![Gyrfa Cymru Careers Wales logo]

Careers Wales LMI Bulletin Feature: The AI Economy in Wales
February 2025

Content

Key Data for Wales

250 skills relating to AI mentioned in vacancies
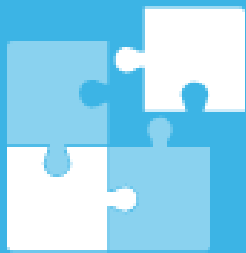
17,000 online vacancies mentions different AI skills over 2 years

Artificial Intelligence began in **1956**

14 specialist areas of AI technologies

Soft skills remain a priority for employers

47% of employers report skills shortages

56% of employers not confident about AI

14% premium on salaries with AI skills

4,388 mentions of AI skills in Public Sector vacancies

1.   Introduction

Artificial Intelligence (AI) as a field of study officially began in 1956 when researchers gathered to explore the idea of creating machines that could simulate human intelligence.   The first example of AI being used in a more practical way, that gained public awareness of the technology was in 1997, when IBM's Deep Blue programme defeated the world chess champion, Garry Kasparov.

Artificial Intelligence (AI) refers to the science of making computer systems perform tasks that typically, or traditionally, require human intelligence. These tasks include learning, problem-solving, decision-making, and recognising speech or images. AI technologies are becoming an integral part of our daily life, transforming jobs and industries, as well as enhancing efficiency in various sectors. AI is not one technology and impacts jobs and industries in different ways.

This Feature provides an overview of how AI is shaping Wales's economy by providing a summary from a selection of sources about the different AI technologies and how skills, jobs and industries are adapting.

2.   What is the AI Economy?

The economic system that's influenced by artificial intelligence includes:
- AI-driven industries
- Job markets
- Automation
- Financial impact
- Global markets

In Wales, AI is being adopted to support innovation, improve public services, and drive economic growth. The Welsh government and organisations across the country are using AI in areas like healthcare, education, renewable energy, and agriculture. For example, AI helps streamline diagnoses in healthcare, optimise teaching methods in schools, and improve crop management on farms.

Additionally, AI supports local businesses in adopting smart technologies, making them more competitive globally. By investing in AI research and encouraging partnerships between universities and industries, Wales is positioning itself as a leader in ethical and innovative AI development.

Working in a digital job involves being part of an exciting and changing industry shaping our future. Every industry relies on technology in different ways, and most jobs use some digital tools and skills. We rely on these technologies in our daily lives!

AI is not just a tool but a major economic force influencing productivity, business models, and labour dynamics. This growing field offers exciting opportunities for Wales to address societal challenges, create jobs, and ensure sustainable development for future generations.

Find out more about Jobs in Digital in Careers Wales' Future Jobs Wales pages.

3.   What are the technologies driving the AI economy?

The growth of the AI economy is powered by several key technologies. These innovations enable the development and application of AI systems across various industries. These technologies collectively drive the AI economy by enabling innovation, improving efficiency, and creating new opportunities across industries. Their continued development will shape the future of AI and its impact on society.
Here are the most significant technologies currently driving the AI economy:

1. Machine Learning (ML)
ML is a core component of AI, allowing systems to learn from data and improve over time. Technologies like supervised, unsupervised, and reinforcement learning power applications such as predictive analytics, recommendation systems, and autonomous vehicles.

2. Natural Language Processing (NLP)
NLP enables machines to understand, interpret, and generate human language. It is the foundation of chatbots, virtual assistants (like Siri and Alexa), and tools for language translation and sentiment analysis.

3. Computer Vision
Computer vision allows AI systems to process and analyse visual information. This technology drives innovations in facial recognition, medical imaging, autonomous vehicles, and surveillance systems.

4. Deep Learning
Deep learning uses neural networks to model complex patterns in data. It underpins breakthroughs in image recognition, speech processing, and generative AI models like ChatGPT and DALL-E.

5. Robotics
AI-powered robotics combines physical automation with intelligent decision-making. Robots equipped with AI are used in manufacturing, healthcare, agriculture, and logistics to enhance efficiency and adaptability.

6. Internet of Things (IoT)
IoT devices collect and transmit data from the physical world. AI processes this data to optimise operations, improve decision-making, and enable smart systems, such as connected homes, cities, and industries.

7. Edge Computing
Edge computing brings AI processing closer to the source of data collection. This reduces latency and improves efficiency for applications like autonomous vehicles, industrial automation, and smart devices.

8. Cloud Computing
Cloud platforms like AWS, Google Cloud, and Microsoft Azure provide scalable infrastructure for AI development and deployment. They offer tools and frameworks for machine learning, data storage, and AI model training.

9. Generative AI
Generative AI technologies, like Generative Adversarial Networks (GANs) and transformer models, create new content, such as text, images, music, and videos. These tools are revolutionising creative industries, marketing, and design.

10. Blockchain

Blockchain ensures transparency and security in AI systems by providing decentralised data management. It's particularly useful in industries requiring trust, such as finance, healthcare, and supply chain management.

11. Quantum Computing

Quantum computing holds the potential to accelerate AI by solving complex problems faster than traditional computers. It could revolutionise fields like drug discovery, cryptography, and optimisation.

12. Autonomous Systems

Autonomous systems, such as self-driving cars and drones, combine multiple AI technologies to operate independently. These systems are reshaping transportation, delivery services, and environmental monitoring.
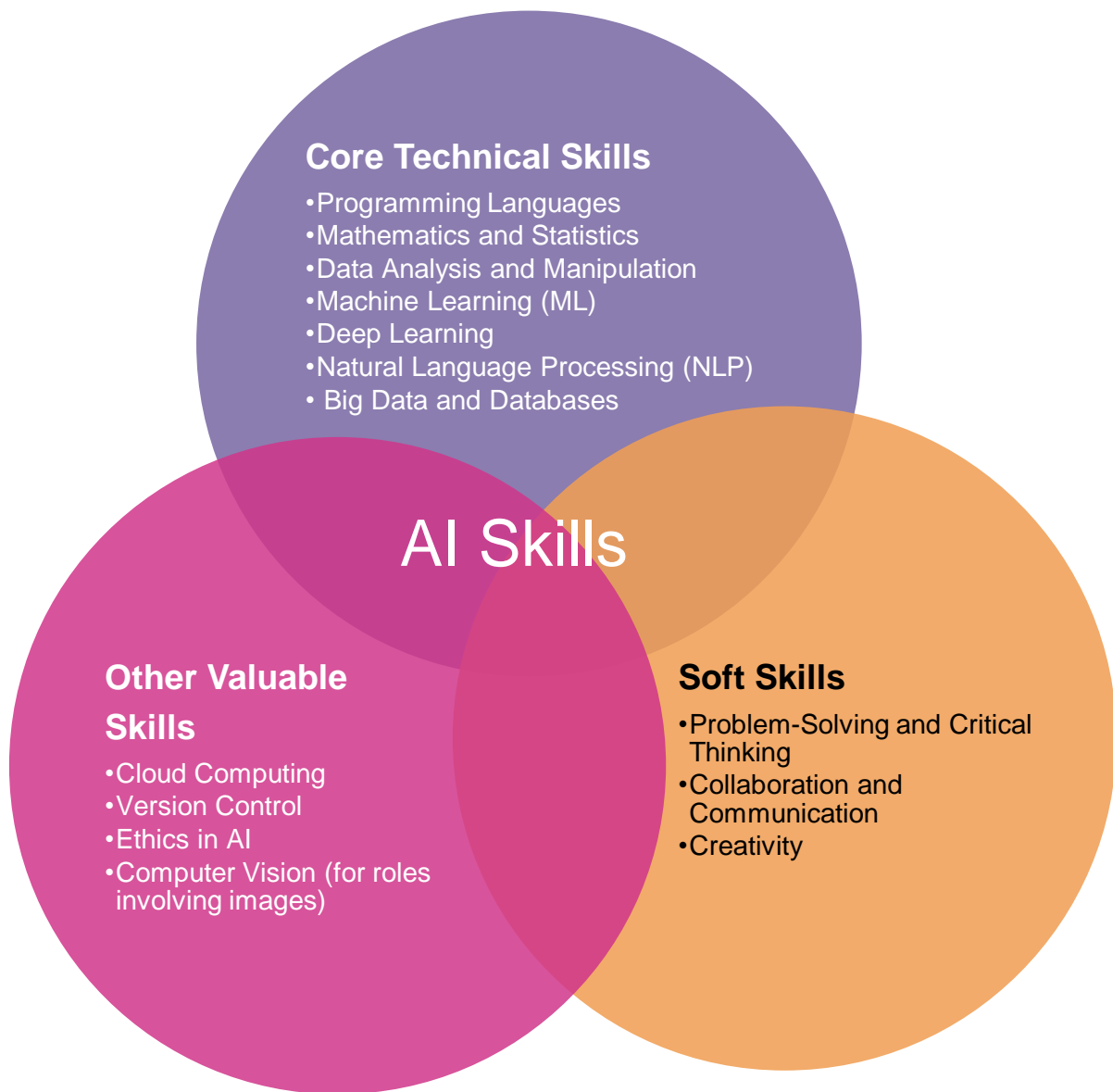
13. Big Data Analytics

AI thrives on data, and big data technologies enable the collection, storage, and analysis of vast datasets. Tools like Hadoop and Spark make it possible to extract valuable insights from complex data sources.

14. Explainable AI (XAI)

XAI technologies ensure AI decisions are transparent and interpretable. This helps build trust in AI systems, especially in sensitive areas like healthcare, finance, and law.

These technologies collectively drive the AI economy by enabling innovation, improving efficiency, and creating new opportunities across industries. Their continued development will shape the future of AI and its impact on society.

Core Technical Skills

- Programming Languages
- Mathematics and Statistics
- Data Analysis and Manipulation
- Machine Learning (ML)
- Deep Learning
- Natural Language Processing (NLP)
- Big Data and Databases

AI Skills

Other Valuable Skills

- Cloud Computing
- Version Control
- Ethics in AI
- Computer Vision (for roles involving images)

Soft Skills

- Problem-Solving and Critical Thinking
- Collaboration and Communication
- Creativity

4. AI Skills

To work in AI (Artificial Intelligence), you'll need a mix of technical, analytical, and problem-solving skills. Depending on the specific role (e.g., AI researcher, engineer, data scientist, or product manager), the required skills can vary.

AI is top of the list of fastest-growing skills in online job vacancies and is expected to continue to rise in importance over the next 5 years. According to the World Economic Forum's The Future of Jobs Report 2025, two-thirds of employer's plan to hire talent with specific AI skills by 2030.

The range of skills, which will become ever more important in the face of AI technology are categorised as:

Analytics from job postings from Lightcast™ in the table below, have identified over 250 skills and qualifications relating to how AI skills is mentioned in online vacancies in Wales, from December 2022 to December 2024.
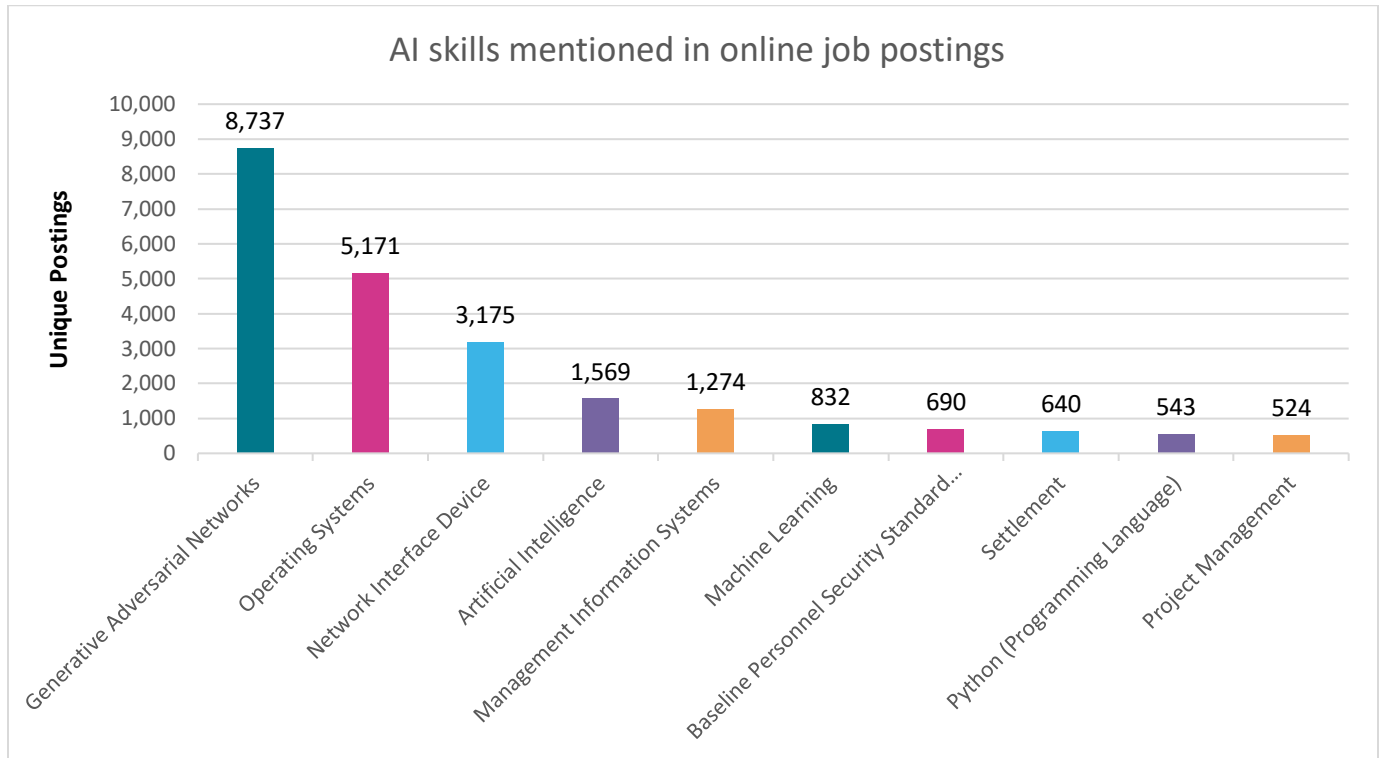
Source:Lightcast™ February 2025

The bar graph above shows that Networks, Operating Systems and Interface Device are the top 3 AI skills mentioned in over 17,000 online job postings between December 2022 to December 2024 in Wales.
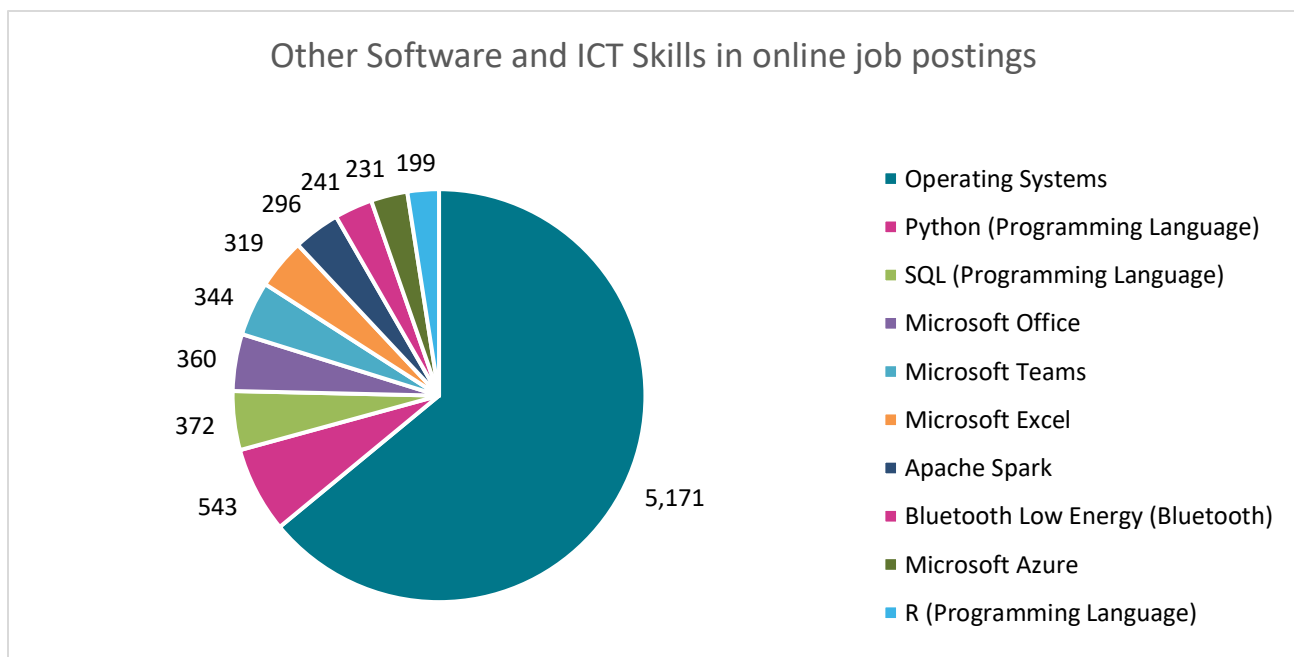
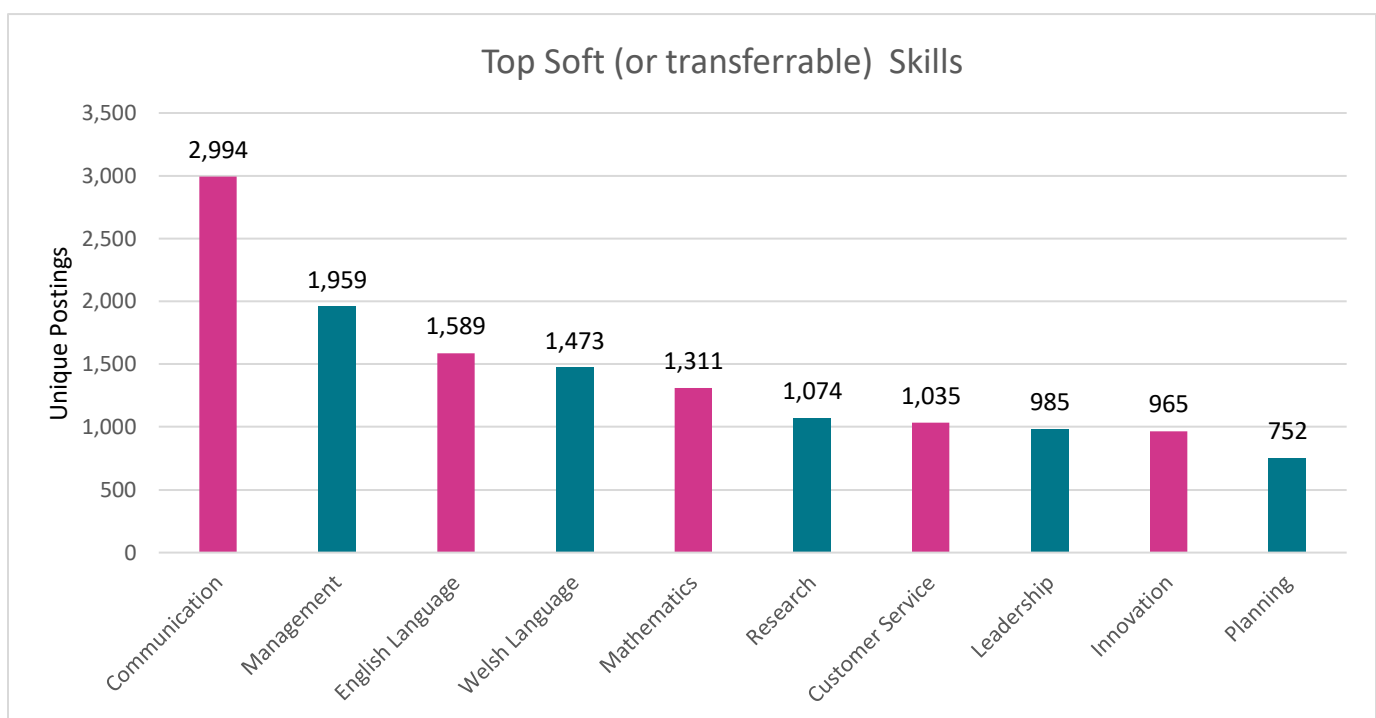Source:Lightcast™ February 2025

The pie chart above shows that Operating Systems, Python and SQL were the most popular software, or ICT skills mentioned in job postings between December 2022 and December 2024 in Wales.

Whilst an increase in job vacancies is positive news for job growth, the Open University's Business Barometer 2024 report for Wales, found that:

- 47% of Welsh employers are still reporting worrying skills shortages and a lack of confidence in AI and green tech skills
- 56% of Welsh employers say they are not confident about applying new AI technologies in their business

Furthermore, in relation to a strong skills pipeline for the future, the King's Trust report on the Digital Skills Gap found that 37% of young people in the UK do not study a 'digital or tech subject' beyond Key Stage 3, and 42% do not think digital skills will be essential to their career. The report warns that young people who already face disadvantage, such as being NEET, show lowest confidence and engagement with pursuing digital skills and jobs.

Top Soft (or transferrable) Skills

Skill	Unique Postings
Communication	2,994
Management	1,959
English Language	1,589
Welsh Language	1,473
Mathematics	1,311
Research	1,074
Customer Service	1,035
Leadership	985
Innovation	965
Planning	752

Source:Lightcast™ February 2025

The bar graph above shows that 'soft', or also known as transferrable skills, are just as important in the development of AI technology, as they complement the technical expertise required to build and manage AI systems.

In high tech jobs, as well as other roles, there is demand for creative reasoning and the ability to reach mutual understanding through human collaboration and discussions. The application and integration of soft skills ensure that AI is used and developed with:

- Ethical considerations and responsibility
- Collaboration and teamwork
- Problem-solving and creativity
- User-centred design
- Trust and transparency
- Leadership and management
- Adaptability in a rapidly changing field

5.   Job Roles in AI

The rapid growth of AI has created a high demand for skilled professionals across various roles. There are a range of job roles that use AI, from high tech ICT jobs to designers as well as administration roles. However, there is a shortage of AI professionals, making it difficult for companies to find skilled workers despite growing demand and higher salary premiums. Pricewaterhouse Coopers (PwC) report that UK employers are willing to pay 14% wage premium for jobs that require AI skills.

Here are some of the most in-demand roles that require high level knowledge of Artificial Intelligence:

1. Machine Learning Engineer - Software Developer | Job Information
Machine learning engineers design, build, and optimise algorithms that allow computers to learn from data. They often work with large datasets and advanced tools to develop AI systems.

2. Data Scientist - Data Scientist | Job Information
Data scientists analyse and interpret complex data to provide insights and inform decisions. They use AI tools to process data, create predictive models, and support business strategies.

3. AI Research Scientist
Research scientists focus on developing new AI theories, techniques, and applications. This role is ideal for those with expertise in mathematics, computer science, and deep learning.

4. AI Software Developer - Artificial Intelligence Engineer | Job Information
AI software developers create applications and systems that use AI technologies, such as chatbots, recommendation systems, and image recognition tools.

5. Robotics Engineer
Robotics engineers design AI-driven robots for industries like manufacturing, healthcare, and logistics. These robots often perform tasks requiring precision and adaptability.

6. Natural Language Processing (NLP) Specialist
NLP specialists work on AI systems that understand and process human language, such as virtual assistants, language translation tools, and text analytics applications.

7. Computer Vision Engineer
Computer vision engineers develop AI systems that process and analyse visual data. This role is key in fields like autonomous vehicles, facial recognition, and medical imaging.

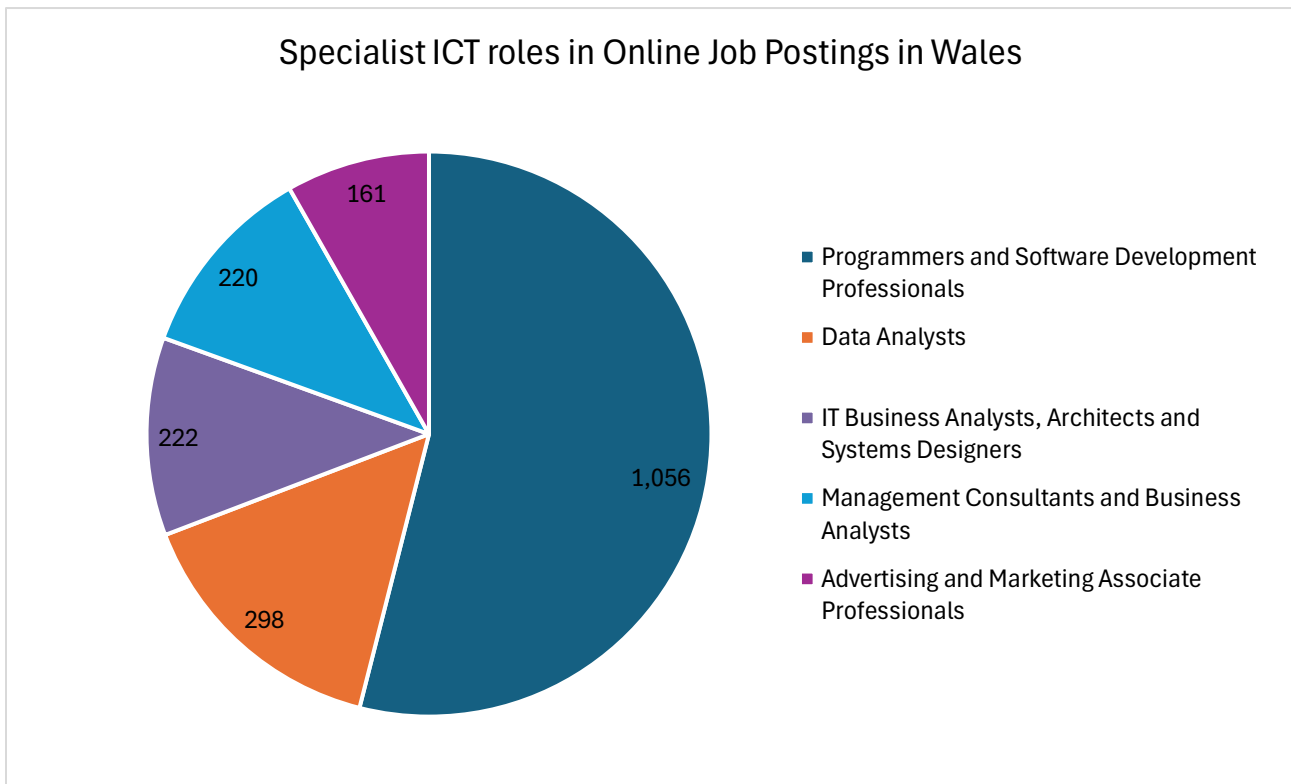**8. AI Ethicist or Policy Advisor**
As AI technologies advance, ethicists and policy advisors ensure their development and use align with ethical standards and societal needs. This includes addressing issues like bias, fairness, and transparency.

9. Business Intelligence Analyst - Business Analyst - Job role | Job Information
These professionals use AI tools to analyse data and provide actionable insights that support business growth, improve efficiency, and enhance decision-making.

10. Cloud AI Specialist
Cloud AI specialists design and manage AI solutions hosted on cloud platforms like AWS, Azure, or Google Cloud. They ensure scalability, security, and efficiency.

Source:Lightcast™ February 2025

Specialist ICT roles in Online Job Postings in Wales

- Programmers and Software Development Professionals
- Data Analysts
- IT Business Analysts, Architects and Systems Designers
- Management Consultants and Business Analysts
- Advertising and Marketing Associate Professionals

The pie chart above shows that from December 2022 to December 2024 in Wales, Programmers, Software Developers and Data Analysts were the most common posted occupations requiring specialist ICT digital skills.

Find out more about different jobs in Digital in Careers Wales' Job Information page.

6.   Opportunities and Threats of AI

As AI techniques are incorporated into more products and services, organisations must also be attuned to AI's potential to create biased and discriminatory systems, intentionally or inadvertently.

AI development is creating new roles, such as AI trainers, explainable AI specialists, and edge AI developers. These positions focus on making AI systems more user-friendly, interpretable, safe, and efficient.

Governments are recognising that the key to harnessing AI effectively is through ethical regulation, responsible development, and human oversight.

AI is a powerful technology with huge benefits, but it also comes with risks and challenges which interplay with each other, as listed below:

Opportunities	Threats
Increased Efficiency & Productivity	Unpredictability and Errors
Enhanced Decision-Making	Potential for Misuse
Cost Savings	High Development and Maintenance Costs
24/7 Availability	Disrupting labour market and supply chains
Improved Healthcare	Ethical Concerns and Bias
Personalisation	Privacy and Security Risks
Risk Reduction in Dangerous Jobs	Dependence on AI and Loss of Human Skills
Innovation & Creativity	Lack of Human Creativity and Emotion
Creating new skills and jobs	Job Displacement and Unemployment

The Welsh Government and Welsh universities have made significant investments in data science and AI through multimillion-pound initiatives to harness the opportunities, for example:
- Wales Data Nation Accelerator (in Cardiff, Swansea, Aberystwyth, and Bangor)
- National Software Academy at Cardiff
- Computational Foundry at Swansea
- Research Centre in AI, Robotics, and Human-Machine Systems (IROHMS) at Cardiff

7.   How AI Is Transforming Industries Across Wales

Artificial Intelligence (AI) is reshaping industries in Wales by boosting efficiency, driving innovation, and addressing local challenges.
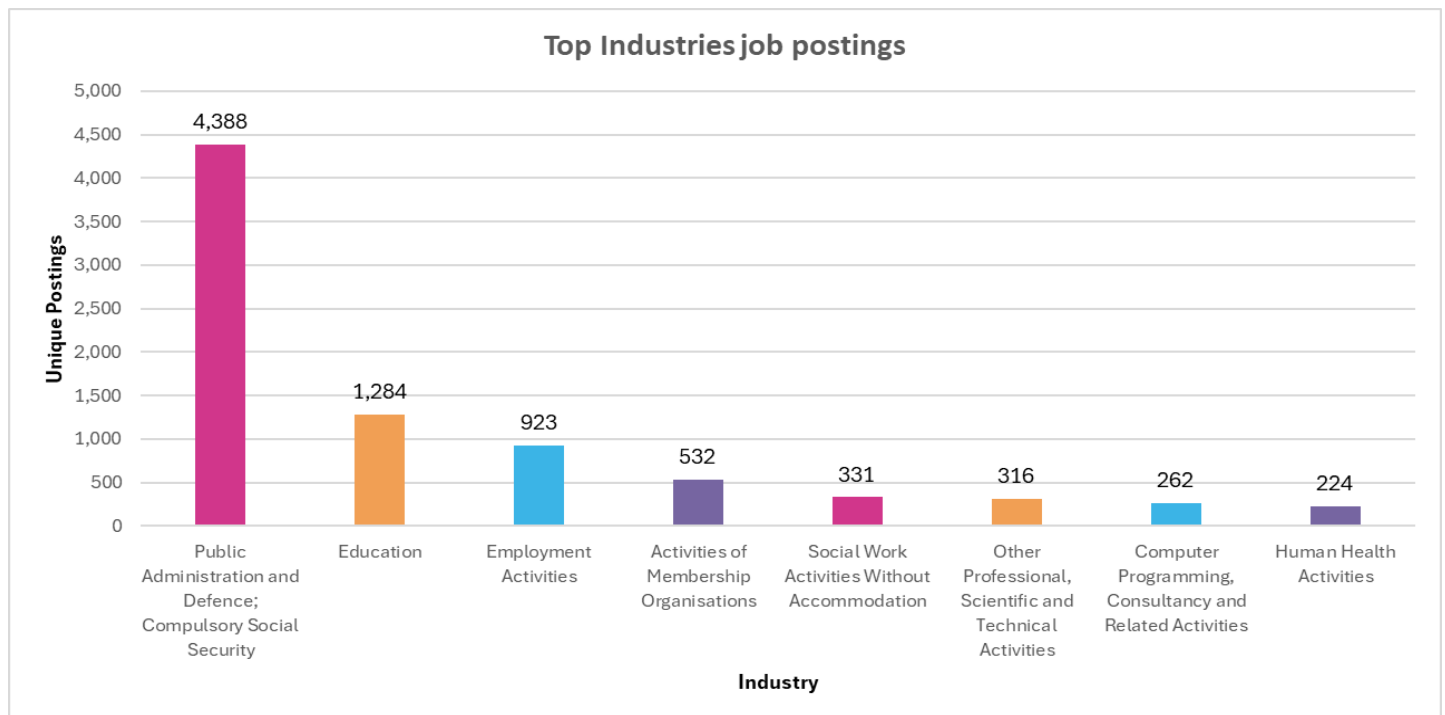Here's how AI is transforming key sectors across the country:

Healthcare
AI is revolutionising healthcare by improving diagnostics, personalising treatments, and streamlining operations.
- **Early Diagnosis**
- **Personalised Medicine**
- **Operational Efficiency**
Find out more about Jobs in Health

Agriculture
AI supports sustainable farming practices and enhances productivity.
- **Precision Farming**
- **Livestock Management**
- **Automation**

Find out more about Jobs in Agriculture and Land

Education
AI tools are enriching learning experiences and supporting educators.
- **Adaptive Learning**
- **Language Tools**
- **Administrative Support**

Find out more about Jobs in Education

Renewable Energy
AI is advancing Wales' commitment to clean energy and sustainability.
- **Energy Optimisation**
- **Grid Management**
- **Predictive Maintenance**

Find out more about Jobs in Energy

Manufacturing
AI enhances productivity and quality in Welsh manufacturing.
- **Automation/Robotics**
- **Predictive Analytics**
- **Quality Control**

Find out more about Jobs in Manufacturing

Transport and Infrastructure
AI is modernising transportation and urban planning across Wales.
- **Smart Traffic Management**
- **Autonomous Vehicles**
- **Infrastructure Monitoring**

Public Services
AI is improving access to and efficiency in public services.
- **Chatbots**
- **Fraud Detection**
- **Resource Allocation**

Find out more about Jobs in Public Services

Tourism
AI is enhancing visitor experiences and boosting the tourism sector.
- **Personalised Recommendations**
- **Virtual Tours**
- **Language Translation**

Find out more about Jobs in Tourism, Hospitality, Sport and Leisure

Creative Industries
AI fosters creativity and innovation in art, media, and entertainment.
- **Content Creation**
- **Film Production**
- **Gaming**

Find out more about Jobs in Creative Arts, Media and Culture

Financial Services
AI is strengthening financial institutions across Wales by enhancing security and decision-making.
- **Risk Assessment**
- **Fraud Prevention**
- **Customer Support**

The UK Department for Education report on [The impact of AI on UK jobs and training](#) identified that:
- Professional occupations are more exposed to AI, particularly those associated with more clerical tasks in finance, law and business management roles
- The finance and insurance industry is more exposed to AI than any other industry
- The least exposed to AI is the Accommodation and Food Services

However, the report also notes that some roles within an industry will have different exposure levels to AI, regardless of the exposure level for the specific industry as a whole.

Top Industries job postings

Industry	Unique Postings
Public Administration and Defence; Compulsory Social Security	4,388
Education	1,284
Employment Activities	923
Activities of Membership Organisations	532
Social Work Activities Without Accommodation	331
Other Professional, Scientific and Technical Activities	316
Computer Programming, Consultancy and Related Activities	262
Human Health Activities	224

Source:Lightcast™ February 2025

The graph above shows that from December 2022 to December 2024 in Wales, Public Administration and Defence, Education and Employment Activities were the 3 top industries in Wales advertising jobs with AI skill mentioned in vacancies.

8.   Conclusion

AI's integration across jobs and industries is driving Wales towards a more innovative, efficient, and sustainable future. Through government initiatives and collaborations between industry and academia, Wales is well-positioned to maximise the benefits of AI while addressing ethical and societal challenges.

"With the technology growing rapidly, and 42% of UK CEOs saying they have adopted AI across their companies in the last year, it's key that current and future workers are upskilled for the AI era to ensure that technology is used responsibly and that the benefits are spread equitably. Both business and government have a key role to play in coordinating, shaping and delivering the skills agenda."
Pricewaterhouse Coopers, 2024

9.   Further Reading:
Wales is 'Uniquely Placed' at the Forefront of UK Drive to Turbocharge AI

AI 'Could Boost Productivity and Competitiveness' for Welsh SMEs

Generative AI - Senedd Research, 2024

World-leading AI cyber security standard to protect digital economy and deliver Plan for Change - GOV.UK

AI PLAYBOOK (UK.GOV)

Artificial Intelligence - an explainer UK Parliament 2023

The Lightcast Global AI Skills Outlook | Lightcast

National AI Strategy - GOV.UK

AI Opportunities Action Plan - GOV.UK

Focus on impact of AI and the world of work | CIPD

10.   Careers Wales information:
Digital Sector | Industry | Job Information

Engineering | Industry | Job Information

Science and Research | Industry | Job Information

Future Jobs Wales

Course Search

We welcome questions and feedback on the data and key messages included in LMI Bulletins. Please send to information@careerswales.gov.wales

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