AI in the Midlands

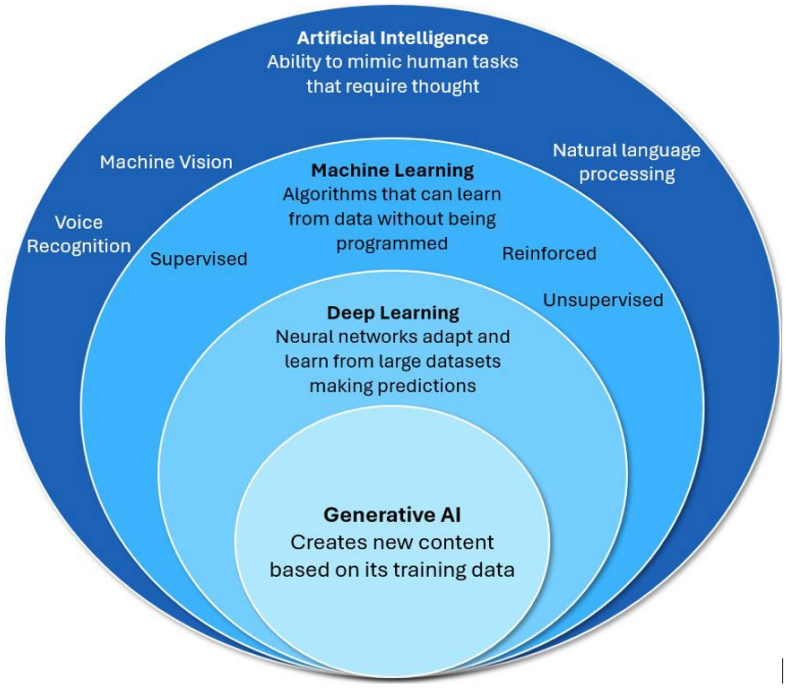
INSIGHTS

With the rise of Artificial Intelligence (AI) in recent years, such as generative AI[1] like Chat-GPT, there has been significant interest into how the impact of AI will unfold on a number of sectors in the economy. Based on this, a joint research project between the Midlands Engine Observatory and Keele University looked to map what current AI capabilities exist within the Midlands and what impact AI will have on business growth.

Artificial Intelligence (AI), is 'technology that enables computers and machines to simulate human learning, comprehension, problem solving, decision making, creativity and autonomy' (IBM, 2024).

AI is already affecting industries globally, with many of the world's largest companies like Microsoft, Apple and NVIDIA having already invested vast amounts of capital into its research and development.

Taking appropriate steps to foster businesses and institutions working with AI, this report will explore how the Midlands can use its voice to shape how AI affects applications, capital investment and industries.



The full report is available on the Midlands Engine Observatory website.

1. Generative AI refers to deep-learning models that can generate high-quality text, images, and other content based on the data they were trained on

Midlands AI Landscape

The report revealed that the Midlands is home to approximately 300 AI businesses, representing 10% of those in the UK[2]. It also found that most of these AI companies are focused on providing software and AI development support to businesses in other sectors including advanced manufacturing, healthcare and transportation.

In the East Midlands, AI is most heavily involved in data infrastructure and advanced manufacturing, followed by MedTech, life sciences, research and consulting, Omics, pharma and energy. Compared to the West Midlands, the region has a more diverse spread across healthcare and research-based industries.

In the West Midlands, AI shows strong activity in advanced manufacturing and data infrastructure, alongside sectors such as Software-as-a-Service (SaaS), MedTech, and software development. Compared to the East Midlands, AI use in the region also leans more into sectors like Fintech, Sensor Technology, and Cybersecurity.

Barriers to AI adoption

The primary barriers faced by Midlands organisations looking to foster AI innovation are:

- the gaps in large scale developments in infrastructure
- competition from other regions like London and the South East
- greater public and private investment is required as well incentivising employees so talent cultivated in the region remains in the region.

Economic Impact

Whilst the current economic impact of AI technology is small, when it arrives, its impact will most likely not come directly from businesses creating AI-based products or services. Instead, impact will potentially come from increased productivity, efficiencies and supply-chain efficiencies as a result of the use of predictive modelling algorithms. As AI technology improves and proliferates, it will introduce both new career opportunities as well as a risk of job displacement in some sectors.

For example, customer service roles are facing competition from AI chat bots and this trend could continue to other white-collar professions as the technology develops.

Bridging the skills gap

The literature suggests a skills gap within the Midlands with 41.5% (just over 2.55m) of working age residents in the Midlands Engine educated to RQF 4+ levels compared to 47.1% UK-wide in 2023 – a further 345,411 of the working age Midlands Engine residents are required to obtain an RQF 4+ qualification to equal the UK average.

This could be disadvantageous as further growth and innovation in AI requires a skilled, often highly educated workforce. While the Midlands has 23 universities and most of them have an AI or AI-related course, these education programmes need to be enhanced using the relationship between industry and educational institutes.

Teaching applications of AI technologies within the courses could be improved so that learning aligns with industry requirements.

2. There are approximately 3,170 active AI businesses according to a Department for Science, Innovation and Technology report)

Strategic opportunities

With manufacturing jobs in the region accounting for a quarter of England's total within the sector, the Midlands' manufacturing strengths can be leveraged to establish the region as a potential hub for AI innovation. What's more, the full report explores the opportunities for AI to be expanded within the service industries and agricultural production. Alongside our world-leading universities, the Midlands has then significant potential for growth.

AI Perspectives: Qualitative Interviews

This study also featured interviews with key stakeholders in the Midlands AI ecosystem which discussed:

AI Understanding

The general UK population is largely oblivious to developments in AI and may be influenced by media portrayals (often only emphasising cutting-edge, expensive technologies since the advent of OpenAI). This can often result in misinformation around the use of the technology, increased apprehension, or exaggerated belief in its capabilities.

Education

Literature highlights the importance of a highly educated workforce with relevant degrees to facilitate growth in the AI industry. As more companies adopt the technology, demand for data analysts to train AI models as well as more traditional IT roles to manage and maintain the systems they operate on, will grow. Simply providing degree courses won't do - the future workforce needs constant training so the importance of apprenticeship-style courses will be critical.

Investment

Access to substantial venture capital and government funding is essential for innovation, especially given the high burn-through rates of many tech and AI companies which may take years to break even. Investors must recognise that most projects will likely fail. This makes collaboration with government bodies vital, as they can provide subsidies for innovation. Universities and other research institutes could be the source of IP generation and highly skilled graduates.

Infrastructure

The development and innovation of AI or any hub requires large investment into local infrastructure. This can take two forms: primary infrastructure like reliable high-speed internet, testing facilities, as well as nearby access to educational and government institutions. The secondary infrastructure, also known as 'place making', focuses on the wider area and quality of life it offers. This is a crucial step in retaining talent in the region but is often overlooked. A great example is Silicon Valley, known for its strong connections to government and educational entities, as well as a vibrant culture that attracts and retains talent.

Case Studies

The below case studies highlight AI usage in Midlands-based companies. These examples offer a glimpse into the region's AI innovation, with additional further details available in the full report.

1. Rolls Royce

Rolls-Royce has successfully integrated AI to boost operational efficiency and accelerate research, particularly in its aerospace and defence branches in the Midlands. The redevelopment of its Raynesway (Derby), approved in 2023, will create 1,170 skilled roles in STEM fields, alongside collaborating further in an 11-partner consortium aiming to use machine learning and AI to reduce development time and enhance model-based system engineering.

2. J C Bramford Excavators (JCB)

JCB, a leading construction and agriculture equipment manufacturer based in Staffordshire, employs over 15,000 workers and generated around £4 billion in revenue in 2022. As part of its interest in AI, JCB has commissioned a study on autonomous excavation to address a skills shortage in excavator operators, a critical role in construction projects.

3. Boots

Boots, one of the UK's largest retailers, headquartered in Nottingham, is integrating AI into its operations as part of its digital transformation. This includes an AI-powered personal shopper, using a chatbot based on Microsoft and OpenAI's ChatGPT, aimed at enhancing online shopping experiences. AI is also being explored to address the challenge of abandoned shopping carts; a strategy likely to be adopted by more retailers.

4. Toyota

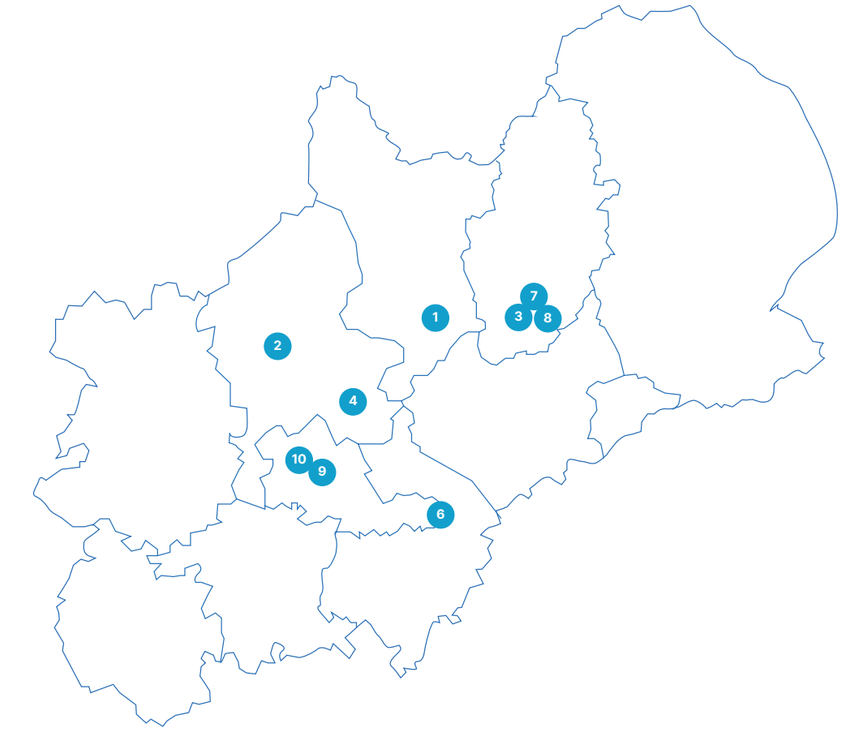
Toyota is globally renowned for its R&D across sectors including automotive robotics, and advanced manufacturing, with AI development central to its operations. While most AI research is conducted overseas, Toyota's UK branch recently submitted a project to UKRI called the 'Innovation Exchange Challenge', aiming to use machine learning to monitor energy consumption within production lines.

5. Aggregate Industries UK

Aggregate Industries UK (AIUK) is one of the leading suppliers of construction materials for the UK. In recent years, the companies' main areas of innovation have been in reducing its environmental impact and transition to more sustainable solutions. While AI innovation within the company is limited, it has adopted AI-driven driver monitoring systems in its cement tankers, using in-cab cameras and sensors to track driver fatigue and prevent accidents. This highlights how AI tools from the healthcare sector can be applied in industries like construction and transportation.

6. Jaguar Land Rover (JLR)

JLR has been a key player in AI innovation in the Midlands, investing £5.5M into autonomous vehicles, tested on a 41-mile stretch around Coventry and Solihull. JLR also uses AI for supply chain and risk analysis, partnering with Everstream Analytics in 2023 to monitor its supply chain in real-time and predict potential shortages. This technology has become crucial in the automotive industry, particularly with the rising demand for electric vehicles, which rely on rare earth metals and components like semiconductors that are susceptible to supply disruptions.



7. Experian UK

Experian is a data analytics company based in Nottingham which provides valuable information for consumer credit, decision making, and targeted marketing.
Experian offers several AI-driven products, including its core credit scoring system, fraud prevention tools, Aperture Data Studio and its Decisioning service.

8. Blue Skeye AI

Blue Skeye AI is a company based in Nottingham focused on using AI to analyse human behaviour through face and voice recognition technologies. They strongly push for ethical development with primary application of the technology in the health and automotive industries. The company has won several awards for innovation in the MedTech space, developing apps that interpret behaviour to help healthcare professionals and patients monitor their mental health, working in collaboration with Nottingham NHS trust.

9. Grid Edge

Grid Edge is startup which uses AI to enhance energy efficiency in commercial buildings. This is done by creating digital twins of the buildings that can provide real-time energy management responding to environmental and energy price changes. The ability for AI to make predictions based on the data allows for forecasting, enabling businesses to plan out their energy usage. As a startup, the company has managed to raise significant investment from the public and private sector and is an example of a successful spin out from Aston University and is an excellent example of AI innovation in the Midlands tackling global issues.

10. Conigital

Conigital focuses on developing autonomous vehicles that operate on AI, with a focus on self-driving vehicles within ports, yards and airports. The company has begun to branch out applications into commercial usage.
The choice to focus on industrial setting like ports provides spaces with less drivers than public roads and can be more heavily controlled, making them ideal training grounds for autonomous vehicles. The continuous investment for the company has allowed the startup to rapidly scale, with facilities now in Australia and India too.

Recommendations

The report provides the following recommendations for the UK government, Midlands' local governments and industry stakeholders to increase the region's capability in developing an AI-driven economy:

Enhance AI literacy and education within the Midlands

In order for the Midlands to be established as a UK hub for AI innovation, there needs to be a stronger understanding of the technology. For businesses, this means integration of relevant technologies through education and practical training.

Invest in infrastructure to grow AI capability

The Midlands needs to improve its digital connectivity and infrastructure. Good digital infrastructure will not only support startups but attract more companies from outside, not just the Midlands, but the UK.

Update HMRC SIC Codes to include AI representation

It is extremely difficult to identify AI, or AI-related, companies from Companies House and other business datasets. It is recommended that a separate SIC code for AI is implemented.

Implement ethical and sustainable policies

As AI adoption grows in products and services, it's crucial for the Midlands to lead in implementing ethical policies that promote Equality, Diversity, and Inclusion (EDI), while also addressing sustainability concerns around energy use, circularity and carbon emissions.

Set up a Midlands AI Venture Capital ecosystem

The Midlands AI ecosystem currently lacks the venture funding necessary to embrace the technology and its associated benefits. Establishing a funding / venture capital ecosystem, akin to Silicon Valley in the USA, will go some way to address this.