



**EN RLMM #8/2022**

Frankfurt, 08 November 2022

www.regionallabourmarketmonitoring.net

Dear colleagues,

we had a wonderful and inspiring conference last month.

Thanks to all speakers, moderators, participants and guests in Sardinia and online. We are looking forward to meet you again in 2023.



We had great hosts and guests at this year's Annual Meeting. Our thanks go to the hosts of EURISPES in Sardinia and Rome. They cared very much for us and showed us so many beautiful and interesting sides of Sardinia. We are very grateful for this. Also, we are very happy about the participating guests from the ASEAN states. They quickly became part of the group. We are also very grateful for that and appreciate the many impulses and interesting questions that they have raised. They helped us a lot to broaden our horizons. We are happy to welcome you as permanent network members and we are looking forward for further fruitful cooperation with GIZ.

**CONFERENCE**

Please find attached the program with embedded links on titles or speakers names, where you can find their presentations.

Furthermore the recording of the stream is available at the EURISPES Youtube Channel: <https://www.youtube.com/channel/UCPAb-TIV0tB-KEjdMbla624A>

Or just click on the title of our conference in the attached program.

And there has been some press work after the conference. Please find the press notes here: <https://www.rainews.it/tgr/sardegna/video/2022/10/lintelligenza-artificiale-guida-la-rivoluzione-digitale--97ab64f3-c475-475a-b72f-df4134753af1.html>



### INVITATION TO POTSDAM –ANNUAL MEETING 2023

The transformation into a decarbonized sustainable economy is one of the biggest challenges of our times and is strongly related to the further developments of potentials in regional and local labour markets. Therefore, the topic of the upcoming network meeting in 2023 will be „**Decarbonizing Economies and Structural Change: Two Dimensions for Regional and Local Labour Market Observatories across Europe and Beyond**“. The transformation into decarbonized sustainable economies will influence more or less all branches and a broad range of occupations and competences. Due to that, it is a big challenge for labour market observatories to develop concepts for measuring and analysing the related changes in regional and local labour markets and VET-Systems. While the transformation will influence the economies as a whole, it will lead to specific regional and local structural changes. In some regions mining facilities, energy plants or refineries with high numbers of well paid industrial jobs will be given up. Affected regions are facing the problem to manage the transformation of labour force and competences and labour market observatories should support with monitoring. The conference will take place in **Potsdam on the 27th and 28th of September 2023** and will be a great opportunity to discuss about these important themes and we invite you to take part in that exchange. The meeting will be organised by the Brandenburg Economic Development Agency (WFBB) and IWAK in cooperation with the OECD LEED Program. In the next weeks we will send you a call for the upcoming anthology.

### ASEAN MEMBER STATES IN NEED OF BUILDING EFFECTIVE LABOUR MARKET INFORMATION SYSTEMS AND SEEKING FOR KNOWLEDGE AND PRACTICAL EXPERIENCE FROM EUROPE

Organised by GIZs regional project RECOTVET, a delegation of government officials from seven ASEAN member countries (Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, the Philippines, and Viet Nam) conducted a study tour in Europe from 10 to 19 October 2022 to study state-of-the-art knowledge about LMIS from different European countries. In the course of the study tour the delegation attended the 17th Annual Meeting of the European Network on Regional Labour Market Monitoring (EN RLMM) in Tempio Pausania, Italy, from 13 – 14 October.



The topic of this Annual Meeting 2022 “The Relevance of Artificial Intelligence in the Digital and Green Transformation of Regional and Local Labour Markets across Europe. Perspectives on Employment, Training, Placement and Social Inclusion”, the working model and lessons learned about EN RLMM gained a lot of interest and appreciation from the ASEAN delegates. Many participants expressed their need to join the EN RLMM as the members to learn more about practical experiences and technical expertise about different topics that the EN RLMM has been working on for years. Some others raised their wishes to set up a similar network in ASEAN as well as to have collaboration with EN RLMM on relevant topics in near future.

#### **SCIENTIFIC COMMITTEE – PERSONNEL CHANGES**

Aline Valette, who was a member of the Scientific Committee for several years, left the network due to a change of jobs. At the Scientific Committee meeting on October 14, Marco Ricceri, as Head of the Scientific Committee, thanked Aline for her work in the Scientific Committee. She will be succeeded as Céreq representative by Matteo Sgarzi (France). Dr Aleksandra Webb, School of Business and Creative Industries, University of the West of Scotland (United Kingdom) also took part as a new member in the meeting of the Scientific Committee. Marco Ricceri welcomed the two new members and thanked them for their willingness to support the work of the Scientific Committee.

#### **EXTENSION OF THE TEMPORARY SUSPENSION OF NETWORK MEMBERS IN ORGANISATIONS IN RUSSIA BY ANOTHER SIX MONTHS**

Viewing the fact that the situation concerning the war of Russia against Ukraine has not improved, the Scientific Committee has extended the temporary suspension of network members in organisations in Russia by further six months. The Scientific Committee will carry out a new assessment of the situation at the end of March 2023.

#### **JOINT PROJECTS OF NETWORK MEMBERS**

At the Annual Meeting in Tempio Pausania, various network members showed interest in applying for and carrying out joint European/international projects. Members who would like to apply for a tender and are still looking for partners from the network can get support from the network coordinator Christa Larsen.



### **BIG DATA KNOWLEDGE HUB - ONLINE SEMINAR ON 24th November – 13:00- 14:30**

The Big Data Working Group from the EN RLMM European Network is pleased to invite you to participate in the third online seminar of the series "**Seminars of the Big Data Knowledge Hub**". This session will be dedicated to a study that our Italian partners are conducting from CRISP Research Centre and University of Milano - Bicocca. The seminar is scheduled for **Thursday November 24, 2022, 1.00 - 2.30 pm** (CET) and has the following title: "**Skills mismatch across EU countries using job ads and survey data at the micro-level**". The aim of the initiative is to offer an opportunity to deepen the network members' knowledge on how to use Big Data for labour market research and consulting by presenting practical cases and demonstrations. The presentation will be delivered by **Francesco Trentini**, and **Lorenzo Malandri** will comment the experience.

The online seminar will be held in English. To participate, please register in advance by providing your basic information (name, organisation and email): [https://teams.microsoft.com/registration/6xVauF8dnkST2Hepy6UAEw,-8xAfjVAIUOTJKHO3vYNyQ,yutJ3-hvbk6fRB5vsSuU9Q,gjl\\_NKnU20Kjkc2hHAFXBQ,7yGZ3RLjp003NPxHjBJTEA,wv3bjWWaQUWKvQRdDw- QQ?mode=read&tenantId=b85a15eb-1d5f-449e-93d8-77a9cba50013](https://teams.microsoft.com/registration/6xVauF8dnkST2Hepy6UAEw,-8xAfjVAIUOTJKHO3vYNyQ,yutJ3-hvbk6fRB5vsSuU9Q,gjl_NKnU20Kjkc2hHAFXBQ,7yGZ3RLjp003NPxHjBJTEA,wv3bjWWaQUWKvQRdDw- QQ?mode=read&tenantId=b85a15eb-1d5f-449e-93d8-77a9cba50013)

The Speaker of the ENRLMM Big Data Working Group is available for any further information both in reference to the event and to the registration and access methods. Eugenia Atin, Tl. +34 688 809 708, E-mail: [e.atin@prospektiker.es](mailto:e.atin@prospektiker.es)

### **CALL FOR CONTRIBUTIONS FOR THE BIG DATA KNOWLEDGE HUB**

**The Big Data Knowledge Hub** is the place where all the members of the EN RLMM can look for guidance when aiming to use big data in their labour market monitoring projects. It is an easy and accessible source of information on the techniques used by other reference labour market observatories for a particular topic or challenge.

This is an **invitation** for all Network members to upload and share their Big Data and Artificial Intelligence related projects and experiences through this platform. To do so, please register in the **Hub** <https://bigdatahub.uvt.ro/> and then **add your resource** to the **Knowledge Library**. You will be asked to add a title for your project, a description, some keywords, the kind of big data categories



covered, and you can optionally attach a document. Once approved, your project will be listed here for all members to learn from.

#### **PUBLICATIONS FROM NETWORK MEMBERS**

Please find attached the latest report on AI diffusion in UK from Lightcast as this affects this year's network topic.

If you wish to spread some interesting activities through our network, just let us know and we integrate this information in the next newsletter.

With warm regards,

Marco, Christa, Ida & Jenny & the EN RLMM Team

#### References

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##### **Dr. Christa Larsen**

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*European Network on Regional Labour Market Monitoring*

**17th Annual Meeting of the  
European Network on Regional Labour Market Monitoring  
(EN RLMM)**

**The Relevance of Artificial Intelligence in the Digital and Green  
Transformation of Regional and Local Labour Markets Across  
Europe. Perspectives on Employment, Training, Placement, and  
Social Inclusion**

**13-14 October 2022  
Tempio Pausania (SS) - Italy**

**Conference hosted by EURISPES, Roma, Italy  
and  
IWAK of the Goethe University Frankfurt am Main, Germany**



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l'Istituto di Ricerca  
degli italiani**



**IWAK**

Institut für Wirtschaft, Arbeit und Kultur



Dear colleagues, friends, supporters of the European Network on Regional Labour Market Monitoring (EN RLMM),

In welcoming the participants in the XVII Annual Meeting in Tempio Pausania (2022), I want to remind that when in 2006 we received the invitation to participate in the first conference on regional labour markets in Europe, promoted by the IWAK Institute of the Goethe-University of Frankfurt a.M, in Germany, our Institute did not hesitate to join such initiative. This was due to the high competence of the promoters and the strategic vision they presented: analysing and evaluating the characteristics of regional and local labour markets, promoting their connection by helping to overcome the limits of an excessively fragmented European situation, working towards the construction of a single European labour market, as an essential complementary structure to the wider European single market.

On behalf of EURISPES I want to thank, first of all, the German friends who in all these years have maintained their faith and worked consistently according to this strategic vision, making a European network grow, which has become a model of interdisciplinary analysis and comparison, Special thanks to its inspirer and founder, Professor Alfons Schmid who has been a permanent member of the EURISPES Scientific Committee since 2007, to Dr Christa Larsen, coordinator of the Network, to the representatives of the international and European institutions who have always accompanied this important initiative, to all the collaborators who have worked for the best organisation of this event.

An element is to underline: the EN RLMM, precisely because the originality and quality of its approach, has often anticipated in its analysis the topics destined to assume great relevance in the European debate over time, as clearly emerges, for example, in the various editions of the the "Anthology", the annual publication of the Network. Also on this occasion of the XVII Annual Meeting 2022, the EN RLMM addresses a topic of great relevance for the future structure of our societies, the economic systems and labour activities: the role of Artificial Intelligence with the structural changes it imposes on the organisation and functioning of labour markets, in terms of employment, training and social inclusion perspectives.

We are all faced with a scenario in which a new system of conditionality and opportunities is emerging, a situation that requires in-depth analysis and comparisons and the search for those elements that can guide these processes in the construction of a "Good Society".

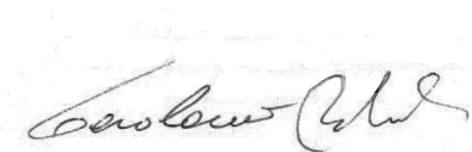


Professor Gian Maria Fara

EURISPES President

It is a great honor for all of us to host researchers, academics, representatives of public institutions, partners of the European Network on Regional Labour Market Monitoring, (EN RLMM) participating in the XVII International Annual Meeting at the EURISPES Sardegna headquarters in Tempio Pausania.

The challenge of the double green and digital transition, aimed at a new development model, more fair and sustainable, requires everyone to seriously deepen our knowledge, profound innovations in our way of operating, the identification of new guiding ideas and practices to be disseminated in our societies, in public and private service systems. The commitment of the international scientific community gathered in Tempio Pausania on the initiative of the EN RLMM constitutes a great stimulus for everyone to operate positively and actively in a scenario full of great tensions. Having created, maintained and consolidated over time this channel of cultural and scientific cooperation is a great value to be protected and supported. The Annual Meeting will also be an opportunity to introduce participants to the quality of this territory which has made great positive contributions to the evolution of our political, economic and social system and which is strongly committed to combining the safeguarding of a millenary tradition. with the profound innovations of this historical phase.



Girolamo Balata  
Director of EURISPES - Sardinia

## Information on registration & setting

The conference will be held in presence in Sardinia. We ask you to register upfront until the **19<sup>th</sup> September 2022**.

To fill out the registration you will need the following data:

- E-mail
- Name
- Surname
- Title
- Organisation

**For registration please click [here](#).**

As soon as the programme is finalised in all details, we will send you the form to **register for the Working Groups**. Only one selection per day will be possible. For further information on currently confirmed workshops **please see the pages 10 and 14**.

Please be aware that **the time settings of the program are in the CET format**. You will receive the final version of the conference programme some time before the event. If you have any questions please contact **Dr Ida Nicotera (Phone: +39 348 9354982; e-mail: idanicotera@gmail.com)**, **Dr Jenny Kipper (Phone: +49 6101 5028708; e-mail: jenny@jennykipper.de)** or **Dr Wilma Mavuli (Phone: +39 349 2902263; e-mail: segreteriaeurispesardegna@gmail.com)**

We are looking forward to meet you all in October!

**The conference language is English.**  
**The participation is free of charge.**





**EN RLMM**

The European Network on Regional Labour Market Monitoring (EN RLMM) focuses on innovative approaches for the monitoring of labour markets in regions and localities across Europe.

Through various activities involving the publishing of Anthologies and organising meetings, it seeks to further the concepts and instruments in regional and local labour market monitoring and to diffuse the common methods for research and analysis in this field.

In 2022, the Annual Meeting of the EN RLMM will take place in presence. It will be organised jointly by EURISPES Rome, in Tempio Pausania, Sardinia and the Coordination/Management of the EN RLMM at IWAK from the Goethe University of Frankfurt am Main, Germany.



12 October 2022

### **Big Data Working Group**

Big Data, as a source for data provision in regional and local labour market monitoring, is of growing importance.



The Big Data Working Group prepared a Big Data Knowledge Hub to support network members in applying big data by providing information and practices on methods, quality criteria, areas of application and data sets.

17:30—19:00

#### **BIG DATA WORKING GROUP**

18:30—19:30

#### **Data4Policy Project - Pathways to Using Data for Evidence-Informed Policymaking**

#### **Exchange Open for all Network Members**

Marie-Helen Cymorek, GIZ (Germany)

19:30 – 21:30

#### **Welcome buffet**

13 October 2022

**Observing the Impact of Artificial Intelligence, as Part of Digital Transformation Processes, on Occupations, Skills, Sectors, and Work.**

**Moderation:** Andrew Dean, University of Exeter (England)

09:00 – 09:30 Check in, Informal Welcome, Coffee

09:30 – 10:30

**Opening Words**

Dr Girolamo Balata, EURISPES Sardinia Director (Italy)

Professor Gian Maria Fara, EURISPES President (Italy)

Giovanni Antonio Addis, Mayor of Tempio Pausania (Italy)

Hon. Alessandra Zedda, VP, Regional Government, Sardinia Region Councilor, Employment, Vocational Training, Cooperation and Social Security (Italy)

Hon. Andrea Biancareddu, Councilor, Public Education, Cultural Heritage, Information, Sardinia Region (Italy)

10:30 - 11:00

**Artificial Intelligence and Local Labour Markets**

**State of the Art Observations from the EN RLMM**

Dr Christa Larsen, IWAK-Goethe University Frankfurt a. M. (Germany)

11:00 – 11:50

**Catching the Skill Transformation Using Big Data and AI: A novel Change Index to Observe how Italian Labour Market has been Changing Through Time**

Professor Mario Mezzanzanica, University of Milano-Bicocca (Italy)

**The Relevance of AI in the Digital Transformation of Regional and Local Labour Markets across Europe**

Duncan Brown, LIGHTCAST (USA)

**Discussion**

11:50 - 12:10 Coffee Break

12:10 – 12:45

**AI and Digital Innovation in Arts and Cultural Sector: Technology, Sustainability, and new Creative Jobs. Are we ready?**

Dr Aleksandra Webb, School of Business and Creative Industries, University of the West of Scotland (United Kingdom)

**Discussion**

12:45 – 14:00 Lunch Break

14:00 – 15:20

**Parallel Working Groups**

**WG1:** Critical Perspectives on AI

**WG2:** Further Methodological Approaches on AI Development

15:20 – 15:40 Coffee Break

15:40 – 16:00

**Conclusions on Working Groups**

16:00 – 16:30

**Report of the Big Data Working Group**

16:30 – 16:45

**Closing Words Day One and Invitation to the Annual Conference in 2023**

Angelo Caliendo, Member, Board of Directors of the EURISPES, Head of Legal Affairs (Italy)

Daniel Porep, WFBB - Wirtschaftsförderung Brandenburg (Germany)

16:45 – 17:00

**Look ahead to the Evening Event**

19:00

**OFFICIAL DINNER (with a visit to the prehistoric site of Nuraghe, located close to the restaurant)**

## Overview of the Working Groups on 13 October 2022

### Working Group 1 - Critical Perspectives on AI

#### Critical Perspectives on Chances and Risks of Digital Transformation and AI

Professor Renato Fontana, Sapienza – University of Rome (Italy)

Dr Ernesto Dario Calò, Sapienza – University of Rome (Italy)

#### AI as Black Box

Daniel Porep, WFBB - Wirtschaftsförderung Brandenburg (Germany)

#### Moderation:

Dr Ernesto Dario Calò, Sapienza – University of Rome (Italy)

### Working Group 2 - Further Methodological Approaches on AI Development

#### Linking the Labour Force Survey to Registered Job Seekers: New Insights on limited Labour Market Slack from the Netherlands.

Dr Michel van Smoorenburg, UWV (Netherlands)

#### Analysis of Job Seekers' Perceptions and Attitudes Using AI

Professor Ciprian Pânzaru, West University of Timisoara (Romania)

#### Moderation:

Dr Michel van Smoorenburg, UWV (Netherlands)

14 October 2022

## Developing skills supported by Artificial Intelligence to adapt to changes caused by Artificial Intelligence in the context of life-long-learning.

**Moderation:** Christian Müller, SECO - State Secretariat for Economic Affairs (Switzerland)

09:00 – 09:30 Check in, Coffee

09:30 – 10:20

### Opening Words

#### The Ethical Perspective on AI – State of the Art of Regulation

Professor Marco Ricceri, EURISPES (Italy)

#### State of the Art

Dr Christa Larsen, IWAK-Goethe University Frankfurt a. M. (Germany)

#### Automation, AI and the Need for Local Adult Learning Strategies

Dr Lukas Kleine-Rüschkamp, Centre for Entrepreneurship, SMEs, Regions and Cities, OECD LEED-Programme (France)

10:20 – 11:20

### Approaching Skills Development for PES

#### The Swiss Case

Dr Moreno Baruffini, Università della Svizzera italiana, IRE - Institute for Economic Research (Switzerland)

Dr Dorit Griga, SECO - State Secretariat for Economic Affairs (Switzerland)

#### The Case of Basque Country

Borja Pulido Orbegozo, Lanbide-Basque Employment Service (Spain)

Maria Leonor Jalon Del Rio, Lanbide-Basque Employment Service (Spain)

## Discussion

11:20 - 11:35 Coffee Break

11:35 – 12:10

### AI— Platform Economy and Skills Development

Iwona Ganko, European Training Foundation (Italy)

Dr Eva Jansova, European Training Foundation (Italy)

## Discussion

12:10– 13:40 Lunch Break

13:40 – 15:10

### Parallel Working Groups

**WG1:** AI in PES

**WG2:** Mainstreaming AI — Role of Regional and Local Labour Market Observatories and Beyond

**WG3:** Current Project from Network Member

15:10 - 15:25 Coffee Break

15:25-15:50

### Plenary Session

15:50 – 16:00

### EC Support for Cross-Border Regional Labour Market Analysis

Ricardo Ferreira, European Commission, REGIO – Border Focal Point (Belgium)

16:00-16:25

### Closing Words

Christa Larsen, EN RLMM Coordinator, IWAK-Goethe University Frankfurt a.M. (Germany)

Professor Marco Ricceri, Head of the Scientific Committee of the EN RLMM, EURISPES (Italy)

16:20 Check out, Informal Good bye

20:00 - 22:00

**CLOSING EVENT: Gastronomic Tour through the main streets of the city. Participants will take part in an evening promenade while enjoying the specialities of typical products from the stalls.**

## Overview of the Working Groups on 14 October 2022

### WG 1: AI in PES

**Managing Current and Prospective Challenges. Open Discussion Group**

**Facilitator:**

Dr Christa Larsen, IWAK-Goethe University Frankfurt a. M. (Germany)

### WG 2: Mainstreaming AI — Role of Regional and Local Labour Market Observatories and Beyond

**AI Solutions and Challenges in Modernising the Content and Structures of VET**

Javier Armaolea Juaristi, Lanbide-Basque Employment Service (Spain)

**Moderation:**

Matteo Sgarzi, Céreq (France)

### WG 3: Current Project from Network Member

**Acquiring 'Crisis-Proof' Skills in two sectors: Care and Arts & Culture**

Dr Andrew Dean, University of Exeter (England)

**Moderation:**

Dr Aleksandra Webb, School of Business and Creative Industries, University of the West of Scotland (United Kingdom)

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European Network on Regional Labour Market Monitoring

**Dr Christa Larsen:** Coordinator of the EN RLMM, Managing Director of IWAK

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**For Registration:**

**Please see page 5 or click [HERE](#)**

**The Annual Meeting of the EN RLMM will take place with the kind support of:**



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degli italiani



**IWAK**

Institut für Wirtschaft, Arbeit und Kultur





# Artificial Intelligence in the UK

The relevance of AI in the  
digital transformation of  
the UK labour market

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# Summary of Key Findings

**With the UK Government pledging to make the nation a world leader in AI, and to ensure this growth benefits all sectors and regions, this report uses Lightcast's job postings data to examine demand for AI skills across the UK labour market in terms of how it compares internationally; which industries, regions, and occupations show the most demand for AI skills; and which specific AI skills are most in-demand. The key findings of this research are as follows:**

- 1** Demand for AI, measured by the share of online job postings requesting AI skills, has more than tripled over the last decade in the UK, from approximately 0.3% in 2012 to around 1% in 2021, with demand continuing to grow in the first quarter of 2022.
- 2** The UK is among the leading nations in the world in terms of employer demand for AI skills, but is behind the US in first place, (with 1.3% of all its job postings mentioning AI skills), Sweden (1.3%), and Canada (1.1%).
- 3** Of the job postings requesting AI skills, those relating to Machine Learning have grown the most over the past few years, more than doubling their share of the overall labour market between 2016 and 2020.
- 4** The number of job postings mentioning AI skills increased across all industries from 2015 to 2021, with the highest share being in Information and Communication; Finance and Insurance; and Professional, Scientific, and Technical Activities.
- 5** Of the UK's 12 NUTS 1 areas (nine English regions, Scotland, Wales, and Northern Ireland,) Greater London leads the market for AI skills with 2.2% of all job postings in the capital mentioning them, followed by Northern Ireland (1.0%), and the South East (0.9%).
- 6** The list of local hotspots of AI demand across the nation is dominated by Cambridge, where 2.6% of all job postings mention AI skills, followed by Greater London (2.2%), Oxford (1.9%), Andover (1.6%), and Edinburgh (1.4%).
- 7** The occupation with the highest demand for AI skills over the past decade is Software Developer/Engineer, but a number of other occupations have also seen significant growth in demand, such as Data Scientist and Data Engineer.
- 8** Jobs where AI skills are requested in the employer's job description tend to pay more than the same jobs which don't mention these skills, with an average salary premium of around 20% across all jobs.
- 9** In terms of technical skills associated with AI roles, demand for Python has increased substantially, as has data science, and SQL, whilst in terms of human skills, communication, teamwork/collaboration, and research are among the most in-demand.
- 10** Technical AI skills are often highly transferable across a range of industries with, for example, Python, data science, and software engineering all being highly sought after in sectors as diverse as IT, Mining and Quarrying, Finance, and Manufacturing.



# Introduction

**Across the world, labour markets are facing transformative trends in the skills required of workers across the full spectrum of occupations and industries, with technological change and automation increasing labour market polarisation, while also reshaping the tasks performed in many occupations.**

One of the main catalysts of these trends is the growth in artificial intelligence (AI). Previous analysis has found that demand for AI skills has grown sharply in numerous economies across the world, with the share of job postings calling for these skills having grown five-fold from 2013 to 2020 <sup>1</sup>.

The United Kingdom government has aspirations to make the nation a world leader in AI, and in September 2021 it published a National AI Strategy, laying out “a ten-year plan to make Britain a global AI superpower” <sup>2</sup>. Hailing the UK as being “well placed to lead the world over the next decade as a genuine research and innovation powerhouse,” the report set out three broad aims for AI development:

1. Invest and plan for the long-term needs of the AI ecosystem to continue our leadership as a science and AI superpower;
2. Support the transition to an AI-enabled economy, capturing the benefits of innovation in the UK, and ensuring AI benefits all sectors and regions;
3. Ensure the UK gets the national and international governance of AI technologies right to encourage innovation, investment, and protect the public and our fundamental values.

If these aims are to be realised, they will need to be underpinned by an evidence-based approach to understanding the following questions:

- How does demand for AI skills in the UK compare to other countries?
- Which industries, regions and occupations have the highest demand for AI skills?
- What are most important AI skills currently being requested by employers?

Drawing on our proprietary database of millions of current and historical job postings, the aim of this report is to shed light on these questions, particularly with the following stakeholders in mind:

- **Policymakers** who are seeking to understand how AI has impacted their regional workforces and economic development plan;
- **Employers** who are looking to understand how AI has affected their industry and what skills they should be hiring for to keep up-to-date with market trends;
- **Education providers** who are looking to identify which AI skills they should be including in their courses and modules;
- **Learners** who need to know the skills they should be seeking in training for jobs in AI-related fields.

Alongside this report, we’ve also partnered with the visual data storytellers, **Infogr8**, to create an interactive report which allows users to delve into more detail at the local level to understand how AI is affecting particular labour markets <sup>3</sup>. We hope that this report and the accompanying online report will prove to be a timely and helpful contribution in answering some of the most pressing questions on the demand for AI skills in the UK labour market.

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<sup>1</sup> Daniel Zhang, Saurabh Mishra, Erik Brynjolfsson, John Etchemendy, Deep Ganguli, Barbara Grosz, Terah Lyons, James Manyika, Juan Carlos Niebles, Michael Sellitto, Yoav Shoham, Jack Clark, and Raymond Perrault (2021): The AI Index 2021 Annual Report.

<sup>2</sup> <https://www.gov.uk/government/publications/national-ai-strategy/national-ai-strategy-html-version>

<sup>3</sup> <https://aiskills.lightcast.io/>

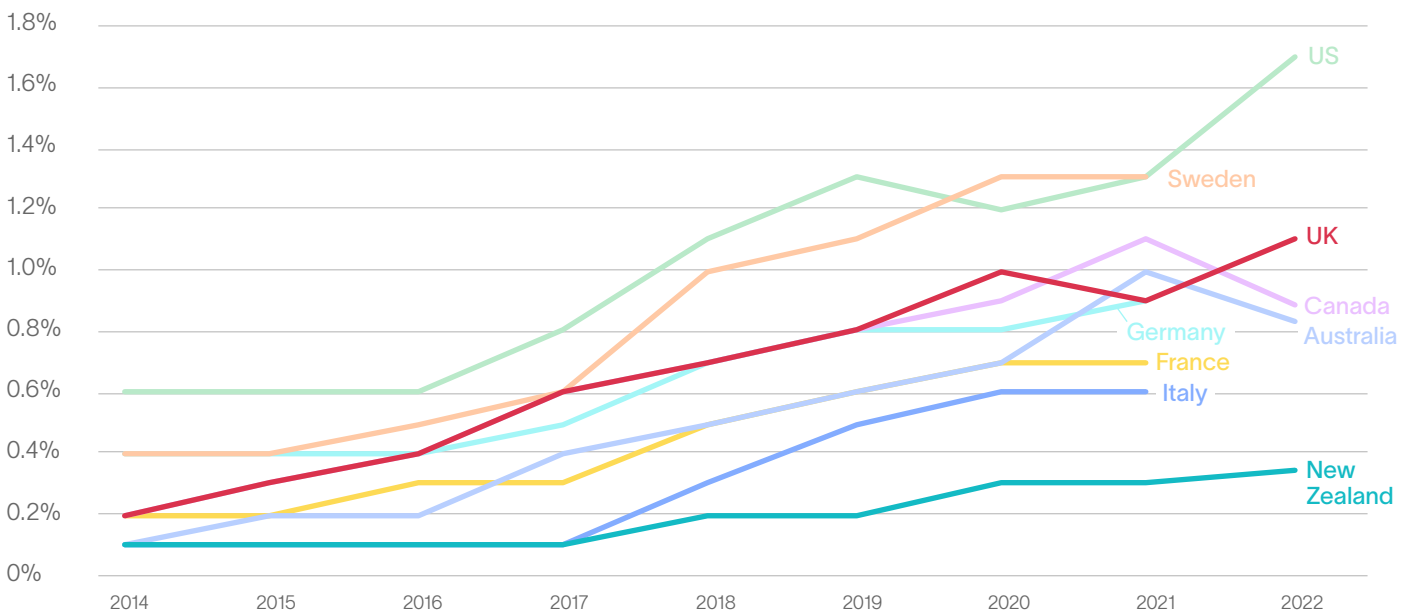
# Overview of AI Diffusion in the UK

We begin by looking at an international comparison of AI adoption, as measured by the share of employer job postings in each country which mention AI skills (see the Appendix for the list of skills we have identified as relating to AI).

In Figure 1, we have included data from six G7 countries, as well as Sweden and New Zealand,

and as you can see employer demand for AI has increased significantly across each of these labour markets over the past decade, with all nine countries seeing their share of postings mentioning AI more than doubling since 2014 (note: the data for 2022 is for the first quarter, and we have this for five of the nine countries).

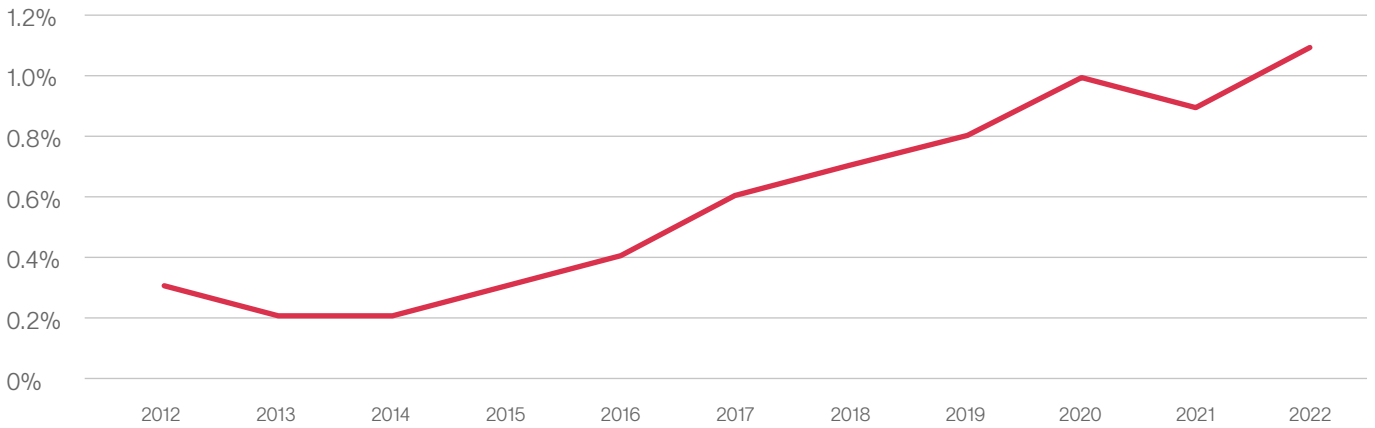
Figure 1: AI Share of Total Postings, by Country, 2014-2021 (and to Q1 of 2022 for five countries)



Of the countries shown, the US leads AI adoption with 1.7% of all job postings mentioning AI skills as a requirement in 2022, with Sweden following at 1.3% in 2021. As far as the UK labour market is concerned, the overall trend is similar to several other European countries, and it is currently third out of the nine shown with 1.1% of job postings mentioning AI skills in the first quarter of 2022.

On the following page, Figure 2 shows the data for the UK by itself going back to 2012, and there we see that over the nine year period the share of AI across all postings has increased threefold from approximately 0.3% in 2012 to close to 1% in 2021, with the upward trend continuing into the first quarter of 2022.

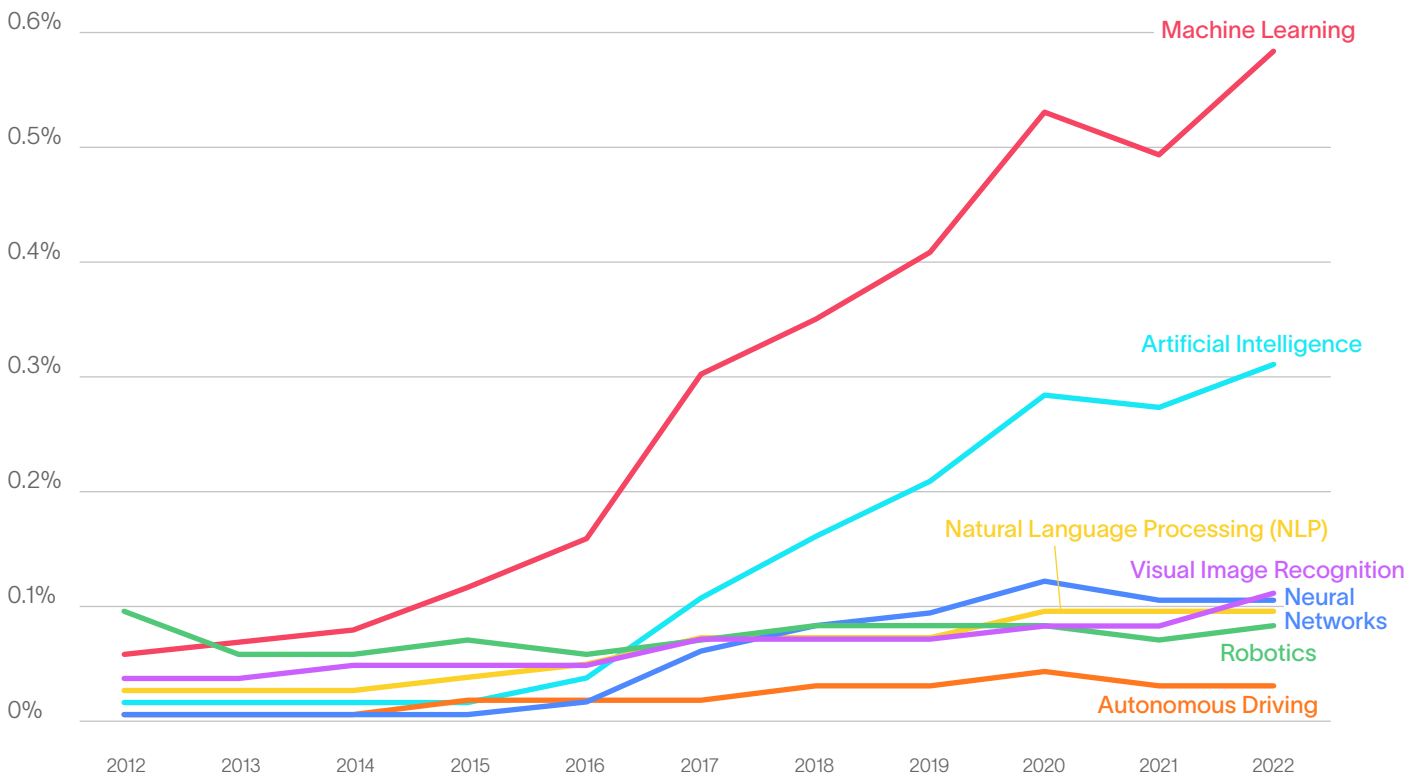
Figure 2: AI Share of Total Postings, UK 2012-Q1 of 2022



There are hundreds of different skills associated with AI in the labour market, and analysing demand for them individually is not particularly helpful in understanding what kinds of skills and technologies are most sought after in the workforce, or how that is changing over time. To make the data more useful in terms of analysing trends, we have grouped skills together into seven 'skills clusters', a complete list of which can be found in the Appendix. For example, rather than looking for demand trends for Speech Recognition and Text Mining, we have grouped them together with more than 20 similar skills under Natural Language Processing (NLP).

Figure 3 shows how demand for these seven clusters has changed since 2012, with job postings mentioning Machine Learning and Artificial Intelligence skills having grown the most, more than doubling their share of the overall labour market between 2016 and 2020. Demand in all areas of AI fell in 2020, perhaps due to the disruption during the Covid-19 crisis, but this may also potentially hint at a saturation of the market, or at a focus in the labour market on status quo job functions and less on innovative positions.

Figure 3: Share of Total Postings by AI Skills Cluster, UK, 2012-Q1 of 2022







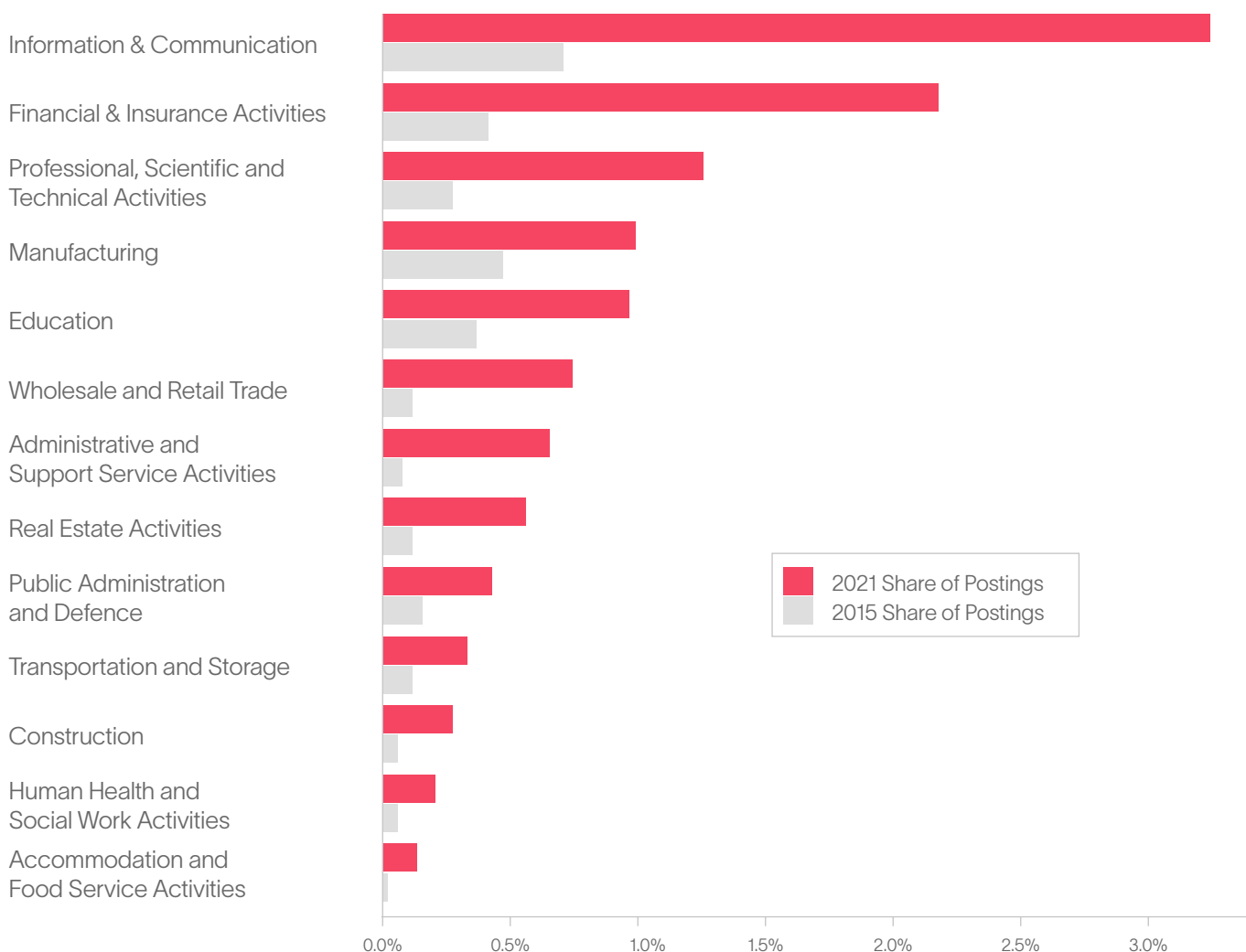
# AI Diffusion by Industry and Region

**In this section, we look at how demand for AI skills differs between industries and regions.**

Figure 4 below shows the change in job postings for AI skills in the UK by sector from 2015 to 2021, using the 2-digit Standard Industry Classification (SIC 2). The data shows that Information and Communication has the highest share of AI, with 3.2% of all job postings relating to this industry referencing AI skills in 2021. This is followed by Finance and Insurance Activities (2.2%), and Professional, Scientific, and Technical Activities (3%).

The increase in the share of AI in industries between 2015 and 2021 illustrates the journey of AI. Almost all sectors have at least doubled their share, with the biggest changes seen in Wholesale and Retail, which had eight times more postings mentioning AI skills in 2021 than in 2015 (from 0.1% to 0.8%), followed by Administrative Support Service Activities with seven times more (from 0.1% to 0.7%). Manufacturing, on the other hand, has seen the slowest rate of growth, slipping from second place in the rankings in 2015 to fourth in 2021.

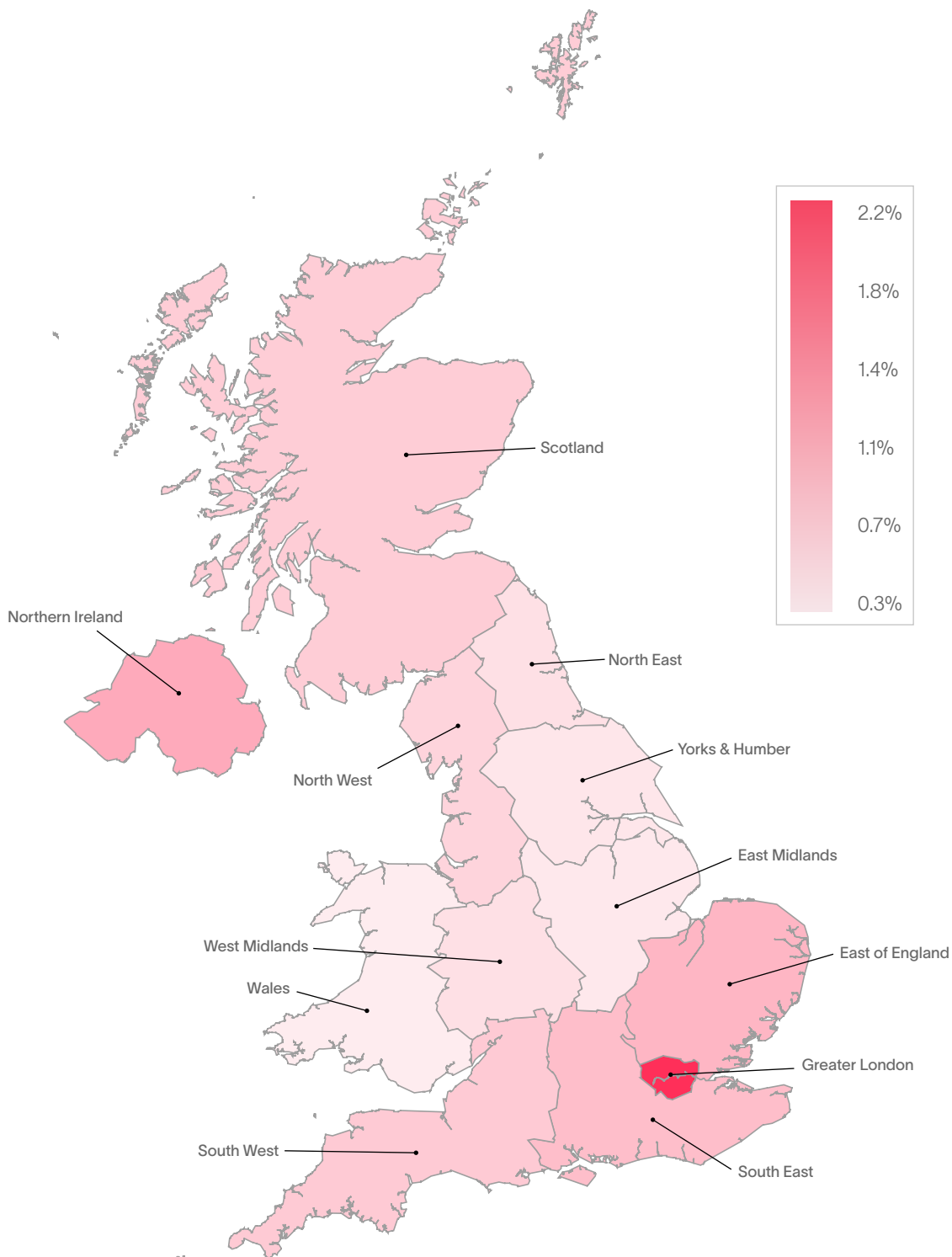
Figure 4: Top AI Industries, 2021 vs 2015



So far, we have looked at AI diffusion from the international and national perspective, but we can also drill down into the data to look at regional variations (please note, the accompanying interactive report, which can be viewed [here](#), includes even more detailed data, down to county level).

As can be seen from the map below, the AI landscape looks fairly similar across the UK, but as we would expect Greater London, with its high concentration of IT and Finance, is dominant with AI skills appearing in 2.2% of all job postings. Far more surprising is that Northern Ireland ranks second, with a share of 1%, which may well be connected to the AI-related research activities at its two universities, Queen's University Belfast and Ulster University.

Figure 5: AI Share of Total Postings (%) across the UK's NUTS 1 areas



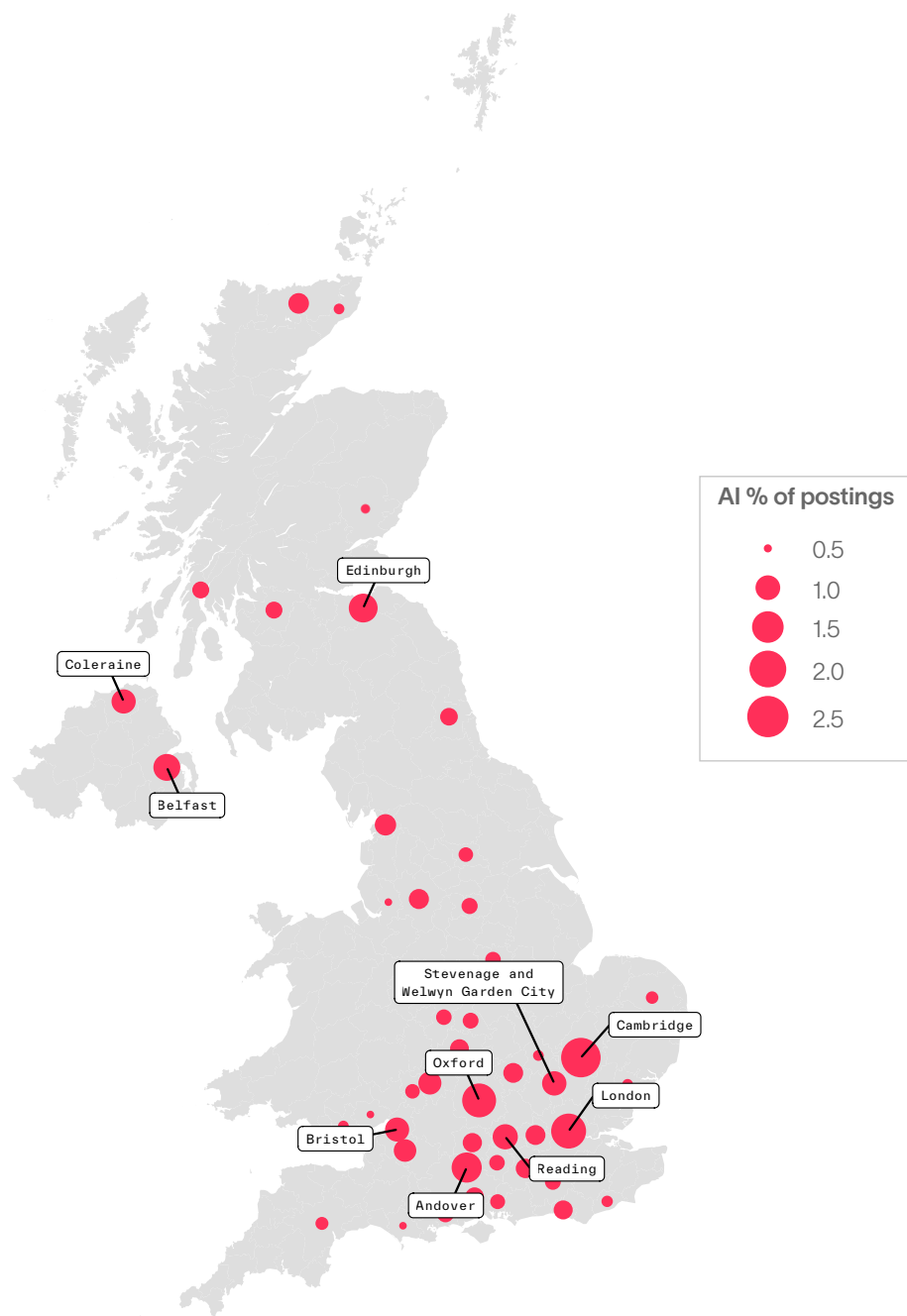


Getting even more granular, we can look at AI diffusion by Travel To Work Areas (TTWA) to reveal local hotspots. The map below shows areas of the country where the share of job postings mentioning AI is 0.5% or above, and the ones which have been labelled are those where the share exceeds 1.0%. Unsurprisingly, Cambridge, with its university, and science park employing over 7,000 people in over 130 companies, tops the list with 2.6% of all job postings mentioning AI skills. There are also a number of other locations that might readily spring to mind when considering where AI jobs are located, such

as London (2.0%), with its vast IT and Finance sectors, and Oxford (1.93%) and Reading (1.14%), both of which have a strong concentration of tech companies.

The data also reveals a number of less obvious locations. For instance, the fourth hotspot in the UK is Andover in Hampshire, which may well be connected to it being the headquarters of the British Army Land Forces, whilst Coleraine in Londonderry – home to the Artificial Intelligence Research Centre at the University of Ulster – comes in at ninth place.

Figure 6: TTWA Hotspots for AI Skills as a Share of Total Postings (%)



# Occupations in the AI Market

**In this section, we analyse the types of occupations that require AI skills, and how the landscape of occupations has changed over time.**

Table 1 lists the top five occupations ranked by AI posting count and by change in rankings since 2012. At the top of the list by a considerable distance is Software Developer/Engineer, which has ranked number 1 since 2012, and which saw almost 18,000 postings in 2021 requesting AI

skills. Next on the list is Data Scientist with over 7,000 postings requesting AI in 2021, followed by Computer System Engineer/Architect jobs (4,849 postings), and Data/Data Mining Analysts (3,778). What is also evident from the data is just how much change there has been over the last decade. Data Scientist, for instance, has moved up 33 places in the rankings since 2012 to reach second place in 2021, whilst Data Engineer has seen an even more dramatic increase having moved up 112 places over that time.

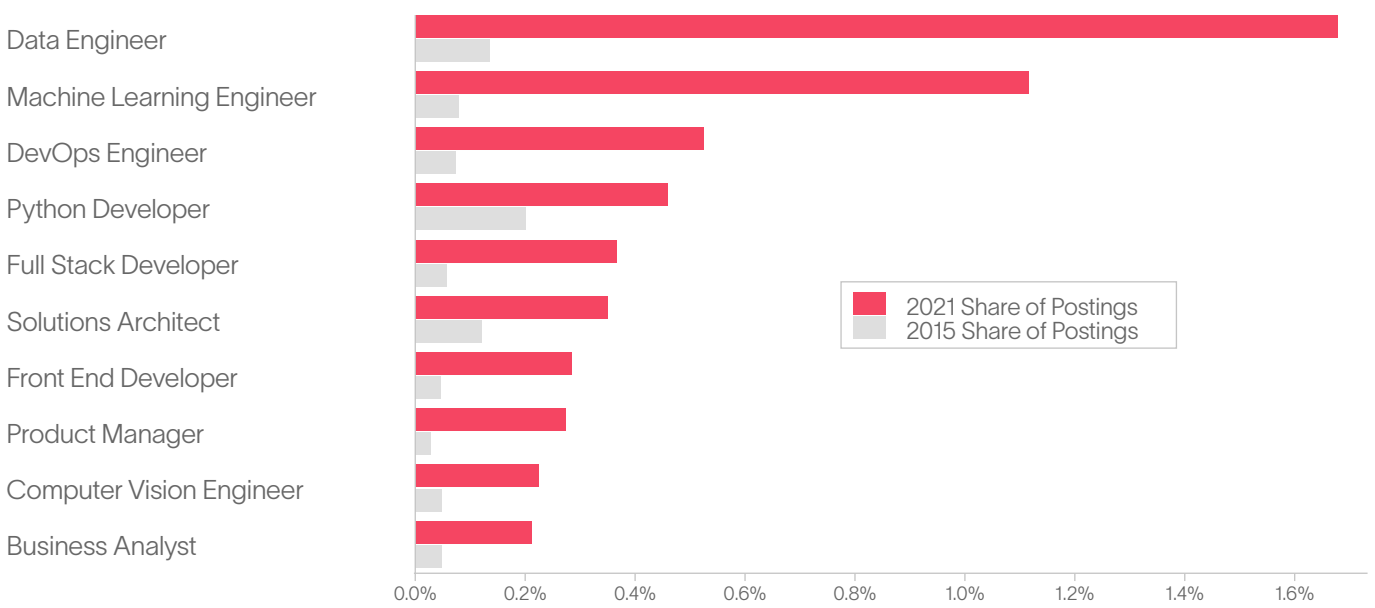
Table 1: Top 5 Occupations Requesting AI Skills in 2021

Occupation	Postings 2021	Rank Change since 2012
Software Developer/Engineer	17,951	0
Data Scientist	7,014	+33
Computer Systems Engineer/Architect	4,849	+11
Data/Data Mining Analyst	3,778	-1
Data Engineer	2,742	+112

As well as looking at occupation groups we can also look at job titles, particularly how the share of postings mentioning AI skills has changed over the past few years. Figure 7 below looks at the top ten job titles that have seen the biggest growth since 2015, and as you can see titles like Data Engineer and Machine Learning Engineer in particular have

moved up significantly in the last six years. Figure 8 on page 12 looks at the opposite end of the spectrum – job titles where mentions of AI skills in job postings have declined over the past few years, and as you can see there have been declines in a number of engineering roles, as well as titles such as Information Analyst and Insight Analyst.

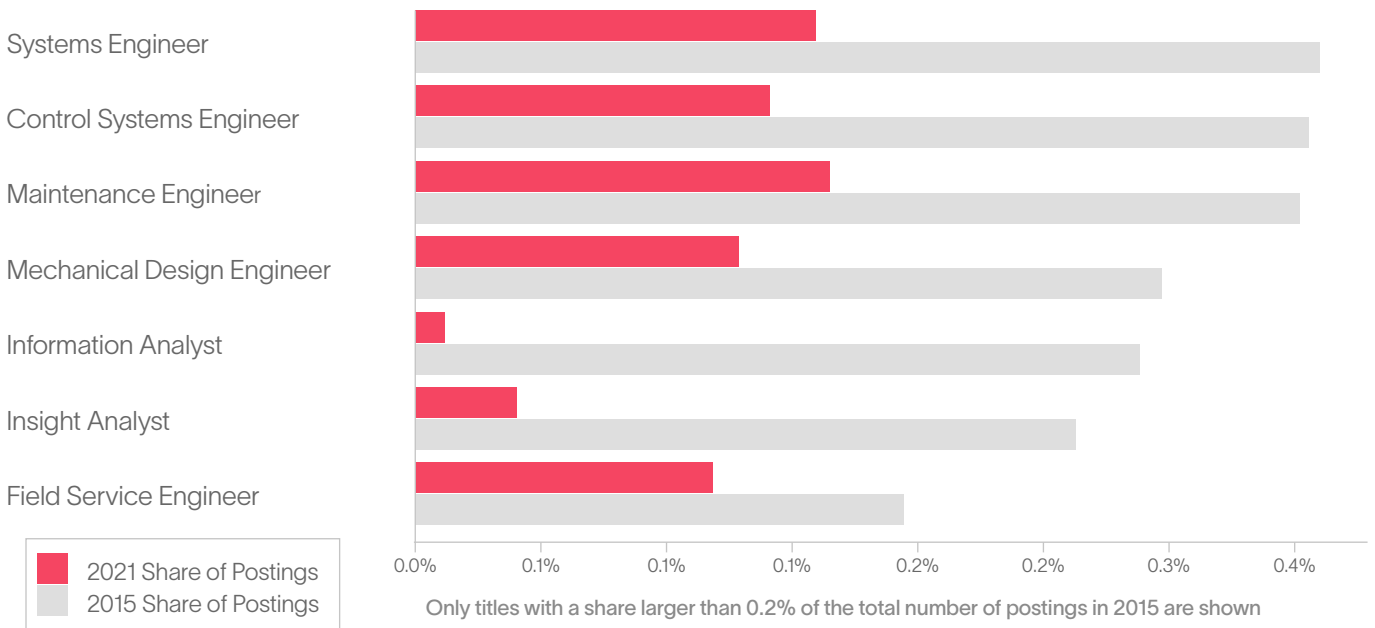
Figure 7: Emerging Titles, 2021 vs 2015



Only titles with a share larger than 0.2% of the total number of postings in 2021 are shown



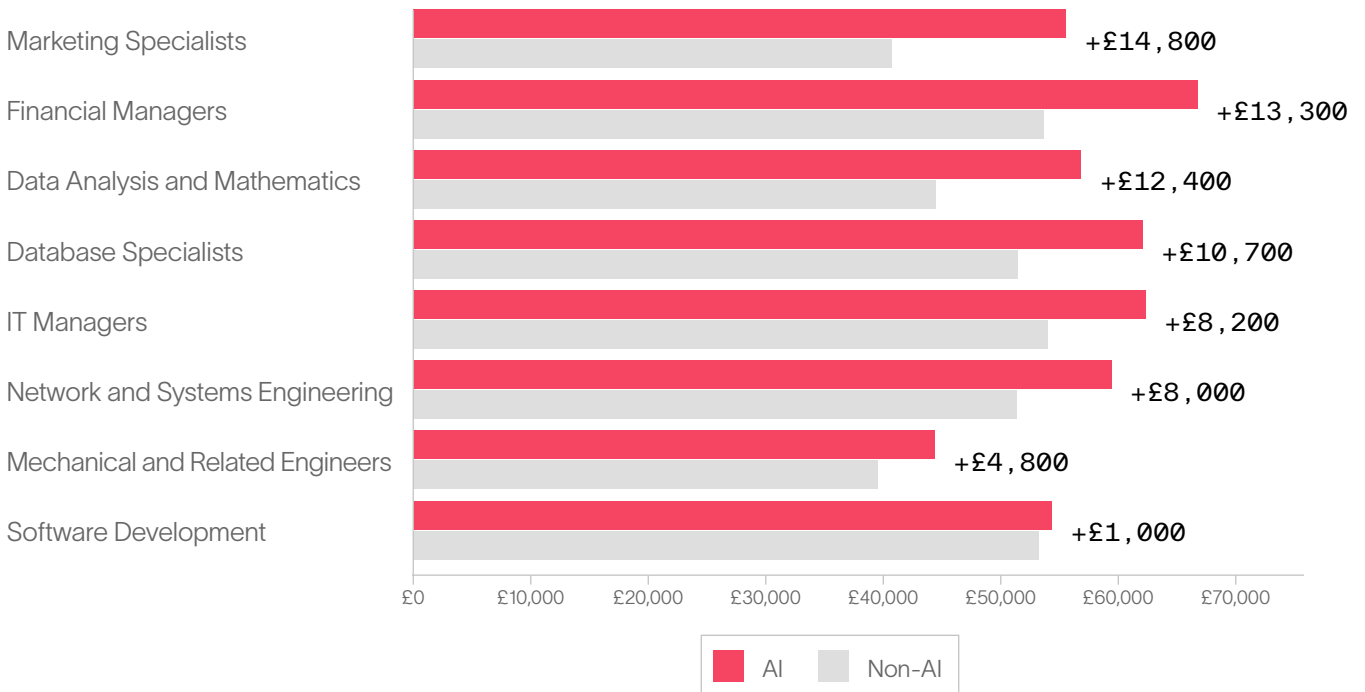
Figure 8: Disappearing Titles, 2021 vs 2015



Finally in this section, we use the data to answer a fascinating question: is there any difference in the amount that job postings mentioning AI pay compared to postings for the same job which don't mention it? The answer is very clearly yes, as Figure 9 shows. In every one of the listed jobs, where AI is mentioned in the job posting the salary

is higher than in those where it is not mentioned. The mark up is, however, clearer in some jobs than others. For example, both Marketing Specialist and Financial Manager roles see a significant pay rise when the job requires AI skills (+£14,800 and +£13,300, respectively). In Software Development jobs, however, the difference is just £1,000.

Figure 9: Salary Premia by Occupation Group, 2021



<sup>4</sup> Occupation group salaries are weighted averages of the occupations in each occupation group. The percentage of postings for each occupation in its occupation group has been used as weights in order to avoid large occupations skewing the group wide average.



# Skills in the AI Market

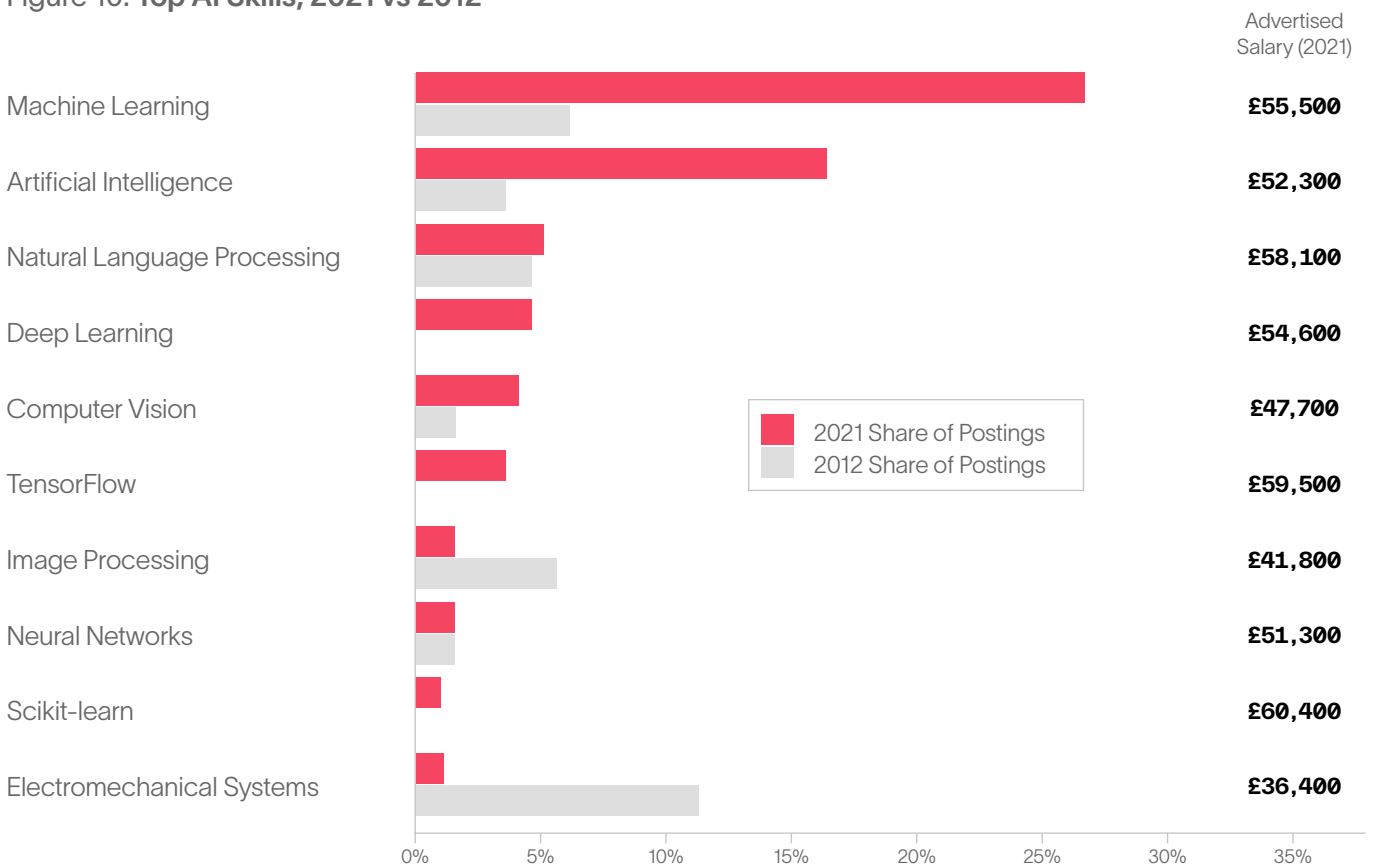
**In this section we examine the skills required by AI jobs to help give us a deeper understanding of what employers are looking for.**

The most commonly requested AI skills that employers specifically ask for are Machine Learning, with around 47,000 postings in 2021 (50% of all AI postings), and Artificial Intelligence, which has 27,000 postings (29%). Several skills like NLP, Computer Vision, Image Processing, and Neural Networks are well established in the Top 10

AI skills. Deep Learning, on the other hand, is an example of a skill that has seen explosive growth in demand, moving up 36 ranks since 2012.

Other skills such as TensorFlow and Scikit-learn have also entered the market in the last few years, and we can see just how valuable they are to employers by the fact that they command the highest advertised salaries of these top skills, at £60,400 and £59,500, respectively.

Figure 10: Top AI Skills, 2021 vs 2012



In addition to actual AI Skills, we can also complete the skill profile for AI jobs by looking at both technical and human skills. Overleaf, Figure 11 shows that Python is the most widely used programming language with around 34,000 job postings in 2021, having grown significantly in popularity over the last ten years, moving up 18

ranks between 2012 and 2021. Figure 12 then shows the top human skills mentioned in AI-related job postings, and as you can see skills such as communication, teamwork, research, problem solving, and creativity are seen as critical parts of being able to perform a job involving AI.

Figure 11: Top Technical Skills, 2021 vs 2012

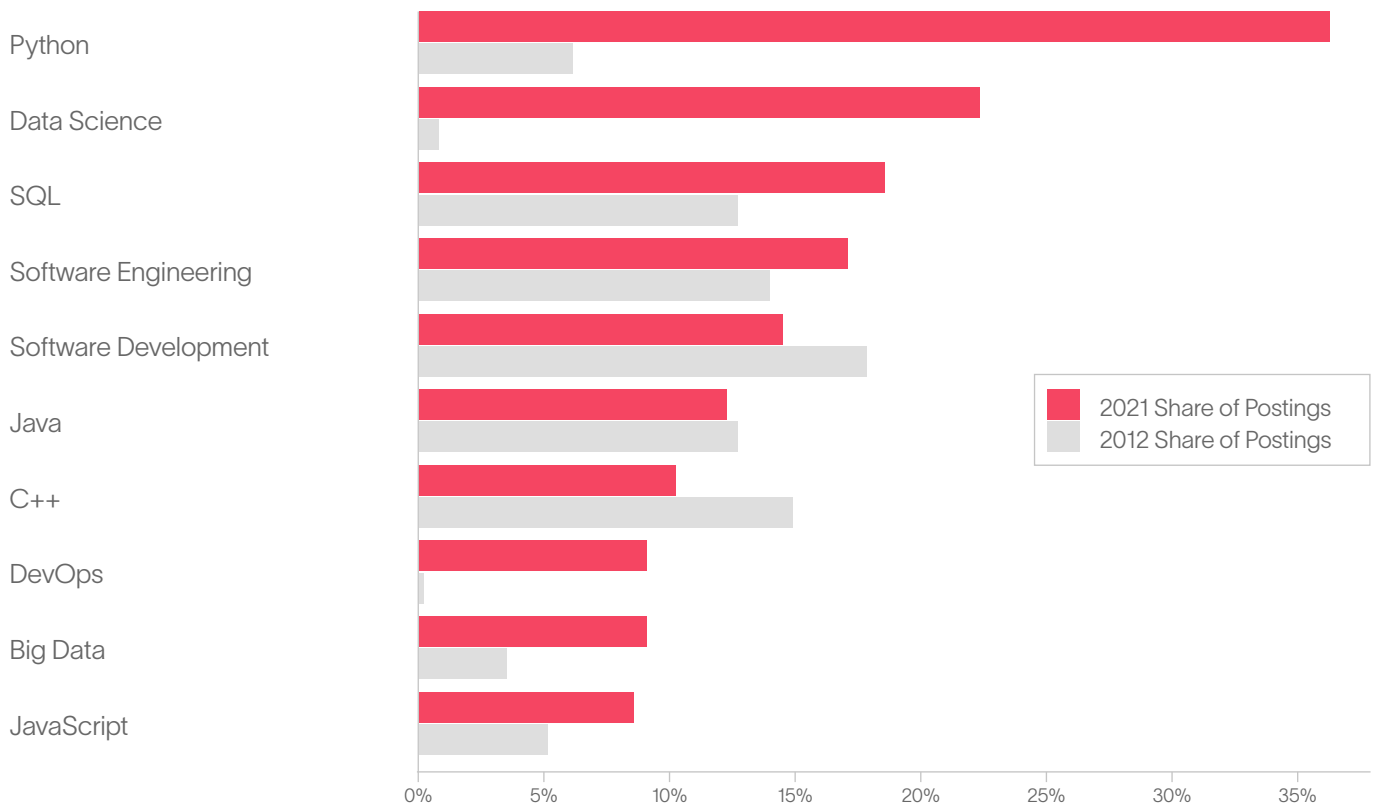
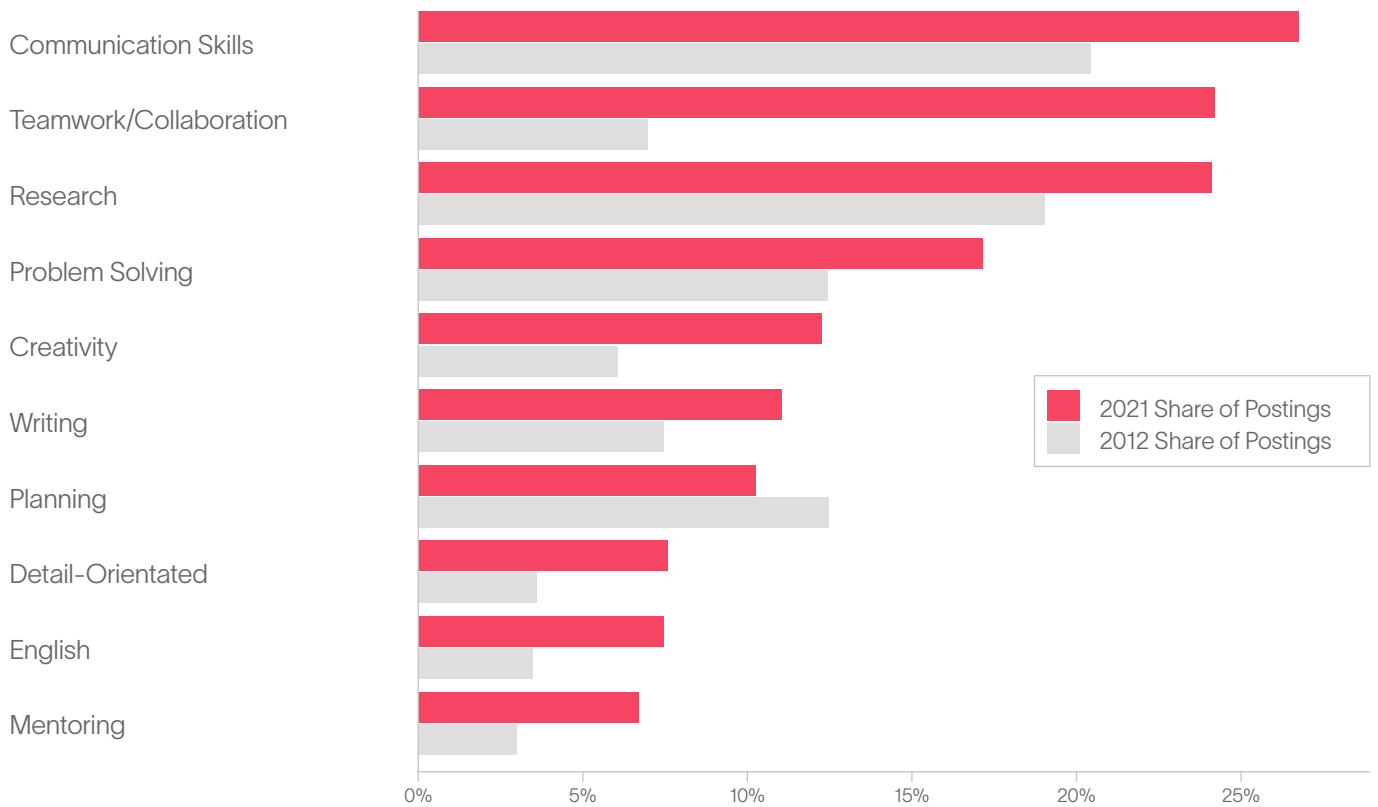


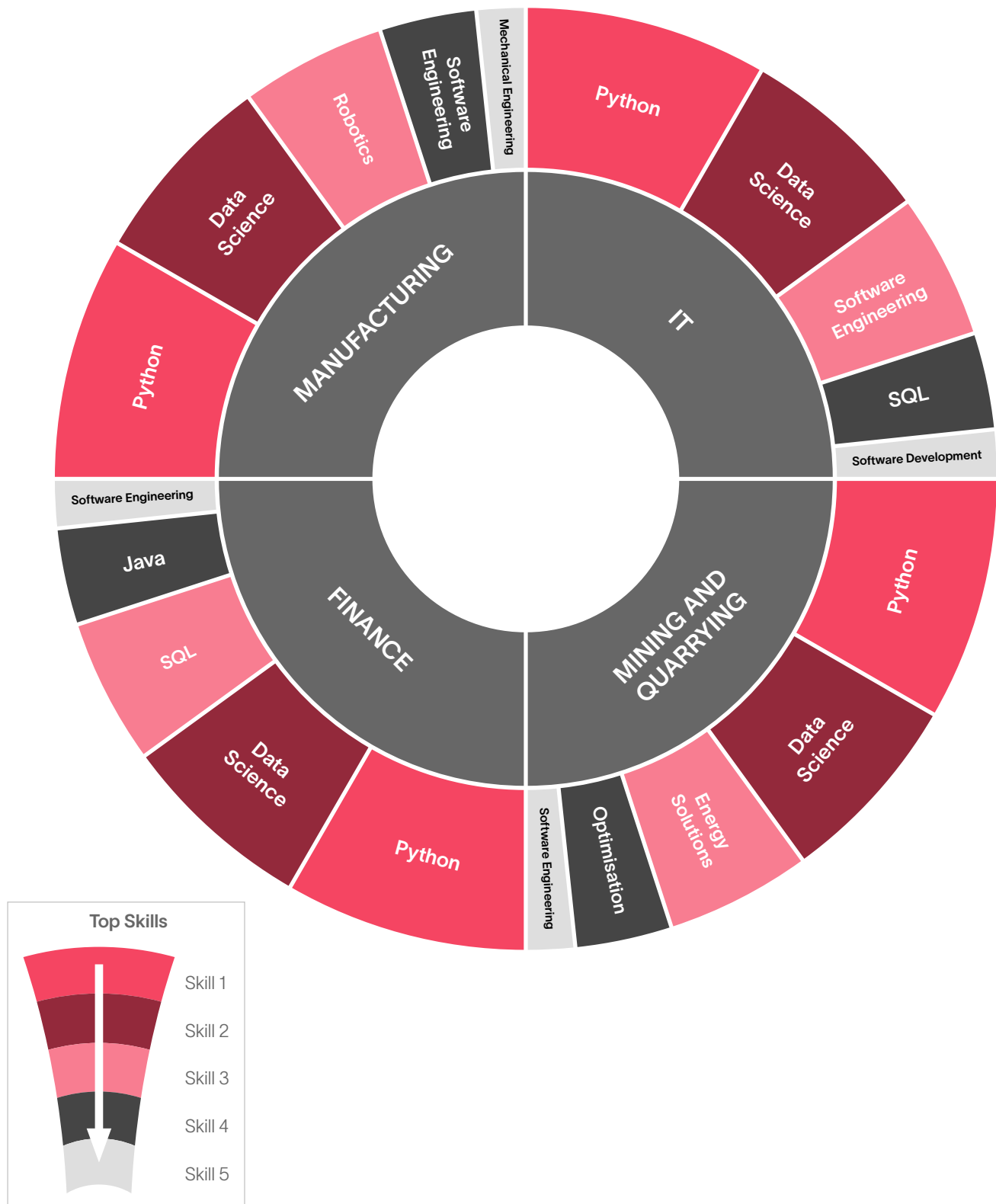
Figure 12: Top Human Skills, 2021 vs 2012



Finally in this section, we can see how technical skills related to AI jobs travel well across industries, with the skills profile changing only slightly when changing sectors. Figure 13 looks at the top five technical skills across five industries – IT, Mining and Quarrying, Finance, and Manufacturing. As you can see, although there are some industry-specific skills that stand out, such as Robotics

and Mechanical Engineering in Manufacturing, and Energy Solutions in Mining & Quarrying, there are also a number of skills that are prevalent in all four industries, such as Python, Data Science, and Software Engineering. What this shows is that these are highly transferable skills, and those who have them are therefore likely to have significant career opportunities across a number of sectors.

Figure 13: Top 5 Specialised Skills Across four Industries





# Conclusion

**As this report shows, the importance of AI skills to UK employers has grown significantly over the past decade, putting the nation amongst the leading countries in the world in terms of AI adoption. However, as we noted in the Introduction, if the government's commitment to making the UK a global AI superpower over the next decade is to be realised, and if this is to benefit all sectors and regions, it will need to be underpinned by a strong evidence-based approach to understanding labour market demand for AI skills.**

This report has been an attempt to provide such an evidence-based approach, but perhaps even more importantly the data and analysis it contains demonstrates *why* this is so vital.

In the section on industries, for example, we saw that although demand has been strongest in the sector we might have expected - Information and Communication - there has actually been growth across all sectors. In the section on regional diffusion, we saw areas we might have expected to have high demand, such as London and Cambridge, but the data also highlighted areas of high demand which are not so obvious, such as Northern Ireland, Andover, and Coleraine.

In the more detailed data you can find at our **accompanying interactive report**, the point becomes even clearer. When we look at the top occupations requiring AI skills, for instance, we find Software Developer/Engineer and Data Scientist appearing in the top fives for all regions and countries. Below that, however, there are some interesting differences. Data Engineer, for example, only appears in the top five in Greater London and the North West, whilst Medical Scientist appears in the top five in East Midlands and Wales.

This report has also highlighted how acquiring AI skills can make people more employable, since they are very often transferable across different industries and occupations, as well as more prosperous, with jobs postings that include these skills found to pay more than postings for the same jobs which don't mention them. Again, this data-driven approach is vital for any strategy for growing AI, since it can be used to encourage people to learn AI skills, as well as help inform education providers as to what skills are needed.

The data therefore serves to both confirm and challenge our assumptions, and this is why any strategy aimed at investing and planning for the long-term needs of an AI-enabled economy needs to take these sorts of nuances into account. If the National AI Strategy is to be a success, and if public money is to be used to support an increase in the training of AI skills which genuinely benefits all sectors and all regions, understanding *what* skills are needed, *which* sectors require them, and *where* they are in-demand will be vital.

# Appendix

**List of AI skills and the skills clusters we have grouped them into:**

**Artificial Intelligence:**

Expert System, IBM Watson, IPSoft Amelia, Ithink, Virtual Agents, Artificial Intelligence.

**Autonomous Driving:**

Autonomous Systems, Lidar, OpenCV, Path Planning, Remote Sensing.

**Natural Language Processing**

**(NLP):** ANTLR, Automatic Speech Recognition (ASR), Chatbot, Computational Linguistics, Distinguo, Latent Dirichlet Allocation, Latent Semantic Analysis, Lexalytics, Lexical Acquisition, Lexical Semantics, Machine Translation (MT), Modular Audio Recognition Framework (MARF), MoSes, Natural Language Processing, Natural Language Toolkit (NLTK), Nearest Neighbour Algorithm, OpenNLP, Sentiment Analysis/Opinion Mining, Speech Recognition, Text Mining, Text to Speech (TTS), Tokenization, Word2Vec.

**Neural Networks:** Caffe Deep Learning Framework, Convolutional Neural Network (CNN), Deep Learning, Deeplearning4j, Keras, Long Short-Term Memory (LSTM), MXNet, Neural Networks, Pybrain, Recurrent Neural Network (RNN), TensorFlow.

**Machine Learning:** AdaBoost algorithm, Boosting (Machine Learning), Chi Square Automatic Interaction Detection (CHAID), Classification Algorithms, Clustering Algorithms, Decision Trees, Dimensionality Reduction, Google Cloud Machine Learning Platform, Gradient boosting, H2O (software), Libsvm, Machine Learning, Madlib, Mahout, Microsoft Cognitive Toolkit, MLPACK (C++ library), Mlpy, Random Forests, Recommender Systems, Scikit-learn, Semi-Supervised Learning, Supervised Learning (Machine Learning), Support Vector Machines (SVM), Semantic Driven Subtractive Clustering Method (SDSCM), Torch (Machine Learning), Unsupervised Learning, Vowpal, Xgboost.

**Robotics:** Blue Prism, Electromechanical Systems, Motion Planning, Motoman Robot Programming, Robot Framework, Robotic Systems, Robot Operating System (ROS), Robot Programming, Servo Drives/Motors, Simultaneous Localization and Mapping (SLAM).

**Visual Image Recognition:**

Computer Vision, Image Processing, Image Recognition, Machine Vision, Object Recognition.

# Methodology and Data

To support these analyses, Lightcast mined its dataset of millions of job postings collected since 2010. Lightcast collects postings from over 45,000 online job sites worldwide, aggregating them, removing duplicates, and extracting data from the text to create a comprehensive, real-time portrait of labour market demand. This includes information on job titles, employers, industries, and regions, as well as required experience, education, and skills.

In order to measure employer demand for AI skills, we used a combination of Lightcast skills and keyword searches to find AI skills in job posting data. The list of AI skills from our data is shown in

the Appendix, with associated skill clusters, which include Artificial Intelligence, Neural Networks, Autonomous Driving, Natural Language Processing, Machine Learning, Robotics, and Visual Image Recognition. While some skills are considered to be in the AI cluster specifically, for the purposes of this report, all skills in associated clusters were considered AI skills, and a job posting was considered an AI job if it mentioned one or more of these keywords. As a posting typically has several skills, it can therefore also have several skill clusters, so for the purposes of comparing different skill clusters of AI in the labour market, some postings have been counted several times – once for each skill cluster that is mentioned in the job text.

## About the Authors

### Bledi Taska

Bledi Taska is Chief Economist and Executive Vice President of Corporate Economics at Lightcast. He is a labour economist specialising in the application of econometrics and statistics on real time labour market data. At Lightcast, Bledi leads a team of economists and data scientists, which supports the company's public policy research, product development, and collaboration with academic researchers and international organisations.

He received a Doctorate degree in Economics from New York University and a Bachelor's degree in Economics from the University of Athens, Greece. He has presented his academic research at Stanford University, Indiana University, IFO Institute, IZA Institute of Labor Economics, the Association for the Advancement of Artificial Intelligence, the Atlanta FED, the European Association of Labour Economists, and the Midwest Economics Association.

### Layla O'Kane

Layla O'Kane is a Research Director on the Economics team at Lightcast, where she manages projects that use labour market analytics to further public policy. Recent research topics include

understanding the career pathways available to vulnerable workers displaced by automation, closing the digital skills gap across workers, entrepreneurship and career opportunities for military spouses, and the return on investment of industry credentials. Layla has had the opportunity to present her work at conferences organised by the UN, OECD, APEC, and SXSWedu.

Layla holds a BA in Economics and in International Relations from the University of Pennsylvania and an MPA in International Development from the Harvard Kennedy School.

### Julia Nania

Julia Nania is a Research Lead at Lightcast, focusing on labour market analysis in Europe. Topics that she has worked on include digitalisation of the labour market, cyber security, and artificial intelligence. Her experience at Lightcast also includes taxonomy management as well as development of data quality processes.

Julia holds a Bachelor's degree in European Economic Studies from the University of Bamberg and a Master's degree in Business Management from the University of Würzburg.





## ABOUT LIGHTCAST

Lightcast is the world's leading authority on job skills, workforce talent, and labour market dynamics. Organisations across the globe use our market research, analytical software, and data expertise to better understand their own workforce and identify skilled and diverse talent for future growth.

Headquartered in Boston, Massachusetts, and Moscow, Idaho, Lightcast is active in more than 30 countries and has offices in the United Kingdom, Italy, New Zealand, and India.

**Check out the interactive dashboard we've created with the visual data storytellers, Infogr8, which offers even more detailed insights of demand for AI at the local level:**

<https://aiskills.lightcast.io/>

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