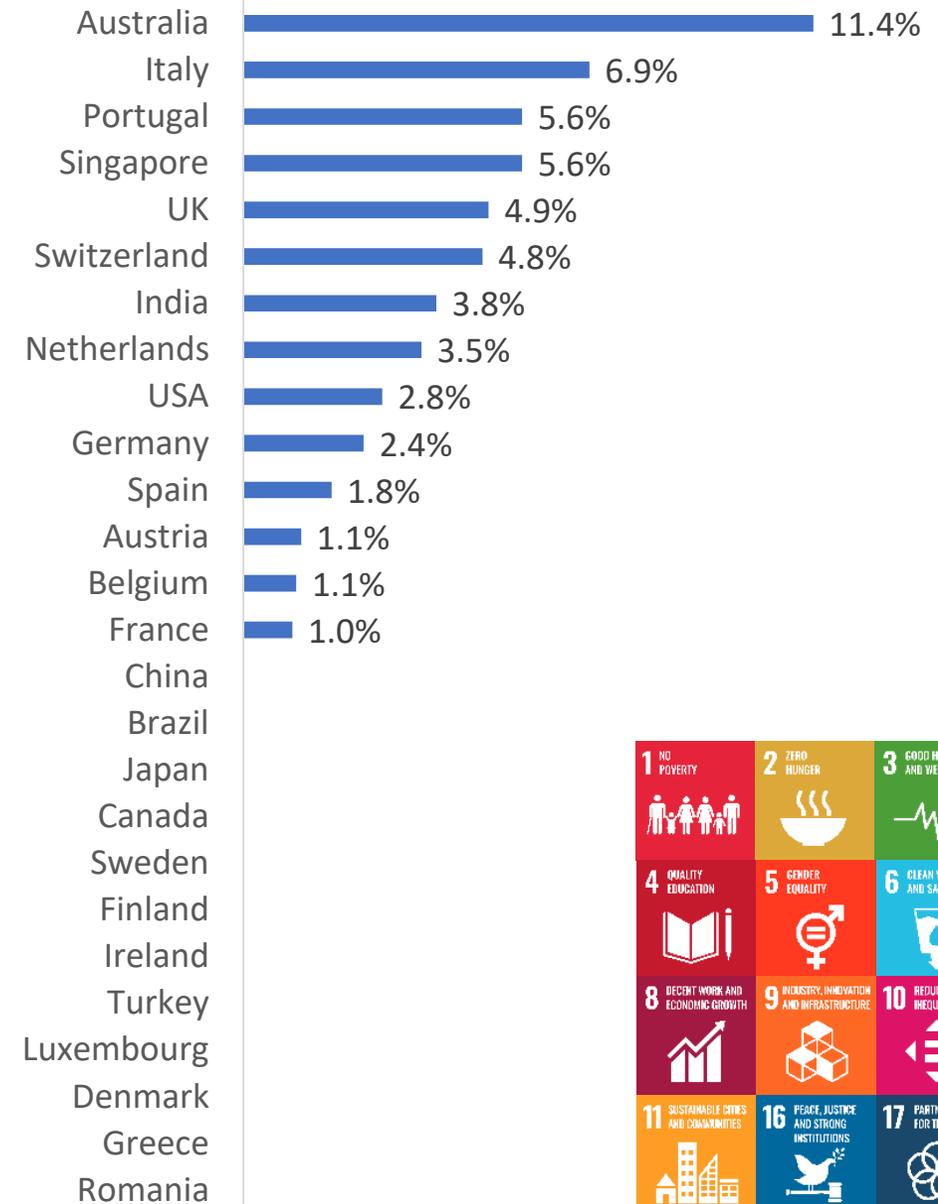
Commitments of CE jobs

- Career growth and learning

Country	Percentage
Luxembourg	28.6%
Belgium	25.3%
Switzerland	19.0%
Romania	16.7%
India	7.7%
Italy	6.9%
Australia	6.8%
Netherlands	6.4%
Portugal	5.6%
Singapore	5.6%
Germany	5.0%
Austria	4.6%
USA	3.2%
Japan	2.2%
Spain	1.8%
UK	1.1%
France	0.9%
China	0.4%
Brazil	
Canada	
Sweden	
Finland	
Ireland	
Turkey	
Denmark	
Greece	
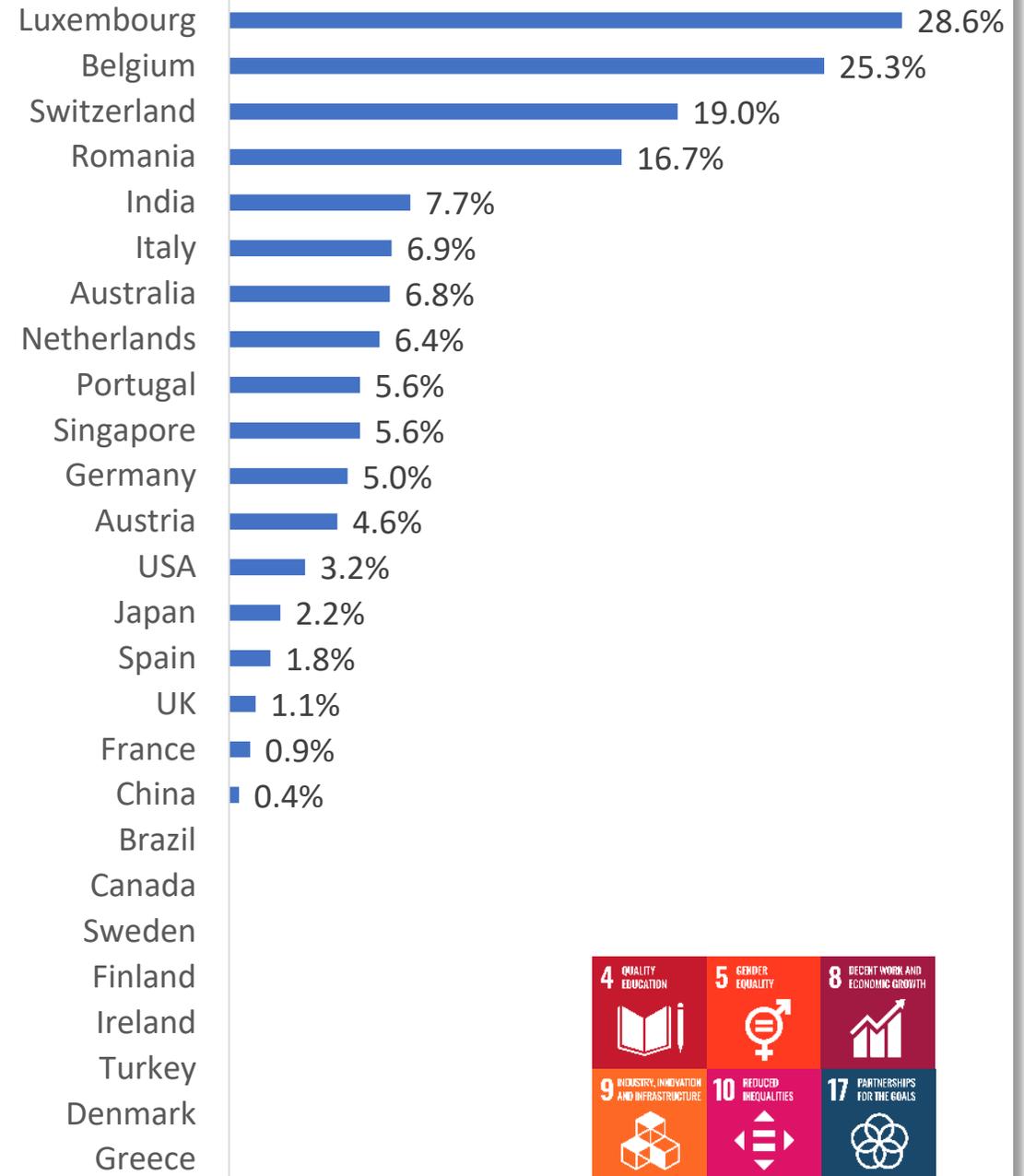
Date posted

- Worldwide
  - Past 24 hours: 4.7%
  - Past week: 27.3%
  - Past month: 66.3%

- Results per country:
  - They do not allow for safe conclusions, given the dynamic nature of social media and the arbitrary way the jobs are posted in the LinkedIn platform
  - Periodical monitoring of this variable (eg. daily, weekly or monthly) can give interesting insights

Conclusion

Conclusions

- Dominance of European countries in contributing to the global CE job market
  - …particularly France and Germany, highlighting their presence as leaderships in sustainable practices and green initiatives

- The nature of CE employment is diverse worldwide, demonstrated by the distribution of job types, experience levels, functions, industries, and commitments
  - Each country has its own characteristics / "preferences"

- The dominance of jobs in diverse industries highlights the multifaceted nature of circularity, including some alternative sectors beyond traditional environmental ones

  - **This highlights the need for cross-sector collaborations!**

Limitations

- The use of only the English term 'circular economy' for job searches may overlook relevant non-English postings
  - Preliminary experiments showed that using the English term seems the best search strategy

- A second limitation has to do with the degree of relevance of low-ranked results to CE, as the term could be included for a general duty job to one fully dedicated to the topic
  - However, we expect this does not change significantly across countries

- The profile of the logged in user can affect the search results / rankings
  - But this applies for all countries and filter values

- Popularity of LinkedIn in different countries (employers and employees in some countries may do limited use of LinkedIn)

Thank you!

Questions?

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