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Demand and Supply of Blockchain Skills in Europe

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Blockchain Skills Demand

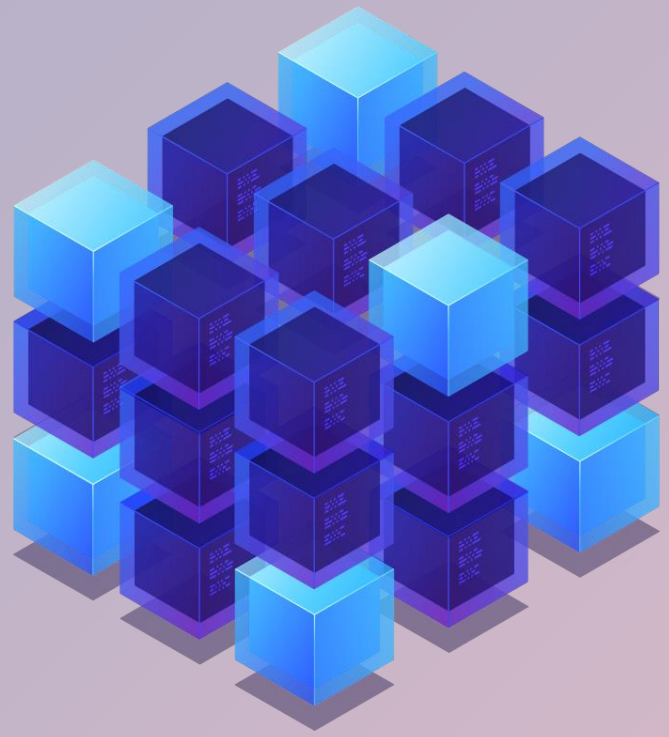
- Blockchain intensive industries: ICT, Financial Services, Gaming
- Recruiters are mostly blockchain service providers
- Blockchain occupations: developers, engineers, managers

- Characteristics of blockchain employees:
  - Typically male
  - Young, average age of under 35
  - Postgraduate education

- Employers want:
  - Do not focus entirely on academic qualifications
  - Professional skills and labour market experience
  - Technical, business and transversal skills

Blockchain Skills Supply

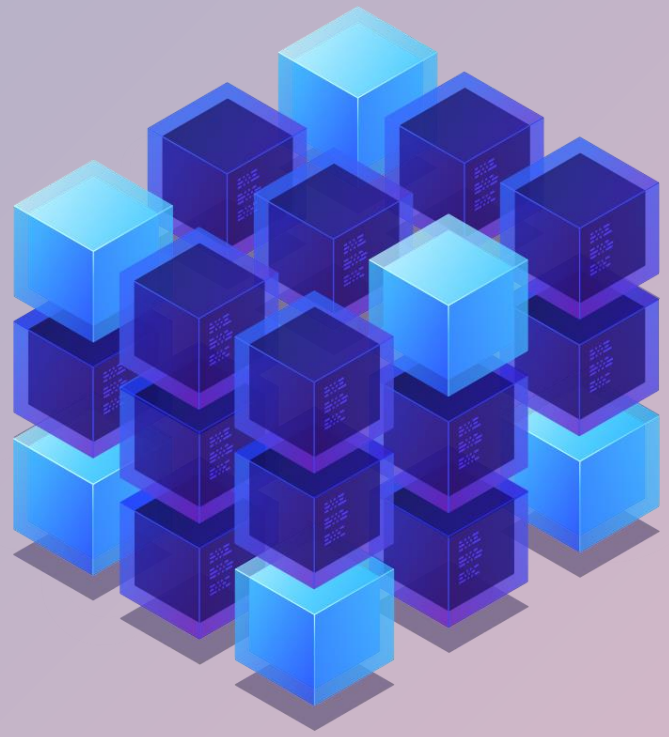
- There are a small number of VET and tertiary programmes and courses in blockchain
- Companies experience difficulties in recruiting qualified staff
  - Current blockchain vacancies (12%) far outstrip vacancy rates for other jobs (EU average 2%)
  - Rely on internal training and e-learning
- Informal education may not be enough to educate and train blockchain experts
  - Formal education providers need to work with the industry to follow latest trends



Blockchain Skills Forecasting

Aim

- To set up a collaborative model for the anticipation of future blockchain skills demand and supply
  - acting as an early warning information mechanism to mitigate possible labour market imbalances, and
  - supporting E&T and labour market actors in making evidence based decisions



Developing the CHAISE Forecasting Model

Forecasting Blockchain Skills Demand

- Innovative method that links demand for blockchain skills to an occupational framework
- Demand data comes from blockchain related jobs advertised on LinkedIn which are then linked automatically to specific occupational (ISCO) categories and verified manually
  - Software developers, Database and network professionals, ICT Service managers, Business services admin managers, Legal professionals
- Blockchain forecasting methodology builds on CEDEFOP occupational and employment forecasts and incorporates EU-LFS to improve the accuracy of our forecasting results

Forecasting Blockchain Skills Supply

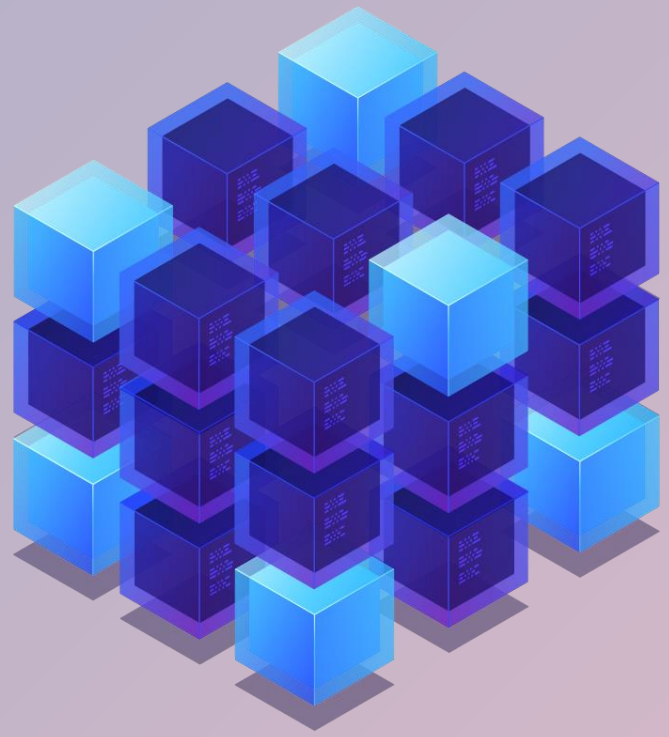
- Utilise graduate information from blockchain related, and where possible blockchain specific, higher education courses across Europe
  - Estimate the proportion of Blockchain graduates from total graduates in blockchain-related fields of study, such as ICT (Eurostat data and information provided by CHAISE consortium)

- Forecast ICT graduates from 2020 - 2026 for each of the EU-27 using linear trends sourced from 2015 - 2019

- CHAISE partners (IE, SI, FR, BE) supplied estimates of Blockchain-specific graduates enabling us to estimate the blockchain-specific share of total ICT graduates at an average of 1.5%

Forecasting Methodology

- This innovative forecasting methodology for blockchain skills supply and demand is fully dynamic
  - When the process is regenerated on annual basis, changes in occupation categories and predictions will allow us to capture changes over time
  - Changes to data gathering techniques and graduate information can be considered for the next forecasting period



Forecasting Results

Distribution of Blockchain Jobs by ISCO Categories

	Ireland		EU-26	
	Freq.	%	Freq.	%
(ISCO 251) Software and Applications Developers and Analysts	155	48%	3,923	58%
(ISCO 133) Information and Communications Technology Services Managers	49	15%	1,008	13%
(ISCO 252) Database and Network Professionals	75	23%	340	5%
(ISCO 121) Business Services and Administration Managers	21	7%	580	10%
(ISCO 261) Legal Professionals	6	2%	41	1%
Other	15	5%	1,014	12%
Total	321	100%	6,906	**100%**

Source: LinkedIn Data, Calculated by Authors

Proportion of Jobs in Each ISCO Category That are Blockchain Jobs

	Ireland	EU-26
	%	%
(ISCO 251) Software and Applications Developers and Analysts	4.3%	4.3%
(ISCO 133) Information and Communications Technology Services Managers	7.4%	6.8%
(ISCO 252) Database and Network Professionals	9.4%	4.6%
(ISCO 121) Business Services and Administration Managers	3.5%	9.4%
(ISCO 261) Legal Professionals	1.1%	2.2%

Note: Data used in the forecast, combination of our estimates and partner reviews

Forecasting Blockchain Skills Demand

Forecasted Blockchain Demand by Blockchain-Relevant ISCO occupations, 2021-2026												
	Software and Applications Developers and Analysts (ISCO 251)		Database and Network Professionals (ISCO 252)		ICT Service Managers (ISCO 133)		Business Services and Administration Managers (ISCO 121)		Legal Professionals (ISCO 261)		Other ISCO Categories	Total Forecasted Additional Blockchain Jobs 2021-2026
Country	Total Demand	Blockchain Demand	Total Demand	Blockchain Demand	Total Demand	Blockchain Demand	Total Demand	Blockchain Demand	Total Demand	Blockchain Demand	Blockchain Demand	
EU Total	219,355	**11,278**	44,854	**1,786**	18,899	**1,352**	152,200	**8,738**	117,893	**1,222**	3,716	**28,092**

- Forecasted Blockchain Jobs in **Ireland: 846**
- Note: 26 EU countries examined. Appropriate data missing from Malta.

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Total ICT Graduates

Total ICT Graduates						
	2015	**2016**	**2017**	**2018**	**2019**	**Increase 2015 to 2019**
Ireland	4,449	4,851	5,275	6,251	6,271	41%
EU-27	105,634	113,557	118,533	124,487	130,264	23%

Source: Eurostat

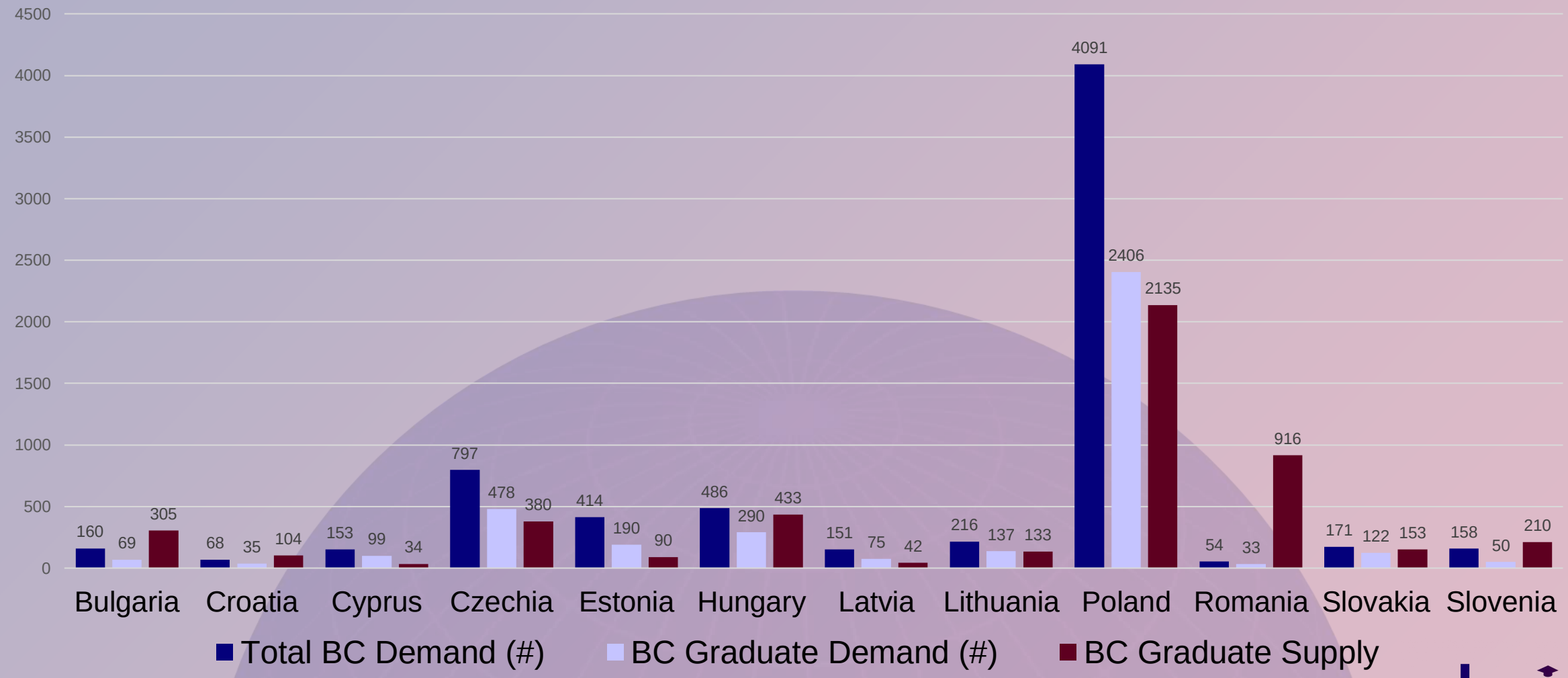
Forecasting Blockchain Skills Supply

Forecasted ICT and Blockchain Graduates by Country, 2020-2026									
Country	2020	2021	2022	2023	2024	2025	2026	Total Forecasted ICT Graduates: 2020 - 2026	Forecasted Blockchain Graduate Supply
Ireland	6,933	7,437	7,941	8,446	8,950	9,455	9,959	59,121	390
EU-27	142,079	147,960	153,845	159,724	165,609	171,488	177,367	1,118,072	14,972

Forecasting Blockchain Skills Supply and Demand: Comparison

Forecast Summary for Demand and Supply, 2020-2026					
Country	Total Blockchain Demand (#)	Blockchain Graduate Demand (%)	Blockchain Graduate Demand (#)	Total ICT Graduate Supply	Blockchain Graduate Supply
Ireland	846	43.90%	371	52,188	390
EU-27	28,092	49.53%	12,966	1,118,072	14,972

Blockchain Skills Demand and Supply Forecasts 2020-2026, Eastern EU Countries



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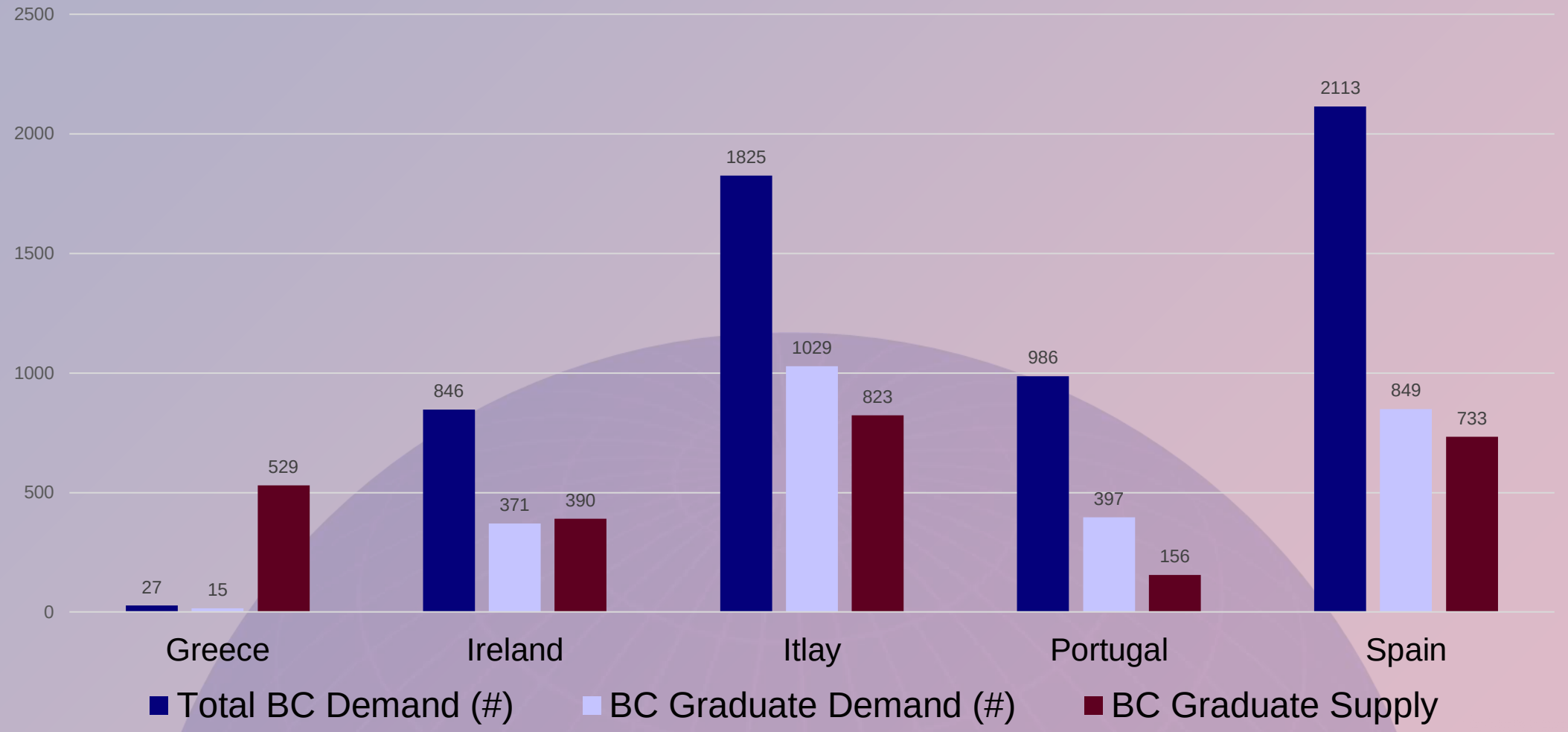
Blockchain Skills Demand and Supply Forecasts 2020-2026, Peripheral EU Countries



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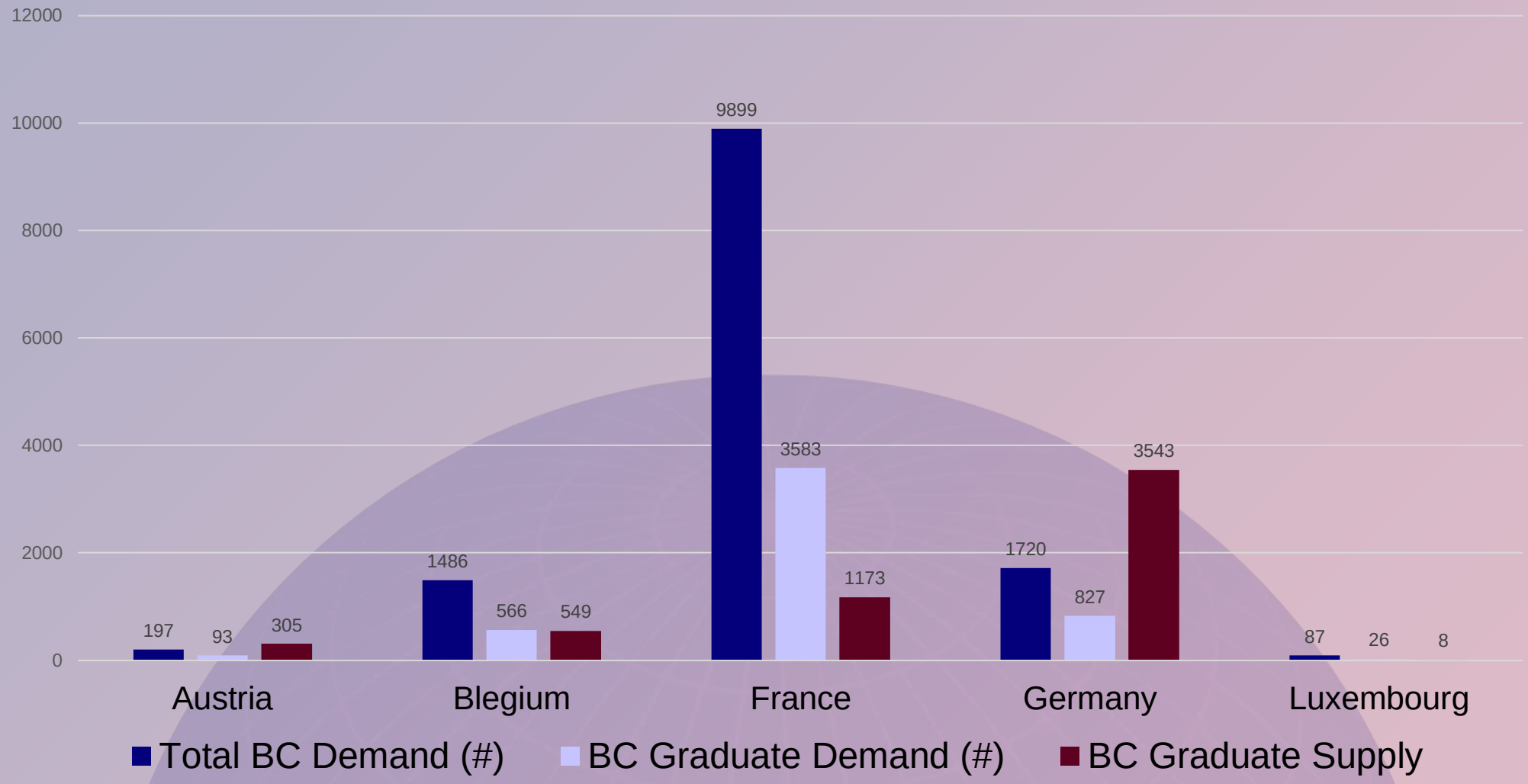
Blockchain Skills Demand and Supply Forecasts 2020-2026, Central EU Countries



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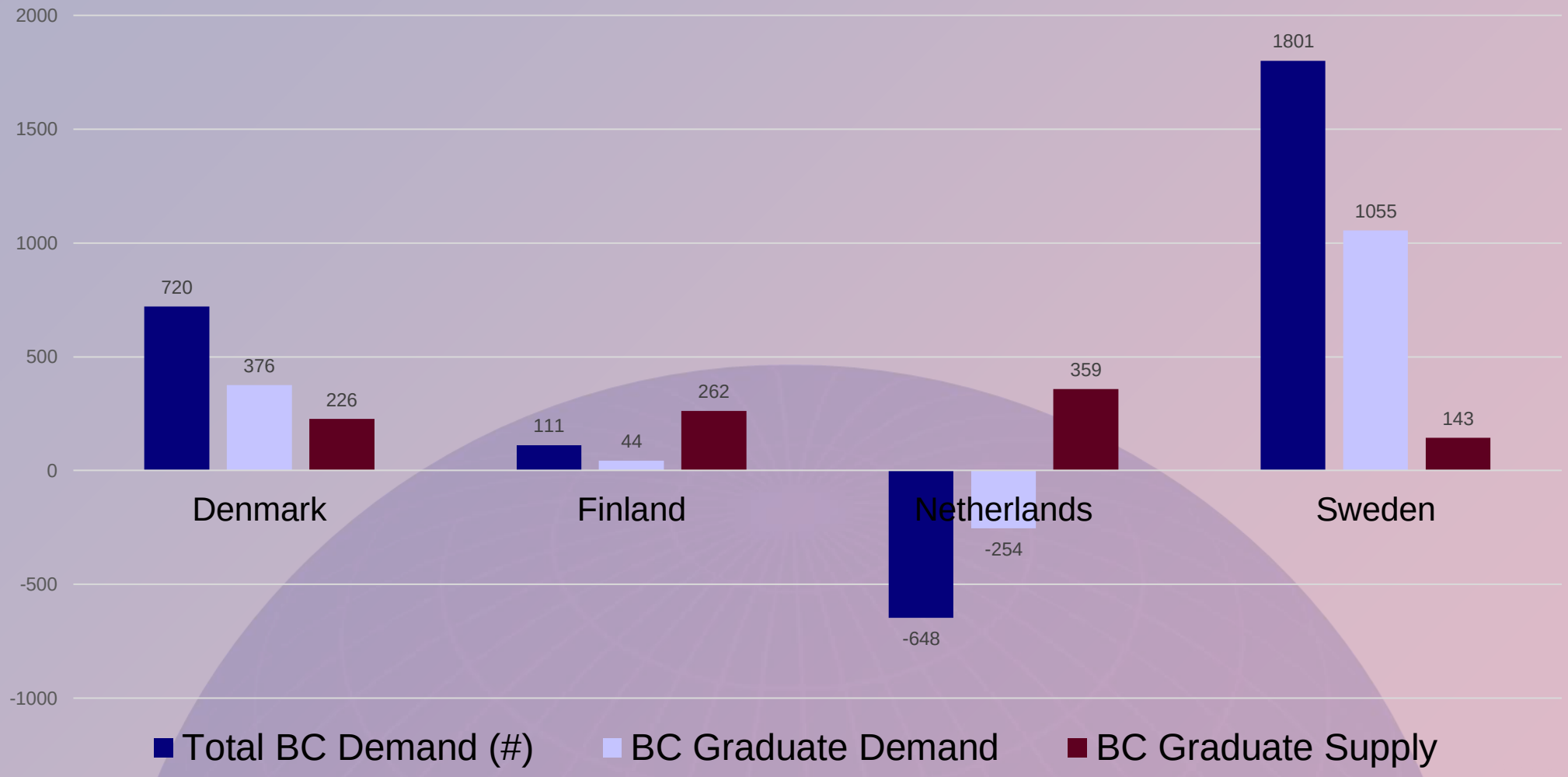
Blockchain Skills Demand and Supply Forecasts 2020-2026, Northern EU Countries



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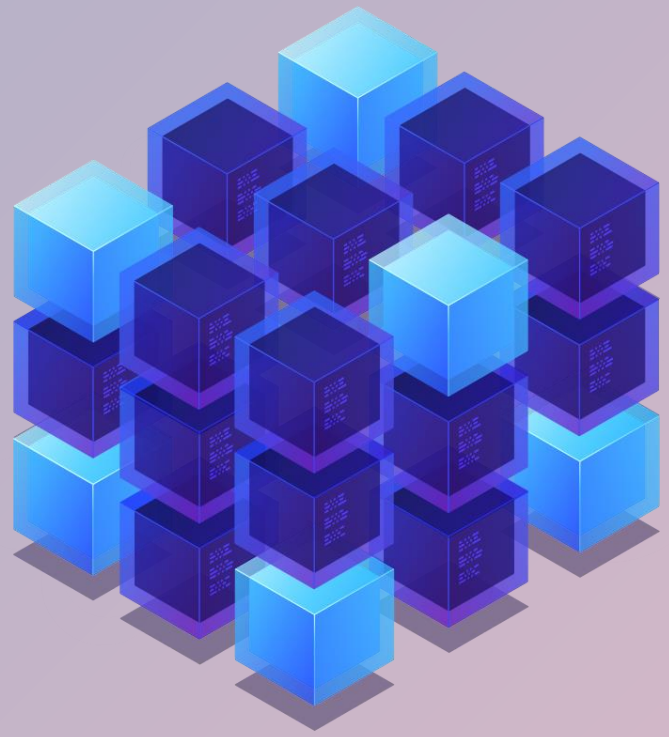


Blockchain Skills Intelligence Gathering

Intelligence Gathering

- Our forecasts of blockchain skills demand and supply are accompanied by detailed examination of current and future Blockchain sectoral development trend, training and education provision, societal, economic and labour market developments

- Over 120 blockchain stakeholders were surveyed (April 2022) and 56 international experts interviewed to validate our forecasting results and provide feedback on our approach

Validation of Forecasting Results

- Survey respondents agree that blockchain related jobs are accurately mapped to ISCO categories **(90%);** LinkedIn is the most appropriate source of blockchain related jobs data **(77%);** new graduates with blockchain skills will come from the ICT and computer science fields of study **(94%)**

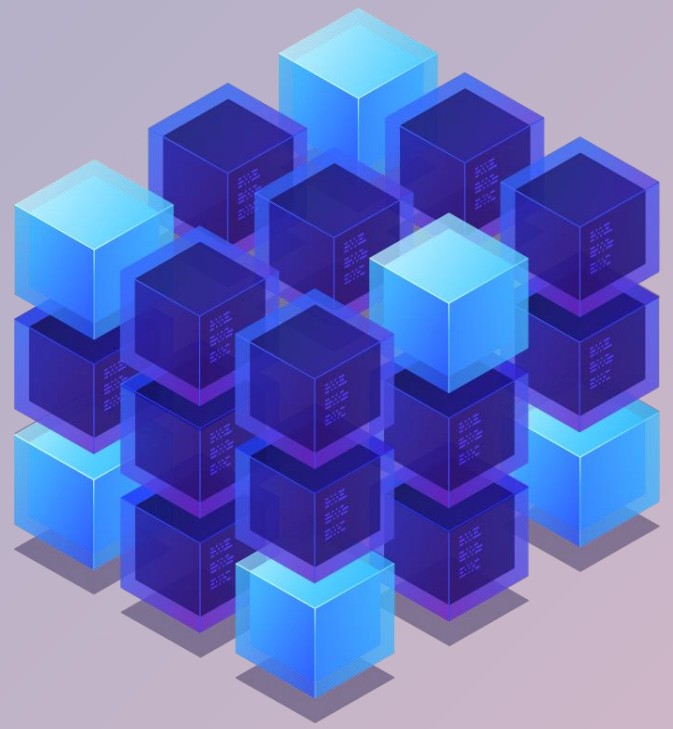
- Approx. 50% of survey respondents were satisfied with forecasting results; 36% thought that 'too low'; and 14% thought that 'too high'

- However, in-depth interviews highlight that:
  - The blockchain sector is still developing and changing so there may be additional sector specific skill needs
  - Demand forecasts may be conservative due to the rapid expansion of the sector
  - The lack of blockchain specific courses across Europe means that it is difficult to forecast the number of blockchain skills supply

Analysis of The Blockchain Labour Market

- The **technical skills** mostly mentioned in Blockchain related online job ads are “Coding”, “Blockchain Solutions Design”, and “Decentralised Application Development”.
- The **business skills** most frequently mentioned in Blockchain related online job ads are “Use Cases development”, “Product Management” and “Product Development”
- The most popular **transversal skills** requested by employers are “cooperation”, “self-determination and autonomy”, and “communication”
- Employers are looking for a combination of technical and non-technical skills in the Blockchain workforce

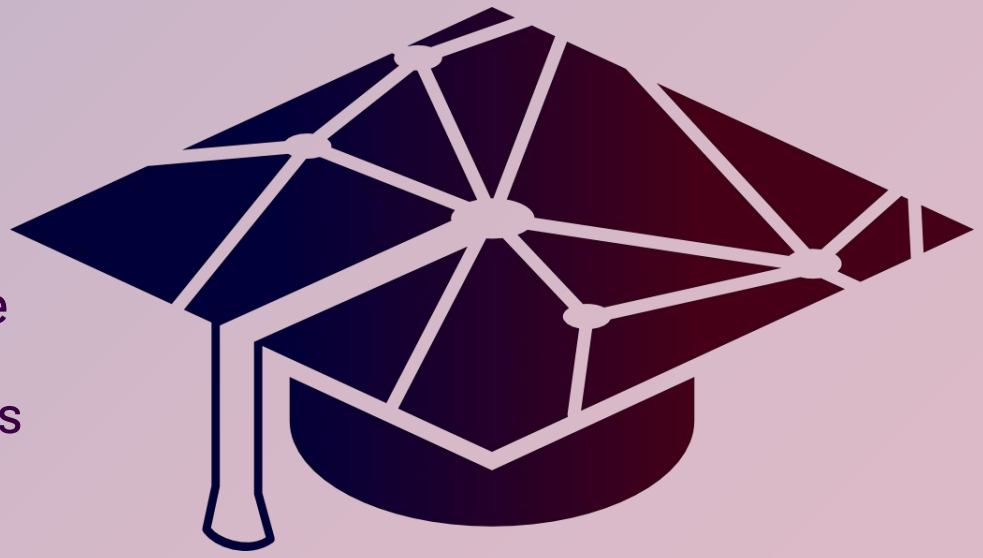
Sectoral Development Trends



- Blockchain technology is used and growing in almost every EU country
- Regulation can accelerate adaptation of blockchain technology
- Strong European Blockchain ecosystem continues to bring together all stakeholders
- The main challenges for the sector include lack of standardisation, privacy and security risks, crime, and misconceptions about the technology

Trends in Education and Training Provision

- Growing demand for Blockchain skills from educators and the jobs market
- Seminars and modules in Blockchain technology are offered to meet this demand
- There are fast and noticeable changes happening in the Blockchain and curriculars need to stay up to date
- Teaching needs to focus technical Blockchain skills as well as business application aspects
- It is important to educate not only developers of Blockchain technology but also users of this technology



Conclusion

- Novel dynamic methodological framework for forecasting demand and supply
- The forecasts are designed to be a key input into any national, or EU level, skills strategies designed to ensure that the growth of blockchain employment is not restricted as a consequence of skill mismatches
- The results indicate that demand for blockchain workers, expressed as a proportion of new jobs, remains quite small in most EU countries (from 0.25% in Sweden to 4.4 % in Croatia in 2021)
- 81% of emerging blockchain jobs are concentrated in just three detailed occupational groups
  - Software and Applications Developers and Analysts
  - Information and Communications Technology Services Managers
  - Business Services and Administration Managers
- The demand for blockchain professionals is likely to remain modest over the 2020 to 2026 period
  - Highest rates of job growth expected in France (9,899), Poland (4,091),Spain (2,113) Italy (1,825), Sweden (1,801) and Germany (1,720).
- The gap between the demand for new blockchain graduates and the supply from universities is not substantial in the vast majority of countries

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Thank you!

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