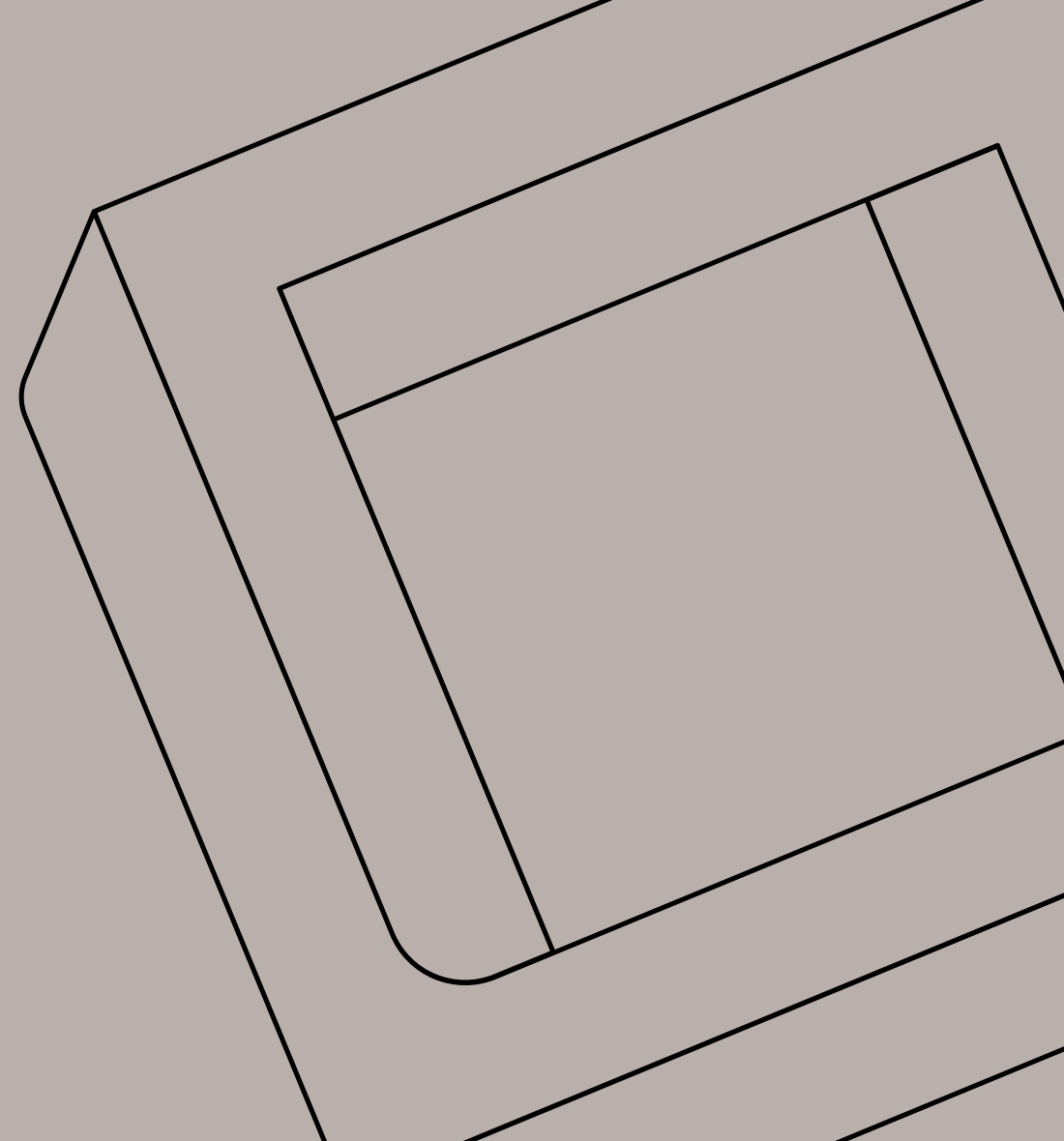


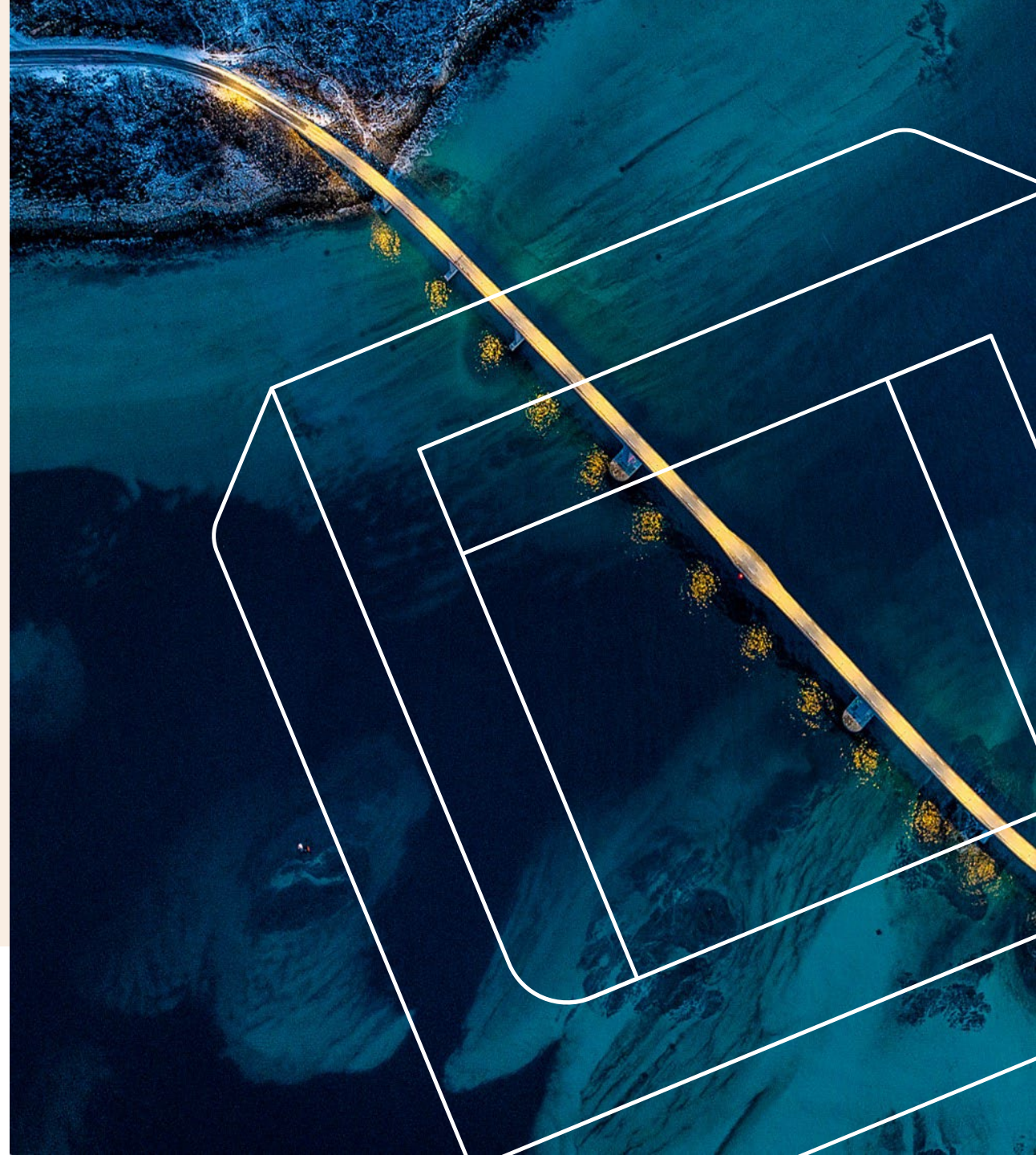
# Comparison of probabilistic and non-probabilistic samples in the European Training and Learning Survey: To what extent are there systematic differences?

Alexandra Cronberg (Verian), Jamie Burnett (Verian)

27<sup>th</sup> February 2025



# 1. Objectives of the presentation



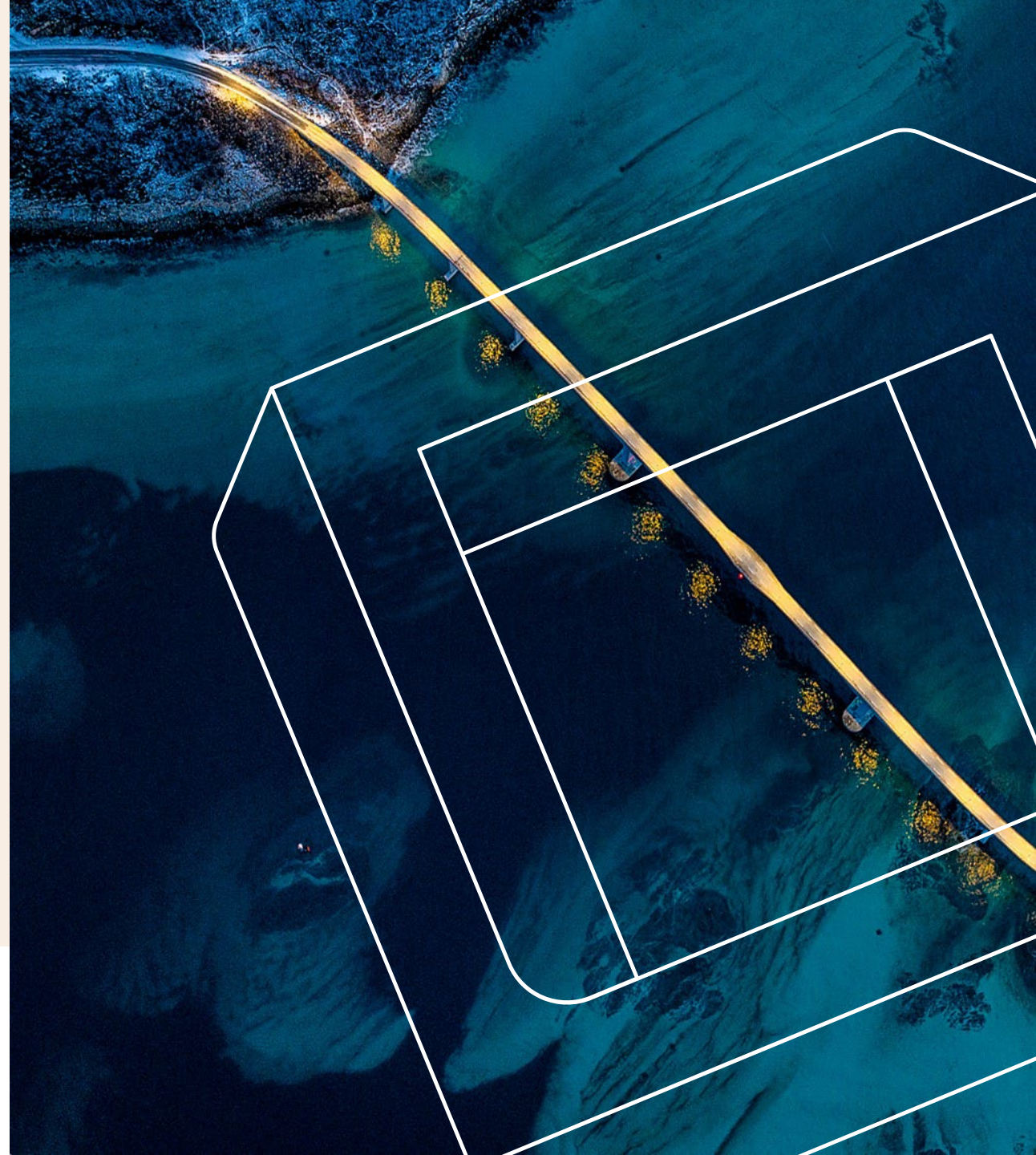
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# Objectives of the presentation

1. Show how the **European Teaching and Learning Survey**, which Verian conducted on behalf of CEDEFOP, combined probabilistic and non-probabilistic samples
2. **Examine differences** between probabilistic and non-probabilistic samples on key outcome indicators and other profiling variables
3. Show how **weights** were derived to improve the representativeness of the non-probabilistic samples



## 2. Study design

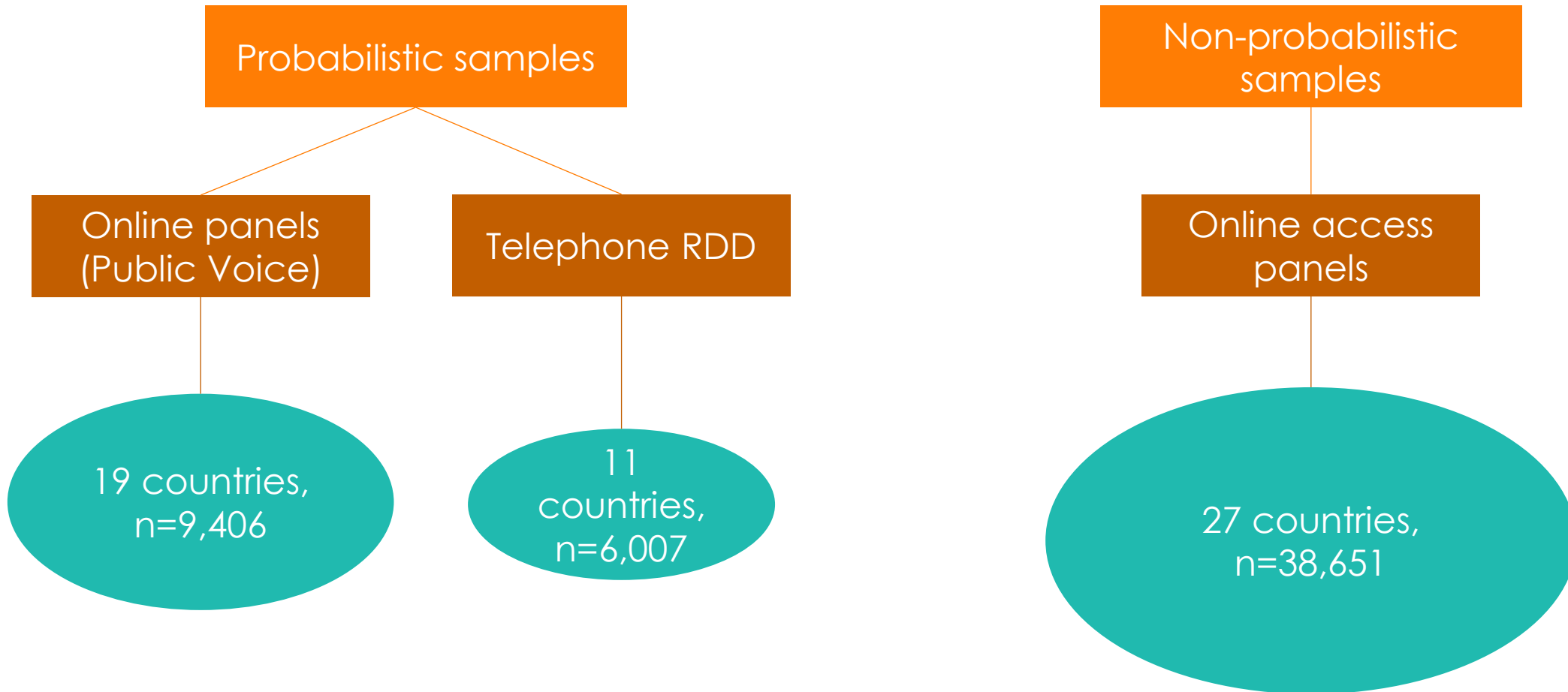


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# Study design – European Training and Learning Survey

- Pan-European survey (**29 countries** - 27 EU member states, plus Iceland and Norway) to gain insight into adult learning and development
- Total of **n=44,658 interviews** conducted among adult workers aged 16-64
- Survey was conducted using **mix** of **probabilistic samples** (online or telephone RDD) and **non-probabilistic samples** (online) in each country
  - Prob samples from high quality sample frames to give representative, reliable estimates
  - Non-prob samples to help achieve target sample size
- Fieldwork took place from October 2023 to February 2024

# Sample achievement



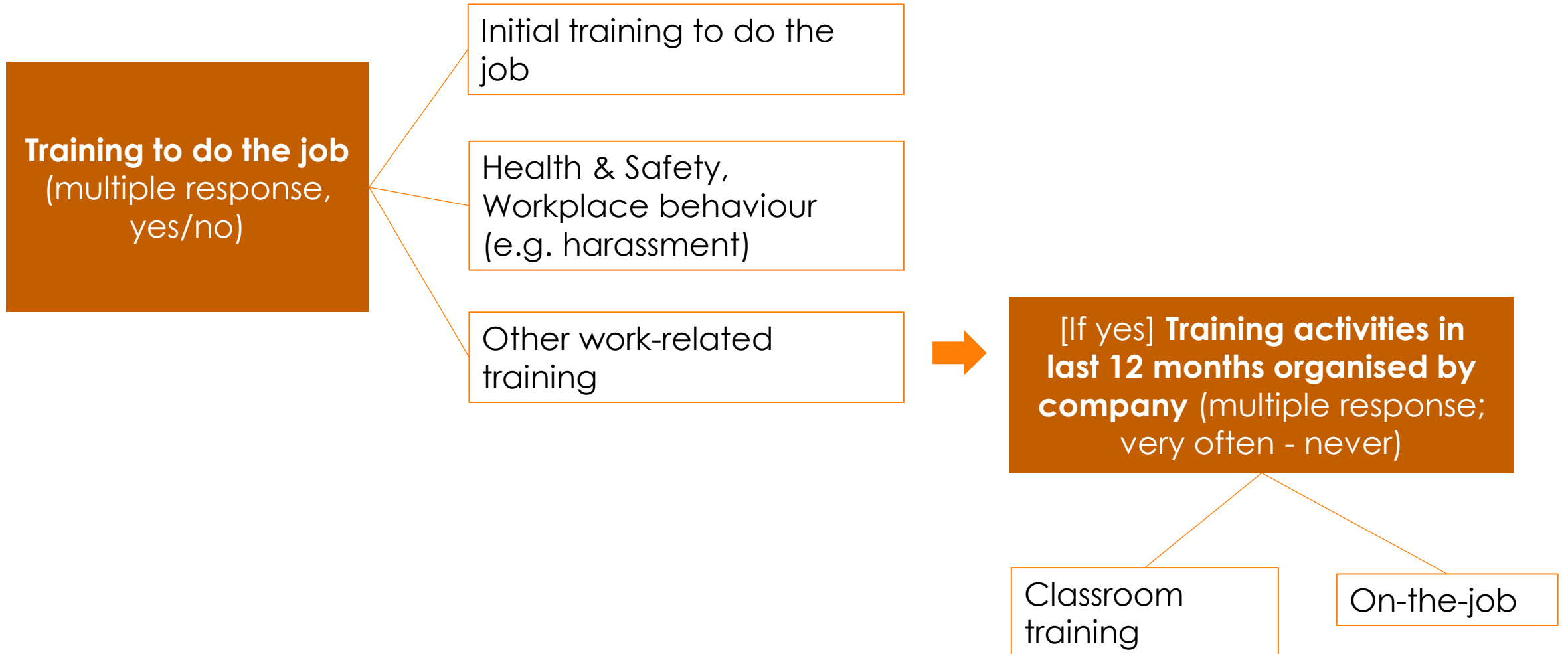
Exceptions: Malta – prob panel + tel RDD; Cyprus – only tel RDD

# Sample size per country – n=1000 to n=3000

Country	Probabilistic samples		Non-probabilistic samples	Total
	Online probabilistic panel	Tel RDD	Online access panel	
Austria	-	500	995	1,495
Belgium	500	-	1,002	1,502
Bulgaria	-	501	993	1,494
Croatia	-	500	499	999
Czechia	500	-	1,001	1,501
Cyprus	-	1,000	-	1,000
Denmark	502	-	498	1,000
Estonia	504	-	501	1,005
Finland	500	-	499	999
France	500	-	2,499	2,999
Germany	501	-	2,499	3,000
Greece	500	-	996	1,496
Hungary	-	501	1,000	1,501
Ireland	500	-	500	1,000
Italy	-	501	2,507	3,008

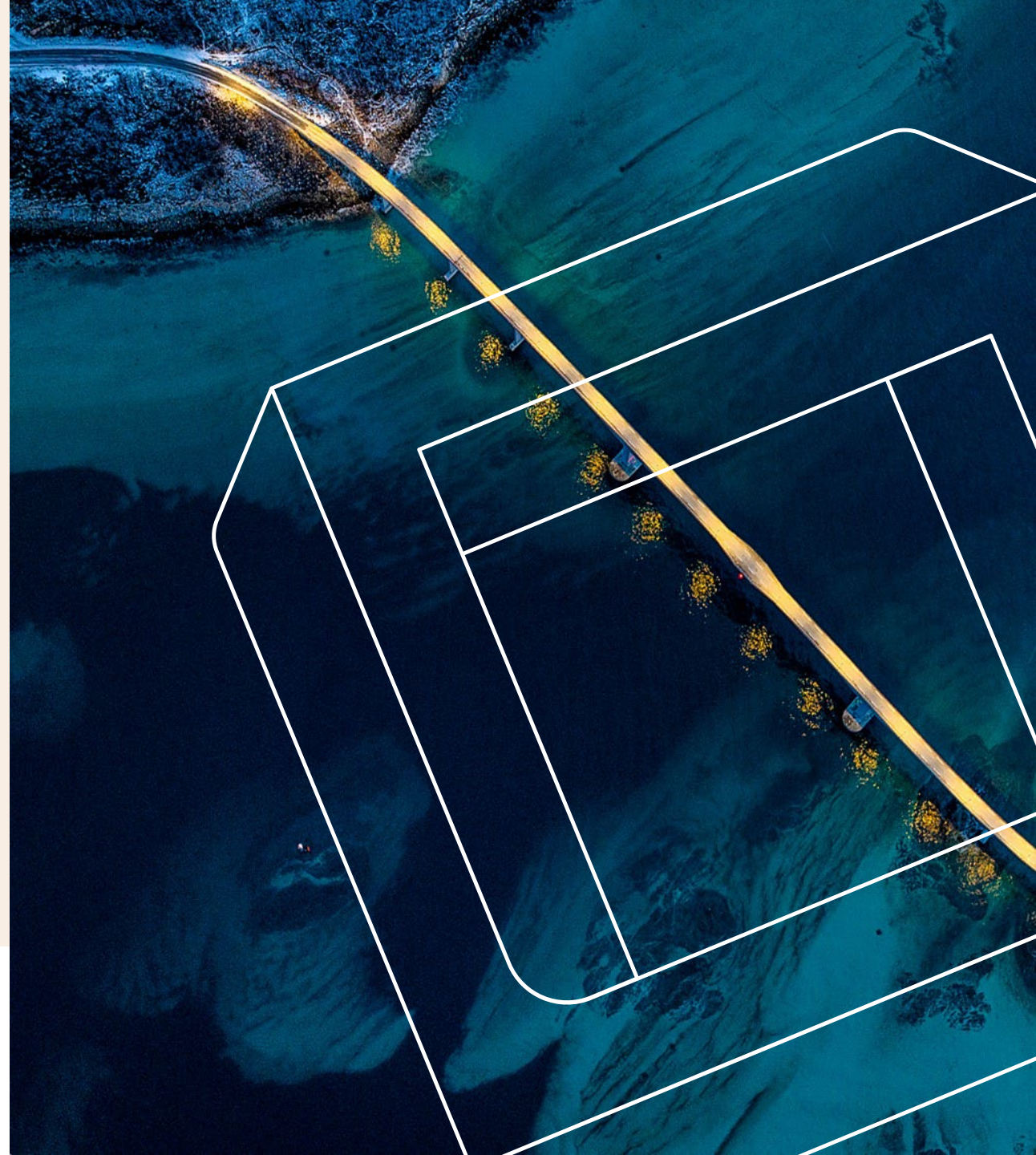
Country	Probabilistic samples		Non-probabilistic samples	Total
	Online probabilistic panel	Tel RDD	Online access panel	
Latvia	500	-	498	998
Lithuania	501	-	499	1,000
Luxembourg	249	-	763	1,012
Malta	582	500	-	1,082
Netherlands	-	501	993	1,494
Poland	503	-	2,504	3,007
Portugal	500	-	997	1,497
Romania	-	500	1,491	1,991
Slovakia	500	-	498	998
Slovenia	-	503	499	1,002
Spain	507	-	2,508	3,015
Sweden	511	-	1,000	1,511
Iceland	-	500	506	1,006
Norway	546	-	500	1,046
<b>Total</b>	<b>9,406</b>	<b>6,007</b>	<b>29,245</b>	<b>44,658</b>

# Key outcome variables





### 3. Examining differences between the sample sources



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# Sample design

- Aim was to **combine prob** and **non-prob samples**.
- If there were statistically significant differences between the prob and non-prob sample profiles, we sought to adjust the non-prob sample to reduce any **observed differences in the key outcome indicators** between the two sample sources within each country.
- We assumed the results from the prob samples were closer to the truth (debatable! but we followed findings in the AAPOR Taskforce report on non-probability sampling (2013))
- We first **weighted** the prob and non-prob samples before examining differences
  1. **Design weight** to adjust for selection probabilities on probabilistic samples
  2. RIM weighting to improve representativeness in terms of demographic profile (**gender by age, education, occupation, industry and region**) – RIM weights derived separately for prob and non-prob samples

# Some differences when comparing prob and non-prob samples on key outcomes

Data weighted for demographics

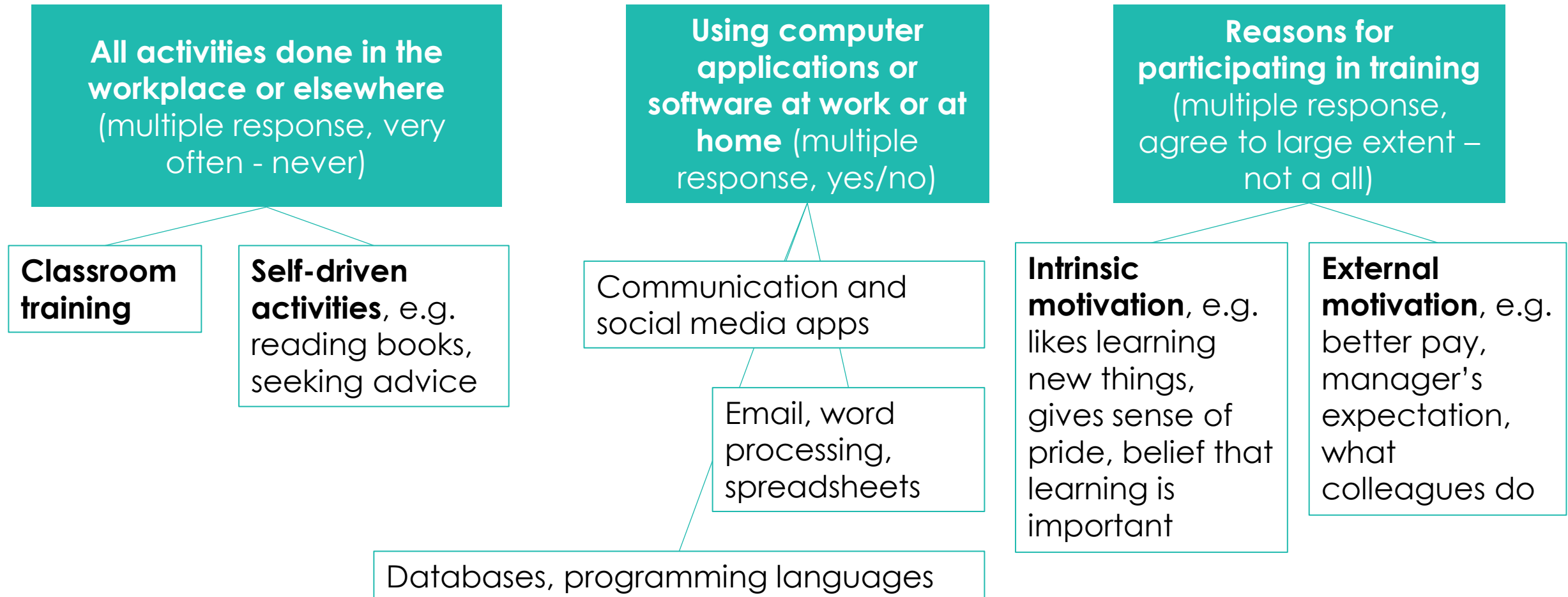
Example – On-the-job training (ratio prob/non-prob, % yes)

Country	Ratio prob/Non-prob	p-value <0.05
Austria^	1.26	*
Belgium	0.55	*
Bulgaria^	0.96	
Croatia^	1.31	*
Czechia	1.33	*
Denmark	0.97	
Estonia	1.04	
Finland	0.69	*
France	0.62	*
Germany	0.63	*
Greece	0.82	*
Hungary^	0.83	
Ireland	0.59	*
Italy^	1.38	*
Latvia	0.91	
Lithuania	0.83	
Luxembou	0.72	
Netherland	1.08	
Poland	0.87	
Portugal	0.88	
Romania^	0.91	
Slovakia	0.80	*
Slovenia^	1.09	
Spain	0.57	*
Sweden	0.62	*
Iceland^	1.31	
Norway	0.76	*

^ indicates RDD sample

Outcome variable	Number of countries with sig. diff. (out of 27)	General trend
Initial training to do the job	4	Mixed
Health & safety etc	13	Mixed
Other work-related training	8	Mixed
Classroom training	14	Prob<non-prob
On-the-job	14	Prob<non-prob

# Other profiling variables



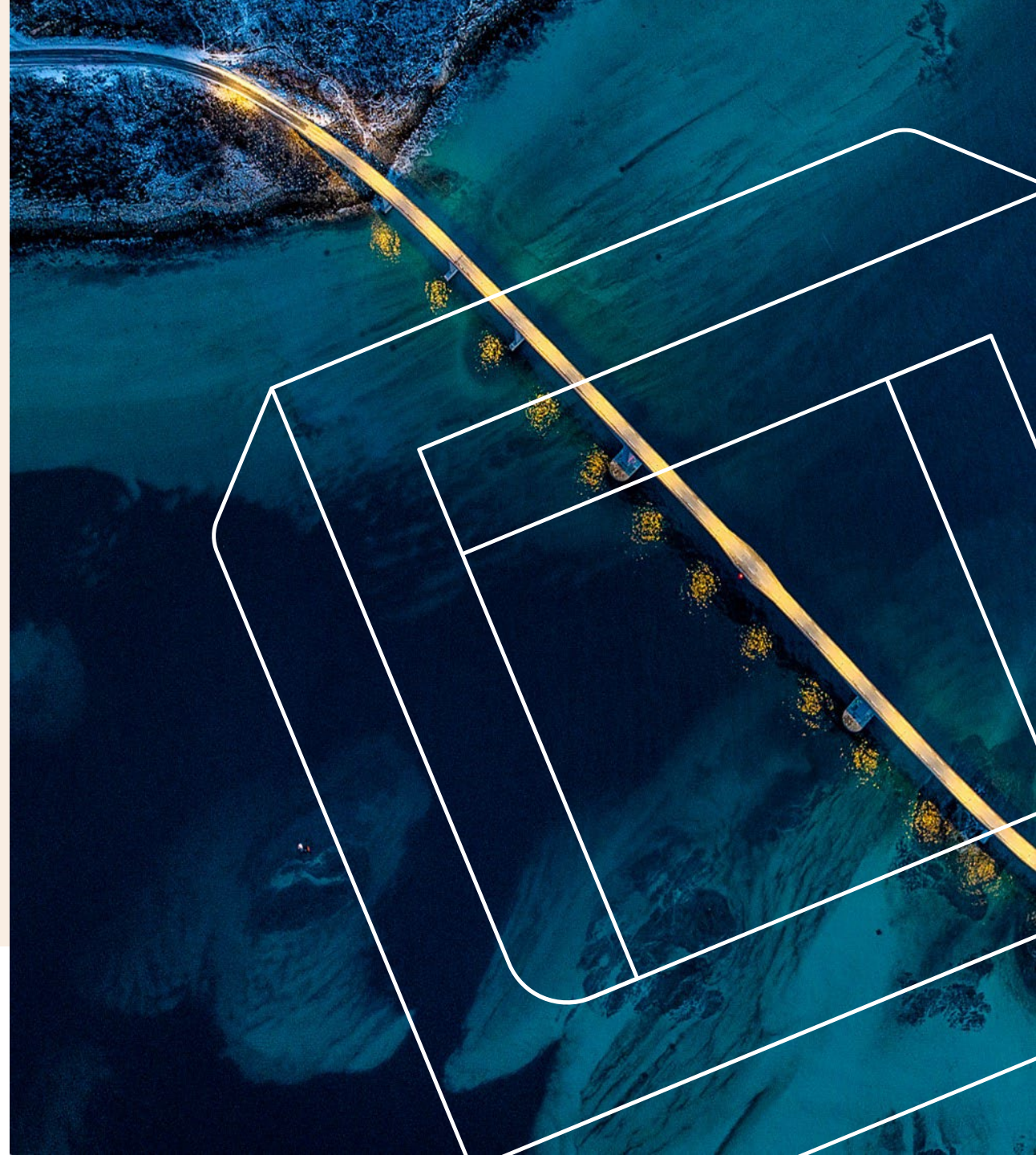


# Some systematic differences between prob and non-prob samples for the other relevant variables

- Some evidence to suggest that **non-probabilistic samples** have higher levels of **extrinsic motivation**.
- **Non-probabilistic samples** tend to use **comms apps**, and **Word/email/ Excel** less, but more use of **programming**.

Variable (bold = key outcome indicators)	Number of countries with sig. diff. (out of 27)	General trend
Any classroom training at work or elsewhere	17	Prob<non-prob
Self-driven activities	18	Prob>non-prob
Communication apps	23	Prob>non-prob
Word processing etc.	22	Prob>non-prob
Programming	18	Prob<non-prob
Intrinsic motivation	23	Prob>non-prob
External motivation	21	Prob<non-prob

# 4. Additional weighting for non-prob samples



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## Additional RIM weights to reduce differences in key outcomes between non-prob and prob samples

- **Data weighted for standard demographics** (gender by age, region, education, occupation) **did not mitigate** for all the observed differences → additional variables included in the weighting scheme to help improve balance
- Variable(s) included as **additional dimensions on the RIM weight** for non-probabilistic sample, to reduce differences compared to probabilistic sample

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# Logistic regression analysis to determine which variables to use for additional RIM weights

- **Separate model** for each outcome variable
- Other relevant variables included as independent variables, and sample type as a dummy variable.
- Separate models for each country
- **Variables** that had a statistically significant association with one or more outcome variables at the 5% level were **considered contenders for inclusion in the weighting scheme** for the non-probabilistic sample

Q 20\_1, 3, 5: intrinsic motivations for learning

Q50\_1, 2: use of computer applications – communication apps e.g. Teams OR social networking apps

Q18: Activities done at work or elsewhere – participation in training (classroom, online etc)



# Selected approach for weighting the non-probabilistic samples

Q18: Activities done at work or elsewhere – participate in training (classroom, online etc)

Q 20\_1, 3, 5: intrinsic motivations for learning

Q50: use of computer applications – communication apps e.g. Teams, Skype OR social networking apps

\* indicates weights are trimmed at 10<sup>th</sup> and 90<sup>th</sup> percentile for final weights, otherwise we recommend trimming at 5<sup>th</sup>/95<sup>th</sup> percentile.

Country	Variables for additional RIM	Efficiency - 5th/95th	Efficiency - 10th/90th
Austria	Q20	72%	77%
Belgium*	Q20-Q50-Q18	58%	65%
Bulgaria*	Demographics only	49%	59%
Croatia	Demographics only	62%	69%
Czechia	Q20-Q50-Q18	62%	69%
Denmark	Q18	71%	79%
Estonia	Demographics only	81%	87%
Finland	Q18	79%	83%
France*	Q20-Q50-Q18	59%	62%
Germany	Q20-Q50-Q18	67%	73%
Greece*	Demographics only	57%	64%
Hungary	Q18	68%	73%
Ireland*	Q18	55%	67%
Italy*	Q20-Q50-Q18	47%	56%
Latvia	Q18	71%	78%
Lithuania	Demographics only	69%	76%
Luxembourg	Demographics only	76%	81%
Netherlands	Q20	81%	84%
Poland	Q20-Q50-Q18	67%	72%
Portugal*	Q20-Q50-Q18	56%	68%
Romania*	Q20-Q50-Q18	52%	60%
Slovakia*	Q18	47%	59%
Slovenia	Demographics only	70%	77%
Spain	Q20-Q50-Q18	61%	69%
Sweden	Q20-Q50-Q18	65%	73%
Iceland	Q20-Q50-Q18	69%	75%
Norway	Q20-Q50-Q18	71%	76%

# Illustrative example - Hungary

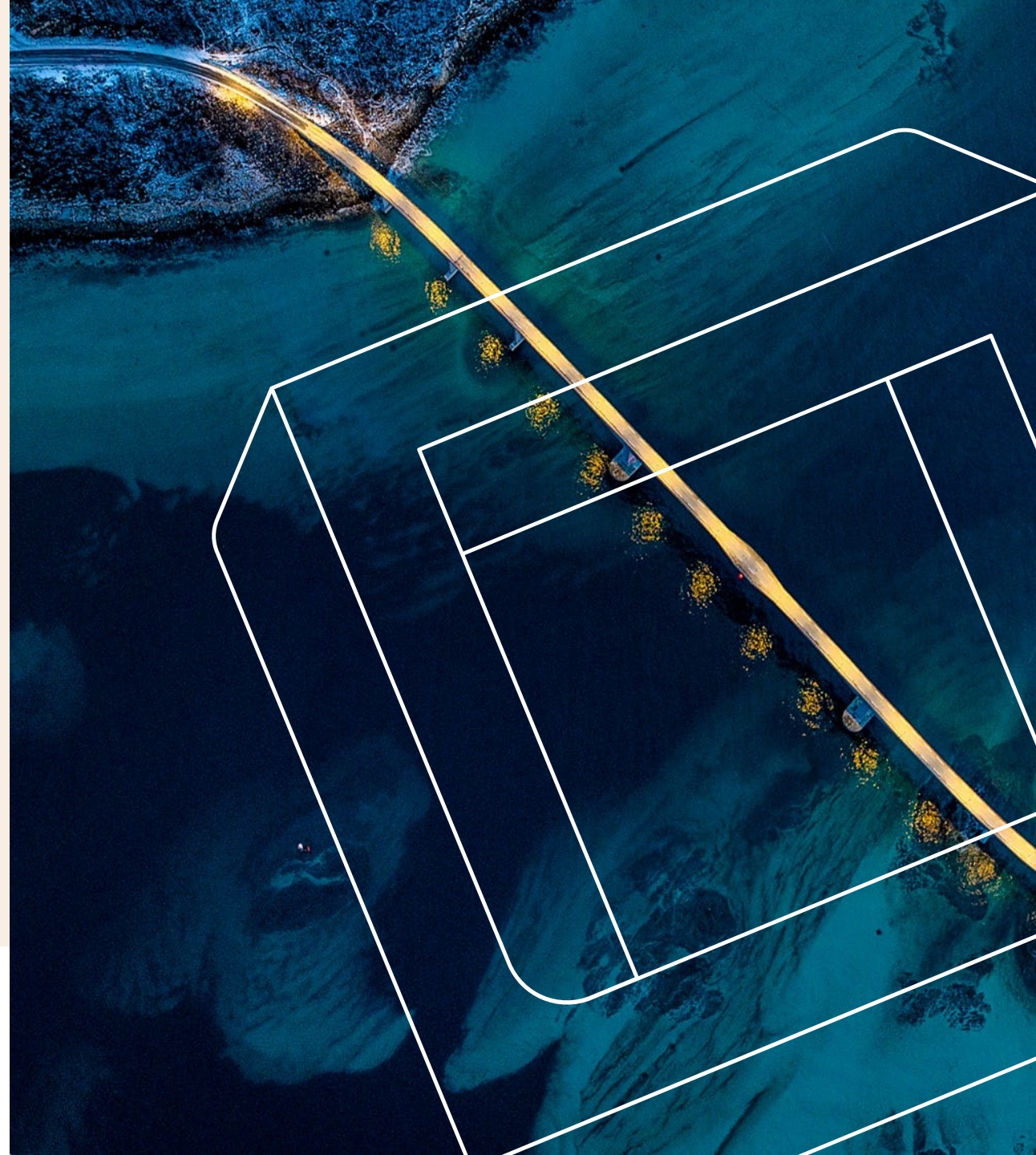
Data weighted for gender & age, education, occupation, industry, and region for each sample separately + **Q18** reduced the difference on key outcome indicators

Training activities in last 12 months organised by company								
<b>% Very often</b>	Probability sample (RDD or PV panel)	Non-probability sample (access panel)	Total	<i>Ease - Frab</i>	<i>Ease - Non-prob</i>	<i>Total</i>	Pearson Chi-square	p-value
	%	%	%	<i>Count</i>	<i>Count</i>	<i>Count</i>		
Training while *not* doing everyday job tasks, eg classroom training	22	27	26	298	602	900	2.527b	0.112
Training while doing everyday job tasks	26	29	28	298	602	900	.922b	0.337

## Weighted for demographics only

Training activities in last 12 months organised by company								
<b>% Very often</b>	Probability sample (RDD or PV panel)	Non-probability sample (access panel)	Total	<i>Ease - Frab</i>	<i>Ease - Non-prob</i>	<i>Total</i>	Pearson Chi-square	p-value
	%	%	%	<i>Count</i>	<i>Count</i>	<i>Count</i>		
Training while *not* doing everyday job tasks, eg classroom training	22	31	28	298	638	936	6.581b	0.010
Training while doing everyday job tasks	26	32	30	298	638	936	2.758b	0.097

# 5. Conclusions



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# Conclusions

1. For most countries, some **differences** were observed in key variables **between the two sample types**, although the magnitude varied across the indicators as well as countries.
  - Respondents on **non-probabilistic panels** appear to be **more extrinsically motivated** and are also more into **programming**.
  - Differences across countries may be explained by **variability in recruitment methods** for **online access panels**
2. **Difference** between sample sources were generally **reduced by including additional variables in the RIM weight**, though not fully removed.
3. **No 'one-size-fits-all'** approach to adjust for differences between sample sources across all countries



# Thank you

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