Harnessing AI to boost Northern Ireland's productivity

Implications for people, business, and government

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Abstract

Artificial Intelligence (AI) has the potential to boost productivity and drive economic growth. In this report, we examine whether AI can help Northern Ireland close its persistent productivity gap. The answer ultimately depends on how AI affects the key drivers of productivity in the region. To this end, we assess the implications of AI for skills and training, for businesses, and for the Northern Ireland Executive. We find its workforce is more concentrated in occupations and sectors which have low productivity and are more exposed to AI. The ability to strengthen Northern Ireland's drivers of productivity growth will therefore determine whether AI leads to a productivity convergence or a continuation of poor performance. We conclude that an effective AI strategy for Northern Ireland should help people and businesses adopt AI, place AI at the heart of public sector transformation, and offer forward-looking, productivity-focused guidance on AI adoption.

Contents

1 Executive Summary

1.1. Artificial Intelligence (AI) is the latest in a series of transformative digital technologies. While its broader social implications remain uncertain, its economic impact is becoming clearer. Global estimates suggest that AI could increase productivity by between 0.7 and 6.8% by 2040. The UK's Office for Budget Responsibility, reflecting the UK's weak productivity performance, projects a more modest 2.3% increase.

1.2. Northern Ireland has a persistent productivity gap relative to the rest of the UK. Whether AI can help close this gap depends on how it affects the five drivers of productivity in the Northern Ireland Productivity Dashboard: business performance and characteristics; skills and training; policy and institutions; health and wellbeing; and investment, infrastructure and connectivity. Examining AI through this lens, our analysis identifies the key barriers that could limit AI's productivity benefits for Northern Ireland.

1.3. We find that Northern Ireland is more reliant on occupations and sectors which have low productivity and are more exposed to AI. An AI skills strategy should therefore focus on supporting individuals to develop their AI-related skills and engage in lifelong learning, rather than directing government support towards training provision for individual businesses. This approach will strengthen the economy's adaptability to AI-induced change, help support SMEs, and contribute towards addressing persistent inequalities in attainment.

1.4. Evidence from past waves of technology diffusion suggests that successful AI adoption requires investment in complementary assets and co-inventions, an area where Northern Ireland has a mixed track record. The strong link between management quality and AI adoption underscores that business leadership will be critical to keeping pace with AI developments and their practical application.

1.5. AI has the potential to transform Northern Ireland's healthcare system and improve population health outcomes, but this requires sustained investment in digital transformation. More broadly, public infrastructure investment is essential to AI adoption and diffusion. Northern Ireland's existing infrastructure gap already constrains its ability to attract investment and drive productivity growth, and the arrival of AI risks exacerbating this further. A long-term strategy is therefore needed to ensure the planning system and utilities infrastructure do not become barriers to AI investment.

1.6. An AI strategy should be a policy priority for Northern Ireland, owned by the NI Executive Office and built around three strands: (1) supporting AI adoption by people and businesses; (2) transforming public sector services; and (3) providing forward-looking, productivity-focused advice on AI adoption.

1.7. For **individuals**, we recommend seeking opportunities to gain the skills and qualifications needed to use AI effectively in the workplace and embracing lifelong learning. For **businesses**, we recommend adopting a smart second-mover strategy for AI adoption, while investing in the complementary assets and managerial practices needed to support this. Our chief recommendation for the **Northern Ireland Executive** is to adopt a smart second-mover AI strategy, overseen by a Productivity & Growth Board, that focuses on creating the conditions for economy-wide AI adoption by people and businesses, rather than focusing on competing at the frontier of AI development.

2 Introduction

2.0.1 Artificial Intelligence (AI) is the latest in a series of new digital technologies. How it will reshape society is unclear, but its effect on the economy is beginning to be better understood. There is already evidence that it can raise productivity associated with specific tasks and processes: automation and monitoring in production and manufacturing; predictive analytics, personalisation and generating text in services; image interpretation, improving workflow and access to data in healthcare; deep learning in research; and safety monitoring in construction.[1]

2.0.2 The political and policy salience of AI has increased in Northern Ireland.[2] While AI companies only represented 0.2% of all Northern Ireland businesses in 2025, there is evidence that the AI industry's economic contribution has grown, and this is predicted to continue, driven by increasing AI adoption across the economy.[3] This report examines what needs to happen to harness AI so as to boost Northern Ireland's productivity.

2.0.3 AI adoption has the potential to enhance economy-wide productivity through three main channels which affect the tasks and processes completed across occupations and industries:

1. AI can improve efficiency, where it complements or replaces other inputs, reducing the resources required for the completion of a specific task or process.
2. Through greater efficiency, AI allows existing resources to be redeployed to higher value tasks or processes.
3. AI allows new tasks or processes to be completed, which enable the creation of new products and services.

2.0.4 The transformative effect of AI is therefore how it can assist in the better use of resources across the economy. Estimates of the size of this effect on productivity vary, depending on the method and optimism of the author. Even when using the same framework, estimates differ: applying Acemoglu's framework to the US, the economy-wide productivity gain is estimated to be between 0.7% and 6.8% after ten years.[4] Applying this to the UK, the Office for Budget Responsibility (OBR) estimate a central scenario of a 2.3% productivity gain.[5]

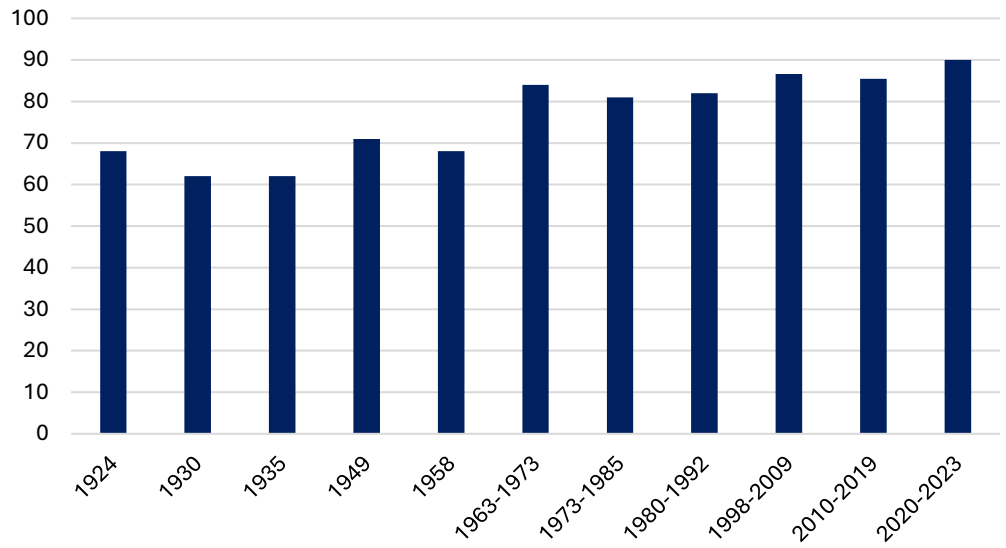
2.0.5 The effect of AI on productivity is of particular importance to Northern Ireland, which suffers from a persistent productivity gap to the UK level. The most recent data shows Northern Ireland's productivity is 12% below the UK level, placing it 8th amongst the UK's twelve regions.[6] This productivity gap is deep seated, and weak productivity growth is the key reason for the relatively poor growth of Northern Ireland's economy.[7]

2.0.6 That Northern Ireland's productivity gap has persisted for over a century is notable (Figure 2.1), given the technological transformation that has occurred during this period. All forms of technological and economic transformation have taken place: from the

[1] Topol, 2019; Dell'Acqua et al., 2023; Besiroglu et al., 2024; Chen et al., 2024; Karountzos, 2025;
[2] NI Executive, 2023; Department for the Economy (DfE), 2025
[3] DSIT, 2023; AICC, 2025; Matrix, 2025; Galvia, 2025; GCD Technologies, 2025; NISRA, 2025
[4] Aghion and Bunel, 2024, and Acemoglu, 2025, cited in OBR, 2025, p.49-50
[5] OBR, 2025, p.49-50
[6] Donaldson et al., 2025
[7] FitzGerald and Morgenroth, 2020

electrification of homes and workplaces; the rise of aviation and mass-produced cars; the use of antibiotics, medical imaging and vaccines; and the spread of computers, mobile phones, and the internet.

Figure 2.1: Northern Ireland's total value of output per job (UK=100)

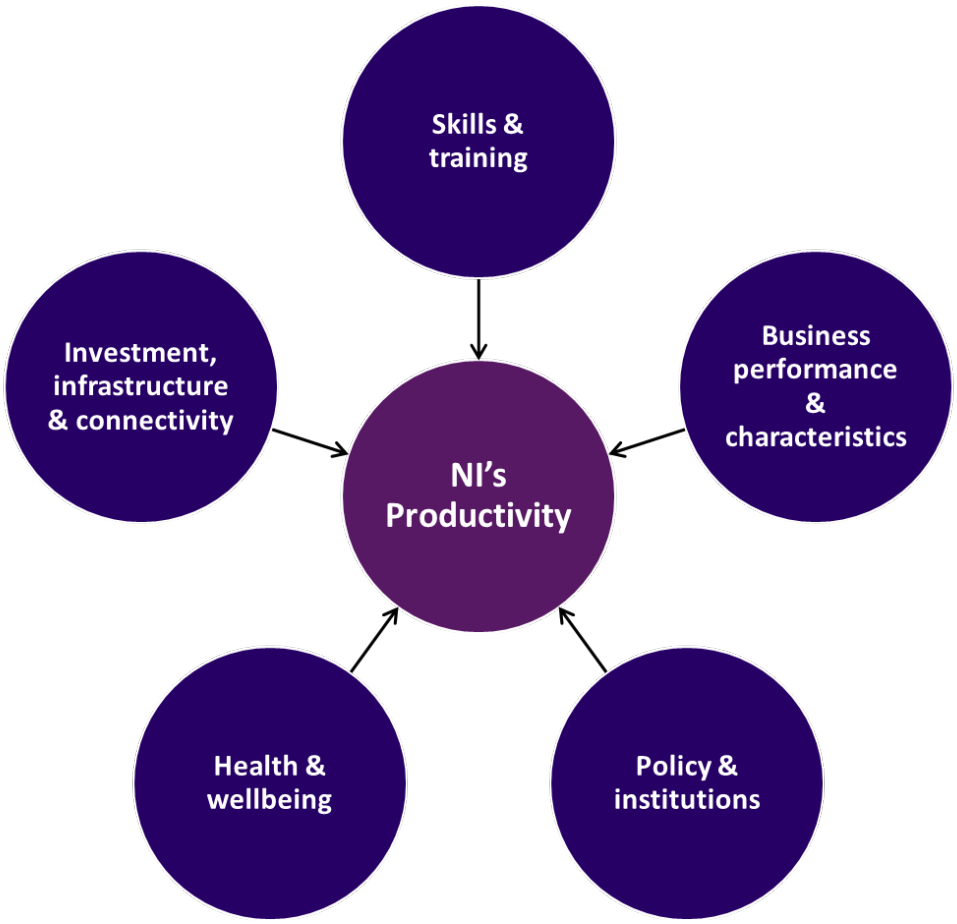


Notes: Grouped years are averages per year. Productivity measured as total value of output per job: for 1924-1992, manufacturing only, calculated as net output per head; for 1998-2023, all sectors, calculated as gross value added per job filled.
Sources: For 1912-1992: Birnie and Hitchens, 1999, p.34. For 1998-2023: ONS, 2025a.

2.0.7 The reasons for Northern Ireland's persistent productivity gap are identified in *Northern Ireland's productivity challenge: Exploring the issues*. These explanations can be grouped together into five categories of productivity drivers, shown in Figure 2.2, as measured in the annual *Northern Ireland Productivity Dashboard*.

2.0.8 Together, these five categories of productivity drivers underpin the ability of people, businesses, and government to achieve productivity growth. Each category relates to a different productivity stakeholder: Skills and training relates to individual employees; Business performance and characteristics relates to individual businesses; Policy and institutions relates to government and policymakers; and Health and wellbeing together with Investment, infrastructure and connectivity provide the wider Business and employee environment that businesses and employees operate within.

Figure 2.2: The drivers of Northern Ireland's productivity



Notes: Based on Jordan and Turner, 2021, 2022; Donaldson, Jordan and Turner, 2025.

2.0.9 Whether AI boosts productivity growth in Northern Ireland and converges with the UK level will be determined by how AI affects each of these drivers. By looking at AI through this productivity lens, our analysis identifies key weaknesses and barriers which may limit the potential benefits for Northern Ireland. We do this by combining existing research with secondary data to understand how AI will affect each of the productivity drivers, and apply this to Northern Ireland's current context. As our recommendations show, addressing existing shortcomings and strengthening Northern Ireland's economic foundations will determine whether AI leads to a productivity convergence or a continuation of poor performance.

3 What is AI?

3.0.1 Artificial Intelligence (AI) is an umbrella term used to describe a range of technologies that simulate human intelligence. There is no single definition. It is a collective term that can refer to parts of the field (such as generative AI, machine learning, deep learning, agentic AI, or artificial general intelligence), a specific method (such as manufacturing automation), or a particular product (such as ChatGPT, Claude, Perplexity, Gemini, or Copilot).

3.0.2 This report follows the OECD's definition:

> *An AI system is a machine-based system that, for explicit or implicit objectives, infers, from the input it receives, how to generate outputs such as predictions, content, recommendations, or decisions that can influence physical or virtual environments. Different AI systems vary in their levels of autonomy and adaptiveness after deployment.*[8]

3.1 Digitalisation, general purpose technologies, and AI

3.1.1 Technology has rapidly advanced over recent decades, with economies worldwide adopting and integrating new digital technologies that have transformed business and society. These have enabled automated production, instant access to information, and immediate communication. AI is simply the most recent form of digital technology.

3.1.2 The adoption and integration of digital technologies is commonly referred to as 'digitalisation'. Digitalisation is one of the most important ongoing transformations of the global economy. Many OECD governments have a national digital strategy,[9] and productivity councils all over Europe prioritise the digital transition.[10] Digitalisation matters because it tends to increase competition, profitability, and ultimately productivity.[11] Higher performing businesses are generally more digitalised.[12] Digital technologies raise economy-wide productivity in part because of their quality of being general purpose technologies and, in some cases, tools for inventing new inventions.[13]

3.1.3 A general-purpose technology (GPT) is one which is widely used, continually improving, and spurs knock-on inventions: for example, electricity and the lightbulb.[14] GPTs typically take a long time to diffuse across the economy, but have historically delivered large productivity gains.[15] AI is a digital technology and is widely regarded as a GPT.[16] It has been diffusing alongside other digital technologies for decades,[17] which can be easily overlooked, as AI technologies often stop being labelled as AI once they become widely

[8] OECD, 2024a, p. 4
[9] OECD, 2026
[10] Fidrmuc et al., 2019 (Slovakia); Productivity Council, 2023 (Denmark); NCPC, 2023 (Ireland); APB, 2024 (Austria); NPB, 2024 (Belgium); UL Think Tank LV Peak, 2024 (Latvia); CPB, 2024 (Netherlands); NPB, 2024 (Malta); NPC, 2025 (Luxembourg)
[11] Brynjolfsson et al., 2021; Coyle et al., 2022; Bunel et al., 2024; DSIT, 2025
[12] Gal et al., 2019; Bunel et al., 2024
[13] Crafts, 2021; Cockburn et al., 2018; Labhard and Lehtimäki, 2022
[14] Lipsey et al., 2005; Crafts, 2021
[15] Brynjolfsson et al., 2017, 2021 ; Crafts, 2021
[16] Klinger et al., 2018; Trajtenberg, 2018; Crafts, 2021; Eloundou et al., 2023; Baily et al, 2025
[17] McElheran et al., 2024; Calvino and Fontanelli, 2023a; Bunel et al., 2024

used. The potential applications of AI throughout the economy are summarised in Table 3.1.

Table 3.1: Potential AI applications

Sector	Potential Uses of AI
Agriculture	Choosing optimum crops for weather conditions; monitoring crops and conditions; improving crop quality and resource efficiency; forecasting prices; employing automated workers such as robots that distribute fertiliser.
Education	Assisting teachers with lesson planning; scheduling; marking; responding to queries; diagnosing learners' needs; identifying appropriate learning materials.
Engineering	Providing networks; forecasting; routing; maintenance and security; managing network quality in energy, water, wastewater, transport and telecommunications infrastructure.
Finance	Enhancing data and analytics; increasing operational efficiency; detecting fraud; modelling investments; assessing risks; approving loans; automating compliance.
Freight and transport	Supporting freight management; monitoring goods; managing last-minute deliveries; monitoring traffic flows; providing traffic status; navigation.
Healthcare	Medical imaging; supporting clinical decisions; monitoring patient health; assisting surgery; identifying high-risk patients; diagnosing diseases; personalised treatments; drug discovery.
Justice system, policing and security	Predicting crimes; assisting visa processing; facial recognition and identity matching.
Manufacturing	Processing data; monitoring and optimising processes; predicting outcomes; diagnosing faults; estimating how long tools can be used.
Marketing and sales	Analysing market trends and customer data; personalised marketing communications; campaign assistance; virtual sales representatives.
National security and military operations	Intelligence gathering; data analysis; use in weapons systems.
Personal contexts	Search engines; chatbots; virtual assistants; activity trackers; recommendation systems.
Recruitment and management	Devising job adverts; sourcing candidates; filtering CVs; allocating tasks; managing performance; surveillance and monitoring of the workforce.

Source: Gajjar, 2023, p.10.

3.2 AI and the digital productivity paradox

3.2.1 As new digital technologies diffuse throughout the economy, they create uncertainties for employees and employers: AI may threaten jobs and entire industries, it may create jobs and entirely new industries, or it may do a combination of both. Ideally, this process of 'creative destruction' sees old, lower productivity industries replaced with new, higher productivity industries, through the reallocation of resources throughout the economy.[18]

3.2.2 How this process is experienced by businesses, employees, and wider society, depends on the relative speed of both creation and destruction. If destruction outpaces creation, this can lead to unemployment and slow economic growth, which can become a persistent feature of those places most intensely affected. AI does have the potential to make this process more creative, by lowering the entry barriers for small businesses to enter markets, if they have the right access to new technology.[19] Alternatively, the process

[18] Schumpeter, 1942; Aghion et al., 2023
[19] Norbäck and Persson, 2024

may become more destructive due to the rapid speed of change, where the investment that AI requires for successful adoption acts as a barrier for smaller businesses and relatively poorer places, reinforcing the competitive advantage of larger businesses and more prosperous places that are able to adopt AI more quickly. An economy's ability to reallocate resources and support the growth of new industries is therefore crucial for seeing productivity growth from new technologies such as AI.

3.2.3 Despite many recent digital innovations, overall productivity in many developed countries has slowed, creating what is often called the 'productivity paradox'.[20] One leading explanation is that digital technologies are still in an installation phase, and that it will take time for businesses and economies to adjust to new innovations before productivity gains are fully realised.[21] Another explanation is that the often intangible benefits of new innovations are easily mismeasured, implying that productivity might be improving but is not fully captured in traditional metrics.[22]

3.2.4 AI is exhibiting its own paradox: many businesses are adopting it but seeing limited returns on investment so far.[23] If we assume that AI has the potential to provide real productivity improvements, the current evidence suggests that these will only be realised as AI becomes more deeply integrated into the processes of businesses and is fully exploited. Therefore, understanding how AI interacts with the key drivers of productivity is critical if people, business, and government are going to see a demonstrable improvement in productivity.

[20] van Ark, 2016
[21] van Ark, 2016; Coyle, 2023
[22] Coyle, 2023; Bijnens et al., 2025
[23] Deloitte, 2025; Yotzov et al., 2026

4 Skills and Training

4.0.1 Low levels of human capital – which covers the skills and training of the workforce – is a key explanation for the persistence of Northern Ireland's productivity gap.[24] Ensuring employees in Northern Ireland have the right skills and training to adapt and exploit advances in AI technology will therefore be crucial in determining whether AI raises productivity.

4.1 Northern Ireland's current skills issues

4.1.1 Northern Ireland's skills deficit has two main aspects: an 'attainment gap', where too many individuals have no or low skills; and a 'brain drain', where a relatively lower proportion of the workforce is educated to tertiary level.[25] While Northern Ireland has seen an improvement in both aspects over time, it still has the highest rate of individuals with no or low skills of any UK region, and its proportion of individuals educated to a tertiary level still lags the UK average.

4.1.2 Northern Ireland's skills deficit is not limited to qualifications: it suffers from a 'low skills equilibrium', where there is a lack of both demand and supply for skills.[26] This means that while employers in Northern Ireland face lower skills shortages than the UK average, this in part reflects the lower skills profile of the work they carry out. Skills shortage vacancies have increased over the long term, emphasising the constraint this poses for businesses seeking to develop into higher productivity areas.

4.1.3 The skills deficit is compounded by a poor record for employer-provided training.[27] Northern Ireland has the second lowest proportion of employers providing training of any UK region, and this performance has worsened over time. In contrast, Northern Ireland performs above the UK average for lifelong learning, which covers training and development both in and out of the workplace. This suggests an underlying demand from individuals to continue developing their knowledge and skills, albeit this is not primarily happening through the workplace.

4.2 AI and the changing nature of work

4.2.1 AI has the potential to drastically reshape the tasks that individuals complete as part of their daily work. As a result, the rapid advances made by AI have led to a re-emergence of 'automation anxiety', with the potential for high numbers of jobs to be replaced, and the quality of remaining jobs reduced.[28] In the past, new technologies have inspired similar unemployment fears, but the reality has not lived up to these expectations.[29] The application of AI to radiology in Box 4.1 provides an example of how predictions of occupational demise due to AI may well be exaggerated.[30]

[24] FitzGerald and Morgenroth, 2020; Jordan and Turner, 2021; Donaldson, Jordan and Turner, 2025
[25] Jordan and Turner, 2021; Donaldson et al., 2025
[26] Mac Flynn, 2017; Donaldson et al., 2025; Donaldson, Jordan and Turner, 2025
[27] Donaldson et al., 2025
[28] Mac Flynn and Wilson, 2019
[29] Mokyr et al., 2015
[30] Topol, 2019; Brady et al., 2025; Christensen et al., 2025; Royal College of Radiologists, 2025

Box 4.1: What can radiologists tell us about the effect of AI on occupations?

AI and automation do not necessarily eliminate whole occupations. Radiologists have experienced major technological advances, allowing AI-assisted image processing to rapidly increase their efficiency. Yet demand for radiologists has remained strong.

In 2016, Nobel Prize winner Geoffrey Hinton, to some 'The Godfather of AI', claimed that people should stop training as radiologists because AI would soon be much better at reading scans. A decade later, AI has indeed significantly improved radiology image processing: yet there are more radiologists than before, with their salaries rising, and the UK, US, and parts of Europe all facing radiologist shortages.

Radiologists are still reading scans, albeit assisted by automation and AI tools. Radiology services have expanded, demand for imaging has grown, and AI is used to augment rather than replace.

4.2.2 Other occupations will have differing levels of exposure to AI within their tasks. For example, there is evidence that AI is changing software occupations. Junior level developers have benefitted from generative AI, because AI has shortened the learning curve, automating tasks that junior developers typically struggled with.[31] There are documented impacts of AI on other professions, including customer service, professional and general writing, and business consulting.[32] On average, generative AI saves time at work which is expected to continue as use becomes more streamlined.[33]

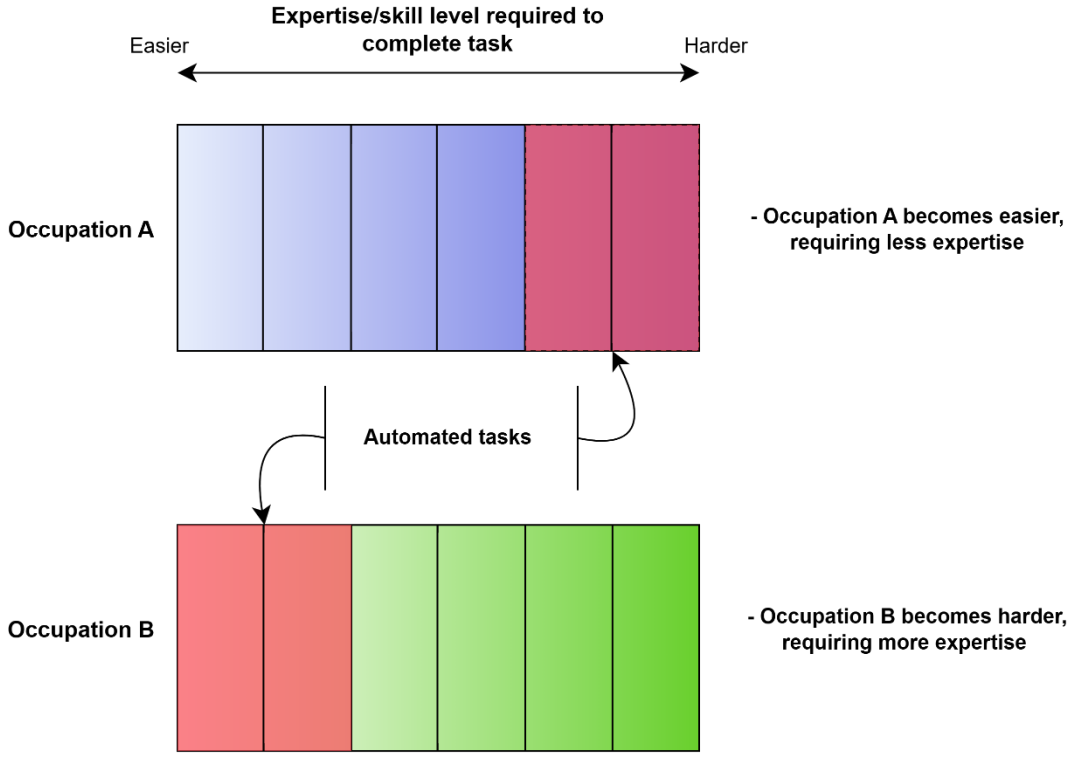
4.2.3 How AI affects tasks and skills of different occupations can be viewed through the lens of automation. Digitalisation and automation typically affect structured, routine tasks. However, recent advances in AI tools mean these can automate some non-routine and cognitive tasks.[34] Figure 4.2 shows how the impact of AI will vary depending upon the tasks and characteristics of different occupations. For the 6 tasks completed by Occupation A, the two most difficult tasks are replaced by AI; for Occupation B, its two least difficult tasks are replaced by AI. This can apply to job roles within an overall occupation. For example, Occupation A could be a trainee accountant in an accounting firm, who is yet to develop higher level skills and expertise, compared to a senior partner who is Occupation B. Similar changes are taking place within other occupations, such as in software engineering.[35]

4.0.4 When replicated across the whole economy, this can lead to the bifurcation of occupations.[36] Relatively lower skilled, lower productivity occupations see AI replace previously more difficult, higher skilled tasks. These employees see their work become more concentrated on those tasks which are less exposed to AI and may reward 'softer' skills, such as face-to-face customer service. For relatively higher skilled, higher productivity occupations, AI replaces more straightforward, lower skilled tasks. This means that employees see their work become more concentrated on those tasks which reward higher-order skills and expertise consistent with tertiary qualifications, with AI

[31] Eastwood, 2026; Hoffman et al., 2025
[32] Brynjolfsson et al., 2025; Noy and Zhang, 2023; Haslberger et al., 2024; Dell'Acqua et al., 2023
[33] Bick et al., 2025
[34] Frey and Osborn, 2017; Gathmann et al., 2024
[35] Eastwood, 2026; Sync NI, 2026
[36] Autor and Thomspon, 2025

augmenting their work. Ultimately, this would lead to a loss of employment for those in middle-skill occupations, and an increasing concentration of employment in either low or high-skilled occupations. The outcome for productivity will depend on whether a transition to higher skilled, higher productivity occupations can be successfully made.

Figure 4.2: A task-based view of AI



Notes: Occupation A could be a trainee accountant and Occupation B could be a partner in the accounting firm. Source: Based on Autor and Thompson, 2025.

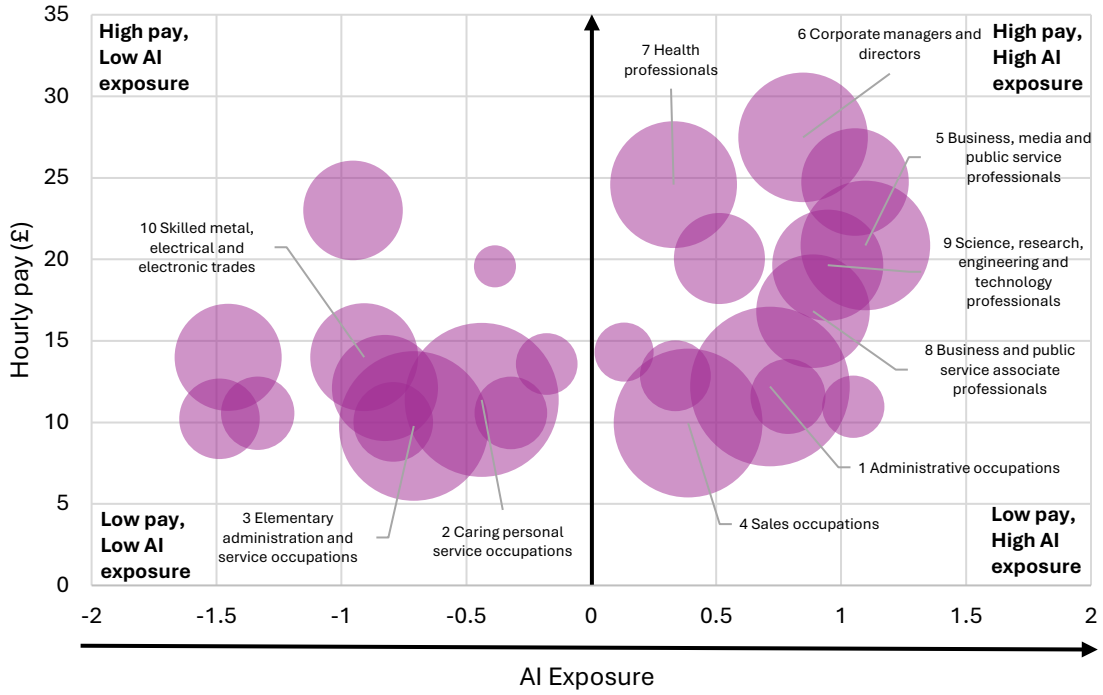
4.3 The economy-wide exposure of occupations to AI

4.3.1 The extent to which the effects of AI at the employee level will feed through to the overall economy and productivity depends on the relative exposure of different occupations to AI, and the relative size of these occupations in the wider economy. Research has produced estimates of how exposed different occupations and sectors are to AI, and we use the exposure measure created by Felten et al. (2021) for the US economy, which we apply to Northern Ireland.[37] Figure 4.3 shows how exposure to AI (horizontal axis) varies by occupation across Northern Ireland (Panel A) and the UK (Panel B), relative to each occupation's average wage (vertical axis) as a proxy for productivity, and total employment (bubble size).

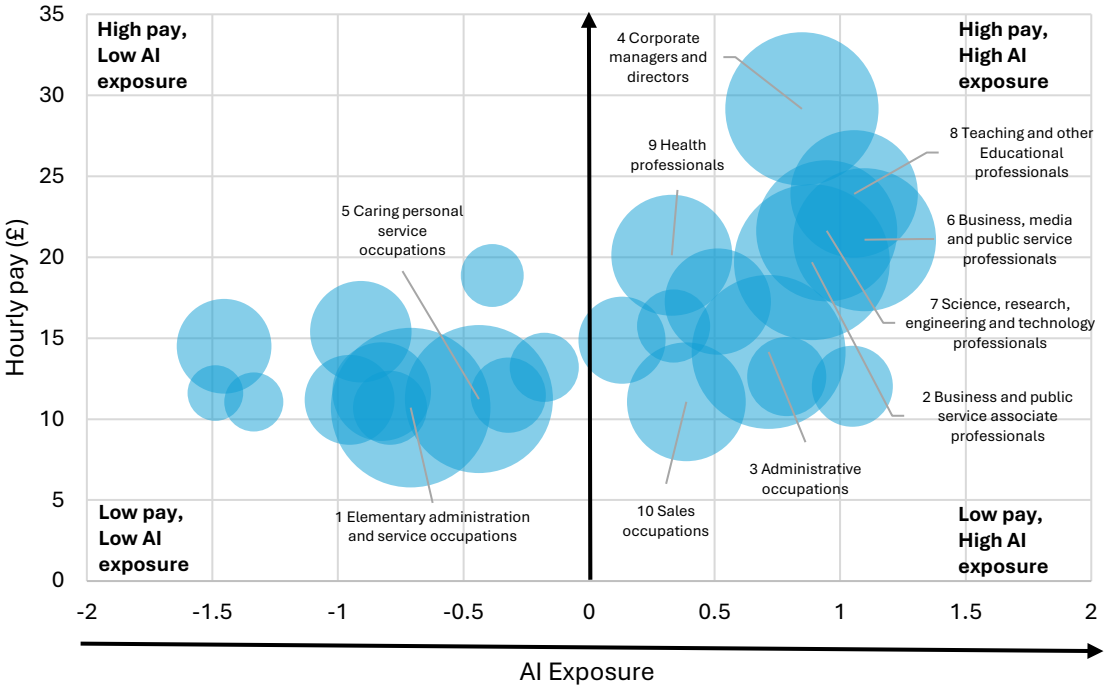
[37] To apply this to Northern Ireland, we match US SOC AI Occupational Exposure (AIOE) and US SIC AI Industry Exposure (AIIE) to their closest equivalent UK SOC 2-digit occupation classification and UK SIC 2-digit industry classification respectively. We assume that equivalent occupations and sectors are similarly exposed to AI in Northern Ireland: these measures of AI exposure have been applied in a similar context, by Williamson et al. (2024) to the Republic of Ireland.

Figure 4.3: AI Exposure across occupations

Panel A: Northern Ireland



Panel B: UK



Notes: Graph measures hourly pay per occupation relative to US SOC AI Occupational Exposure (AIOE) re-classified by the UK SOC 2-digit occupation classification. AI exposure is relative, where 0 is the average exposure to AI across occupations, and negative (positive) is below (above) average. Top 10 largest occupations by employment labelled in order of size. Size of bubble indicates share of total employment ranging from 0.6% (smallest) to 9.1% (largest). All data for 2021.
Sources: Felten et al. (2021) for AI exposure. For Northern Ireland: hourly pay from NISRA (2025a); employment from NISRA (2023). For UK: hourly pay from ONS (2025b); employment from Nomis (2026).

4.3.2 AI exposure in Figure 4.3 is relative, where zero is the average exposure to AI across all occupations, a negative value reflects relatively lower exposure than average, and a positive value reflects relatively higher exposure than average. The highest paid occupations in Northern Ireland have the highest exposure to AI, such as Business, media and public service professionals, Corporate managers and directors, and Science, research, engineering and technology professionals. However, there are also low-paid occupations that are highly exposed to AI and which are large employers in Northern Ireland: these include Administrative occupations, Sales occupations, and Secretarial and related occupations.

4.3.3 Northern Ireland has a lower overall average level of exposure to AI across occupations, at 0.06, compared to 0.21 for the UK, when weighted by occupation size.[38] Northern Ireland also has a lower proportion of the workforce who are more highly exposed, at 57%, compared to 64% for the UK. Greater exposure to AI does not differentiate between whether an occupation will be positively affected (by augmenting human labour) or negatively affected (by replacing human labour). However, Northern Ireland has a lower average wage than the UK.[39] This means the proportion of highly AI-exposed employees who are paid below the UK average wage is higher for Northern Ireland, at 41%, compared to only 33% for the UK. Therefore, Northern Ireland is relatively more exposed to low-paid occupations which could see jobs replaced rather than augmented. This creates the potential for AI to be more disruptive for employment in Northern Ireland. If the growth of high-skill, high productivity jobs does not take place, Northern Ireland's workforce may become more concentrated in low-skill occupations that are less exposed to AI but with lower potential for productivity growth.

4.4 What are the implications for Northern Ireland?

4.4.1 Past automation in Northern Ireland was associated with a reduction in the number of middle-skill occupations and an increase in the number of low- and high-skill occupations.[40] This is consistent with how AI might lead to a bifurcation of tasks across individual occupations. In turn, this raises the potential danger of AI reinforcing Northern Ireland's existing structural bias towards lower skilled, lower productivity jobs. If employees in middle-skill occupations are unable to move into higher skilled occupations, greater AI adoption will displace these employees towards lower skilled, lower productivity occupations. Ensuring employees have the right skills and qualifications to adapt to AI in the workplace is therefore critical to providing them with the opportunity to move into higher skilled jobs.

4.4.2 This problem could be further exacerbated by the 'low skills equilibrium'. Employers in Northern Ireland already provide relatively less training, and a shift towards low-skill occupations would reduce the return from training even further. Employees could therefore be locked into their own personal 'low skills equilibrium', without avenues to develop new AI-relevant skills, and with low demand for these skills from employers.

[38] Overall exposure calculated as a weighted average of each occupation's AI exposure relative to its share of the total workforce.
[39] In Figure 4.3 the weighted average hourly wage across occupations for Northern Ireland is £15.64, compared to £16.72 for the UK.
[40] Foster and Wilson, 2019; Mac Flynn and Wilson, 2019

4.4.3 This suggests a need for policy intervention to prevent the existing low skills equilibrium being exacerbated. This should ensure that existing employees can access relevant training, particularly in middle-skill occupations that are highly exposed to AI, which gives them the opportunity to develop higher-order skills, both in the use of AI, and in areas where AI provides complementarity to existing skills and tasks. As AI diffuses, some people may need to broaden their skills base, while others may need greater specialisation. Soft skills – which focus on socio-emotional skills that are particularly important for human-facing occupations – will likely become increasingly important as a differentiator across all sectors.

4.4.4 In the context of a low-skills equilibrium, an AI skills strategy should prioritise the training and skills development of individuals, rather than directing government support for training towards individual businesses. The uncertainty surrounding how AI will develop creates significant difficulties for government to decide which businesses to support. By focusing on the AI skill needs of individuals, the government will help strengthen the adaptability of Northern Ireland's economy, and provide an avenue to address persistent inequalities in skills and educational attainment.

4.4.5 Given the high proportion of SMEs in Northern Ireland's economy, many of the issues relating to AI skills and training will be faced by businesses with fewer than 10 employees, alongside those who are self-employed. Economy-wide gains from productivity will require AI adoption by these businesses. Focusing on the training needs of individuals and developing their skills will therefore increase the capacity of SMEs and the workforce to adapt to AI-induced changes, and provide a strong foundation for individual entrepreneurship, an area where Northern Ireland has traditionally lagged behind.

4.4.6 This approach reinforces the importance of lifelong learning as part of an AI skills strategy. An attitude of lifelong learning is key for people to adapt to an increasingly digital economy, and supports effective AI adoption.[41] This is also an area where Northern Ireland has existing strengths. Given the potential rapid development of AI and its application to work, the capacity to meet this challenge will be as much a function of those already in the workforce today rather than future employees. Table 9.1 in the Appendix sets out examples of AI-related training that can be completed by individuals and is currently available in Northern Ireland.

[41] OECD, 2025c; UNESCO, 2025

5 Business Performance and Characteristics

5.0.1 Differences in the performance and characteristics of businesses is a key explanation for Northern Ireland's productivity gap.[42] AI and other digital technologies have the potential to improve the productivity of businesses.[43] However, not all businesses will be affected in the same way, and so it is important to understand how AI will interact with the key drivers of business productivity.

5.1 Business and Northern Ireland's productivity

5.1.1 One of the earliest explanations for Northern Ireland's low productivity was its economic structure, with a relatively high concentration of businesses in low productivity industries. The evidence shows that today this is only part of the explanation, with a long tail of underperforming businesses across all sectors dragging down economy-wide productivity.[44]

5.1.2 Competition encourages businesses to make decisions that prioritise productivity. Yet there is evidence that businesses in Northern Ireland have not experienced this pressure, instead engaging in satisficing, where they aim to meet a target for an acceptable level of revenue to survive rather than maximising profits. This can be seen in declining export intensity across the economy in recent years.[45]

5.1.3 Historically, research and development (R&D) expenditure by businesses in Northern Ireland has been relatively low, and economy-wide R&D intensity remains below the UK average, despite recent growth.[46] Wider levels of innovation across business processes and products remains a problem, with Northern Ireland one of the worst performing UK regions. Northern Ireland has particularly suffered from 'soft peripherality', being distanced from networks relating to new knowledge and technology.[47]

5.1.4 Access to finance is a key requirement for starting and developing a business. Although, Northern Ireland has improved to match the UK rate of SMEs where finance is a major obstacle, barriers to accessing external finance remain.[48] In addition, entrepreneurship levels remain low in Northern Ireland, and there is evidence of a management practices gap, which is particularly evident for smaller, domestically orientated businesses with less well qualified managers.[49]

5.2 Which businesses and sectors will gain from AI adoption?

5.2.1 Business-level evidence on the aggregate effects of AI adoption strongly suggests that businesses using AI – and digital technologies more broadly – tend to be more

[42] Jordan and Turner, 2021; Donaldson et al., 2025
[43] Acemoglu et al, 2025; Calvino and Fontanelli, 2023a; Czarnitzki et al., 2023; McElheran et al., 2024; Babina et al., 2024
[44] Mac Flynn, 2017; Jordan and Turner, 2021; Jordan, Pramanick and Turner, 2023; Fliers et al., 2023
[45] Hitchens, Wagner and Birnie, 1990; Jordan, and Turner, 2021; Donaldson, Jordan and Turner, 2025, p.3
[46] Donaldson et al., 2025
[47] Brownlow, 2013; Jordan and Turner, 2021
[48] Donaldson et al., 2025
[49] Jordan, Pramanick and Turner, 2023; Donaldson et al., 2025

productive.[50] AI has also proven useful for R&D in specific sectors, such as pharmaceuticals, healthcare, and materials science, indicating its potential as a new method of innovation.[51] More highly exposed sectors tend to be more knowledge-intensive, with more potential for productivity growth, whereas less exposed sectors are typically more reliant on physical processes and human interaction.[52]

5.2.2 The overall effect of AI across different sectors of the economy remains uncertain at this early stage of adoption, with limited availability of robust evidence. Sectoral exposure to AI can act as a proxy to understand what effect it might have. Figure 5.1 shows how exposure to AI (horizontal axis) varies by sector across Northern Ireland (Panel A) and the UK (Panel B), relative to each sector's productivity (vertical axis) and total employment (bubble size). Northern Ireland has a similar overall average exposure to AI across sectors, at 0.26, compared to 0.29 for the UK.[53] Focusing only on sectors which are highly exposed (above zero), these also account for a similar proportion of Northern Ireland's workforce, at 68%, compared to 66% for the UK.

5.2.3 This measure of AI exposure does not identify whether it will have a positive or negative effect on sectoral productivity. However, compared to the UK, Northern Ireland lacks employment in high productivity sectors which are most exposed to AI. Instead, it has more employment in highly exposed sectors with lower productivity. The proportion of Northern Ireland's workforce in the sectors more exposed to AI but with productivity below the UK average is 80%, compared to 65% for the UK. Given their lower productivity, these sectors may struggle to effectively adopt AI and realise its full benefits, reinforcing Northern Ireland's existing problem of low productivity.

5.2.4 While AI and digital adoption is associated with higher productivity on average, this hides the uneven distribution of gains across types of businesses.[54] Larger and already high-performing businesses tend to benefit most from AI and digitalisation, while the majority of smaller businesses see more limited gains.[55] Evidence shows that larger businesses tend to have greater resources and capabilities available to use AI compared to SMEs.[56] This mirrors the well documented performance gap between larger, younger, and more profitable 'frontier' businesses and the majority of laggards.[57] The Covid-19 pandemic did act as a catalyst for SMEs to increase their digital technology adoption to survive, and has sparked an increase in SME-digitalisation globally, including AI.[58] However, the ability of SMEs to remain up to date can be difficult, as they tend to be constrained by their more limited resources.[59]

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[50] Acemoglu et al, 2025; Yang, 2022; Calvino and Fontanelli, 2023a; Czarnitzki et al., 2023; McElheran et al., 2023; Babina et al., 2024; Siedschlag and Duran-Vanegas, 2025

[51] Paul et al., 2020; Jumper et al., 2021; Merchant et al., 2023

[52] Felten et al., 2021; Calvino and Fontanelli, 2023a

[53] Calculated as each sector's AI exposure weighted by its share of total employment.

[54] Anderton et al., 2023; Siedschlag and Duran-Vanegas, 2025

[55] Coyle et al., 2023; Calvino and Fontanelli, 2023a; McElheran et al., 2023; Bunel et al., 2024; Filippucci et al., 2024

[56] Czarnitzki et al., 2022

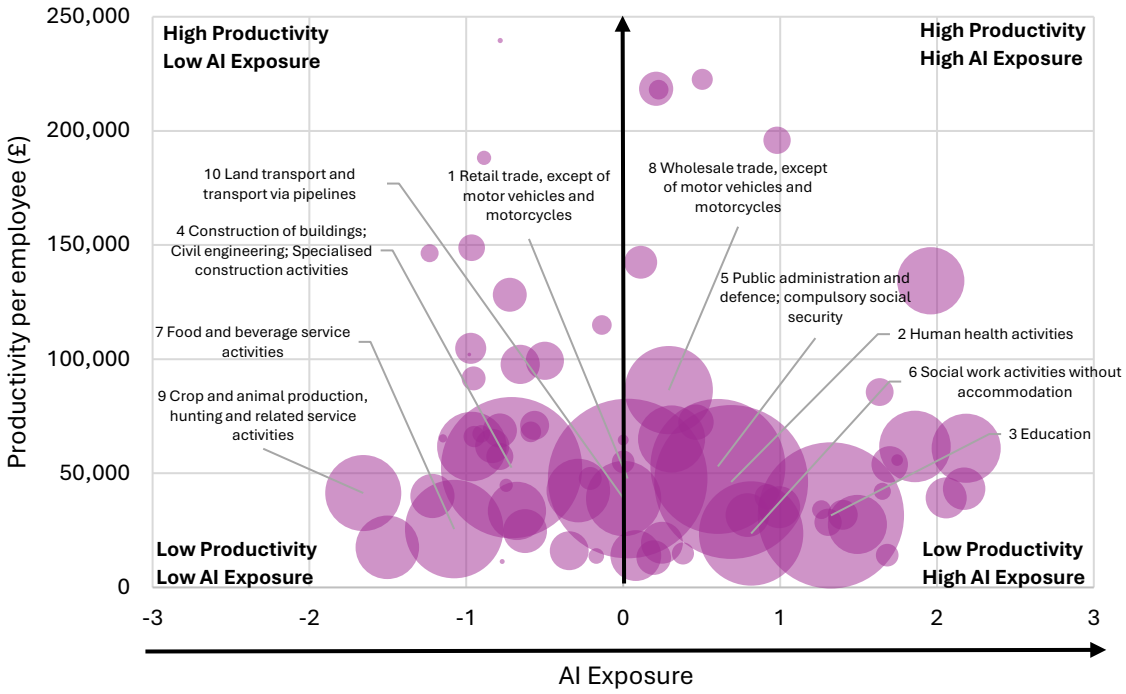
[57] Andrews et al., 2015; Coyle, 2023

[58] Abed, 2021; Luong and Dundas., 2023; Lu et al., 2022; Roffia and Mola, 2022; Roman and Rusu, 2022; Cong et al., 2024

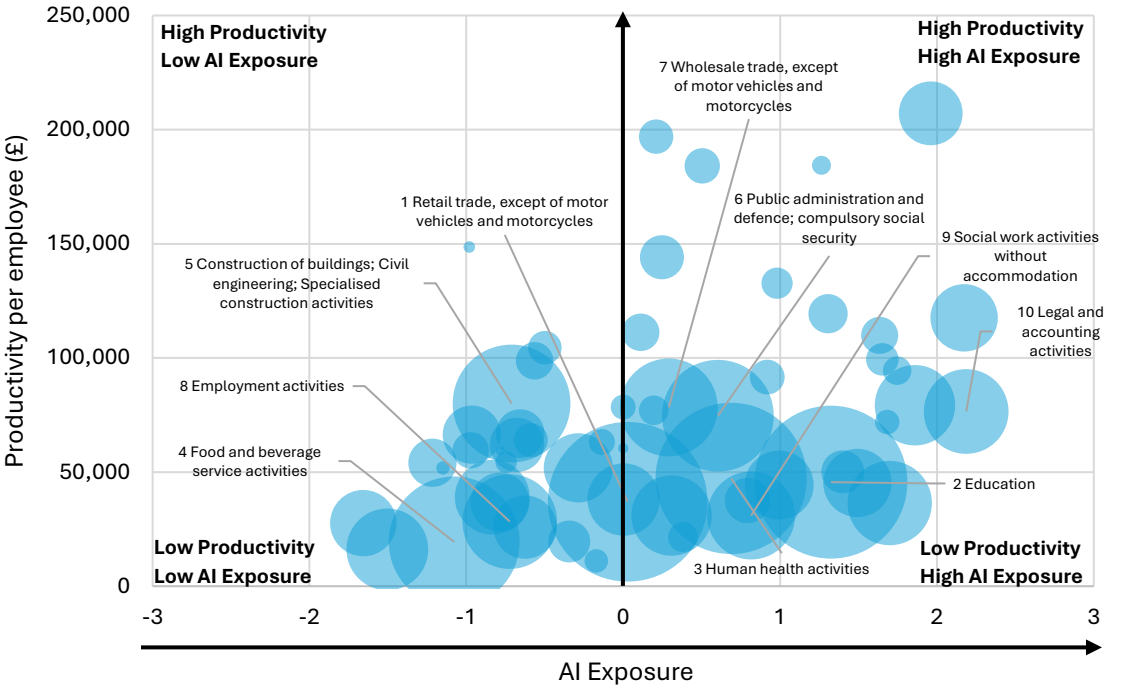
[59] Yesuf and Fields, 2025

Figure 5.1: AI exposure across sectors

Panel A: Northern Ireland



Panel B: UK



Notes: Relative AI exposure based on Felten et al. (2021). Graph measures productivity per employee relative to US SIC AI Industry Exposure (AIIE) re-classified by the UK SIC 2-digit industry classification. AI exposure is relative, where 0 is the average exposure to AI across sectors, and negative (positive) is below (above) average. Top 10 largest sectors by employment labelled in order of size. Size of bubble indicates share of total employment, from 0.01% (smallest) to 10.9% (largest). Sectoral productivity calculated as GVA divided by employment. All data for 2021.
Sources: AI exposure from Felton et al. (2021). GVA by 2-digit industry from ONS (2025c). For employment: Northern Ireland from NISRA (2025b); UK from ONS (2025d).

5.3 How does uncertainty affect AI adoption?

5.3.1 The decision of how much a business invests in AI adoption requires a judgement on the expected return. A Deloitte survey of almost 2,000 executives found that many businesses are concerned about rising AI investment yet slow returns.[60] While media hype can distort realistic expectations, lagging returns relative to expectations can stem from the uncertainty surrounding the measurement of intangible assets. These are intrinsically harder to quantify and prone to mismeasurement, introducing greater uncertainty into investment decisions.[61] This in turn introduces additional uncertainty over the measurement of benefits to productivity, discouraging investment in AI. It is possible that some AI adoption may also be performative, where use is exaggerated to manage stakeholder and public impressions.[62]

5.3.2 Given this uncertainty, and as AI is in its early stages, businesses may adopt a 'second mover' strategy, expecting adoption to be easier in the future.[63] Small businesses may face additional uncertainty around adoption, as their relatively limited access to financial, human and organisational capital poses barriers to technology adoption.[64] Evidence shows that both first and second mover strategies can have positive effects on the innovation capability of small enterprises, with their success depending on the availability of other complementary assets within the business.[65]

5.4 A business's other assets and AI adoption

5.4.1 Both tangible and intangible assets are important drivers of business-level productivity.[66] Tangible assets refer to physical technology, like machinery and hardware. Intangible assets are the organisational structures, workforce skills, software, and the knowledge and processes of a business.

5.4.2 AI's contribution to improving productivity is through its interaction with these other assets. Intangible assets can be the key difference separating high- and low-performing businesses, with evidence showing that the presence of complementary assets plays a central role in successful AI adoption.[67] These complementary assets can take the form of: 'complementary co-inventions', which are internal organisational changes and the tacit knowledge accumulated by managers and employees as they learn how to use the new technology; and 'complementary investments', which are sourced externally and could include investment in employee skills and training that allow workers to productively use new technology.[68]

5.4.3 A lack of complementary assets can be a barrier to effective adoption of new technology, and present costs that affect a business's investment timing decisions.[69] This can help

[60] Deloitte, 2025
[61] Brynjolfsson et al., 2021; Corrado et al., 2021; Bijnens et al., 2025
[62] Gomes, 2025; Elsayed, 2025; Elsayed, 2026
[63] Hoppe, 2000
[64] Hewitt-Dundas, 2006; Jones et al., 2014
[65] Nafizah et al., 2023
[66] Coyle, 2023; Brynjolfsson et al., 2021
[67] Calvino and Fontanelli, 2023b; Roper, 2023
[68] Bresnahan and Greenstein, 1996; Brynjolfsson et al., 2021; Coyle, 2023
[69] Bresnahan and Greenstein, 1996

explain the digital 'productivity paradox', where new technology takes a long time to diffuse, and is initially associated with slow productivity growth.[70] It can take a significant amount of time for a business to build-up the necessary complementary assets to take advantage of new technology. Businesses may therefore experience a temporary slowdown in productivity during the early periods of adoption, as complementary co-inventions and investments take place: this is described as the 'productivity J-curve', reflecting delayed J-shaped returns to investment.[71]

5.5 Management practices and AI adoption

5.5.1 Good management practices contribute to better business performance and higher business-level productivity.[72] This holds true for both the UK and Northern Ireland.[73] Good management is one of the most important complementary assets required to effectively adopt new technologies.[74] Famously, the information technology revolution of the 1990s resulted in much higher productivity in the United States than in Europe because of superior management practices in the former.[75]

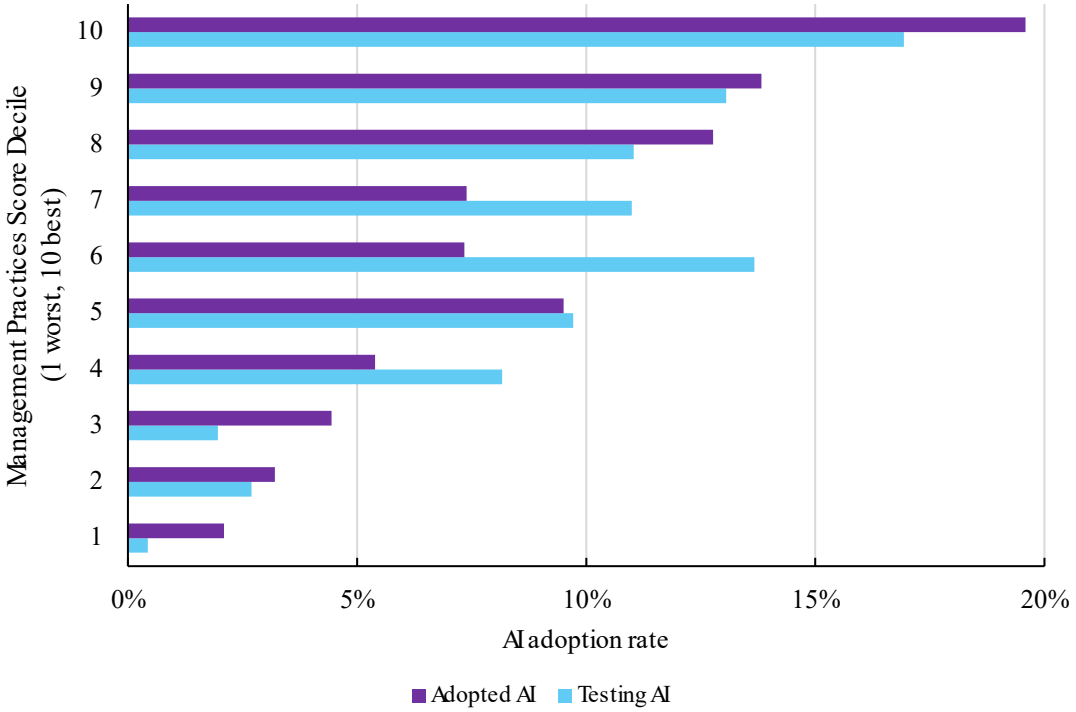
5.5.2 Based on surveys in 2025 and 2026, good management practices are a key predictor of AI adoption by businesses across Europe and the United States.[76] In the UK, an ONS survey found that a higher management practice score was associated with a stronger commitment to AI adoption.[77] Figure 5.2 reveals that nearly 20% of businesses in the highest decile of management practices had adopted AI by 2023, with a further 17% testing the use of AI in their business. Meanwhile, AI adoption and testing was very limited for those businesses in the bottom decile of management practices.

5.5.3 In Northern Ireland, management practices are a strong predictor of the digitalisation of business processes.[78] Unfortunately, Northern Ireland's management practices are the lowest of the UK's twelve regions, which, unless addressed, does not bode well for AI adoption.[79]

5.5.4 Box 5.3 provides an example of how realising the benefits of a new digital technology – the personal computer – depended on making complementary changes to organisational processes, workforce skills, and management practices.[80] If AI follows a similar pattern, business investment solely in AI infrastructure will not be sufficient to substantially raise productivity.

[70] van Ark, 2016; Crafts, 2021
[71] Brynjolfsson et al., 2021; McElheran et al., 2023
[72] Bloom and Van Reenen, 2007
[73] ONS, 2018; Jordan, Pramanick and Turner, 2023
[74] Brynjolfsson et al., 2021
[75] Bloom et al., 2012
[76] Bick et al., 2026
[77] ONS, 2024
[78] Jordan, Pramanick and Turner, 2023
[79] ONS, 2024
[80] CBR Staff Writer, 1994; Bresnahan and Greenstein, 1996

Figure 5.2: AI adoption and management practices in UK businesses



Notes: Management practices score measures how close to best practice a business's management practices are.
Source: ONS, 2024

Box 5.3: The importance of complementary assets in the PC revolution

In the 1980s, client/server systems and PCs emerged. This allowed computing to be decentralised away from bulky mainframe computers, which were expensive and required specialised personnel to operate.

Client/server systems and PCs could do many of the same tasks as mainframes at a fraction of the cost, and were far easier to use, dramatically reducing the size of business computing systems. On paper, the benefits of adoption were clear and undisputed. Yet many businesses chose to delay adoption, if at all.

The additional costs of complementary investments were one reason for delayed adoption, even if the core technology itself was affordable. These included:

- Integrating client/server systems alongside mainframes required complex software adjustments.
- The market supply of complementary components was initially limited.
- In-house programmers understood mainframe and not client/server systems, so employing the technical expertise was expensive.
- While client/server systems were strictly better than mainframes, they required a re-organisation of management practices to be effective.

Evidence shows that large productivity gains only arrived after users and suppliers developed the necessary complementary co-inventions and organisational restructuring, including management practices.

5.6 What are the implications for Northern Ireland?

5.6.1 The effect of AI on productivity is unlikely to be spread evenly across businesses and sectors. Employment in Northern Ireland is relatively more concentrated in sectors which have low productivity and are highly exposed to AI. If Northern Ireland is to raise its productivity, then businesses in these sectors must adopt AI effectively, and use this as an opportunity to raise their productivity.

5.6.2 The characteristics of businesses within these sectors will determine the success of AI adoption. Given it is larger and already high-performing businesses that are expected to benefit most from AI adoption, there is a risk this will reinforce existing inequalities across business performance in Northern Ireland. This could mean that a small number of businesses see substantial productivity improvements and can successfully compete in international markets; but economy-wide, an increasing number of businesses become part of the 'long-tail' of underperformers, increasingly reliant on the domestic market.

5.6.3 SMEs are a critical part of Northern Ireland's economy, with 89% of businesses having fewer than 10 employees.[81] SMEs are already resource constrained and face barriers to accessing finance, hindering their ability to make the necessary investment in both AI and complementary assets. In 2025, 25% of SMEs in Northern Ireland needed support with AI skills, and 26% needed support with technology adoption.[82] Support for SMEs should focus on providing networks that support the diffusion of practical applications of AI. New initiatives, such as the Artificial Intelligence Collaboration Centre (AICC), have begun to meet this challenge.

5.6.4 The evidence from past GPT diffusion and digitalisation suggests that successful adoption requires investment in complementary co-inventions and assets. Northern Ireland has a mixed track record in this area, given relatively lower R&D intensity concentrated in a small number of relatively large businesses, and lower levels of economy-wide innovation. As the skills section of this report discusses, businesses in Northern Ireland also tend to underinvest in the skills and training of their employees. This makes Northern Ireland's economy more vulnerable to fast-paced technological change.

5.6.5 The strong link between management practices and AI adoption demonstrates that business leadership will be crucial to Northern Ireland keeping pace with new developments. Furthermore, good managers are needed because uncertainty will play a role in shaping the decisions made by businesses over where they make investments in both AI and complementary assets.

5.6.6 There is a danger that 'hype' around new AI developments may obscure where businesses might see the greatest practical benefits. With the right investment, a skilled workforce, and appropriate government support, Northern Ireland could see businesses at the cutting edge of AI research. However, the current uncertainty associated with AI means this would be a risky strategy to prioritise for a small, regional economy such as Northern Ireland. Instead, a 'smart second mover' strategy which focuses on economy-wide productivity gains from practical AI adoption should be a priority for government and the majority of business leaders, thus helping the long tail of underperforming businesses catchup with their productivity leading peers.

[81] Department for the Economy, 2025
[82] Enterprise Northern Ireland, 2025

6 Business and Employee Environment

6.0.1 The business and employee environment in Northern Ireland determines the capacity for businesses and people to effectively adopt AI and facilitate productivity growth. This combines Health and wellbeing, which ensures people can reach their full potential when in work, with Investment, infrastructure and connectivity, where inequality of access for people and businesses can affect spatial AI adoption, reducing attractiveness for inward investment.[83]

6.1 The key issues affecting NI's business and employee environment

6.1.1 Northern Ireland has the highest economic inactivity levels of any UK region. A key driver of this is long-term ill health, which accounts for over one third of those who are economically inactive. This has worsened over time, linked to a lack of resources particularly in healthcare, a failure to reform public services, and an ageing population creating increasing pressure. [84]

6.1.2 Northern Ireland lags behind in the investment needed to create the foundation for productivity growth, with the lowest gross fixed capital formation (GFCF) of any UK region. Attracting foreign direct investment (FDI) has been a central part of Northern Ireland's economic strategy, although evidence of its contribution towards raising productivity has been limited, with FDI intensity showing evidence of a long-term decline.[85]

6.1.3 There have been low levels of public investment in Northern Ireland's connectivity and infrastructure, although it has seen some recent improvements. Recent investment has seen access to Gigabit-capable internet services in Northern Ireland surge ahead of other regions of the UK. However, it lags behind in other areas of connectivity, such as road and rail infrastructure, alongside investment in new technology, such as public electric vehicle charging. This story of underinvestment is reflected across other types of infrastructure, including housing, electricity, and water and sewerage.[86]

6.2 How will AI affect health and wellbeing?

6.2.1 Poor health can create barriers to labour force participation and affect performance at work.[87] AI has potential benefits for healthcare, which may allow existing services to operate more efficiently, staff to be redeployed to patient-facing roles, and support the introduction of new, more effective treatments. AI can and has been used to accelerate drug discovery, improve epidemiological research, support administrative tasks, enhance medical imaging procedures, and assist with mental health triage. Of particular importance is that it may reduce routine tasks, giving more time for health staff to complete other patient-facing tasks. Healthcare professionals will not be replaced, but

[83] World Bank, 2025
[84] Pivotal, 2024; Donaldson et al., 2025
[85] Jordan and Turner, 2021; Donaldson, Jordan and Turner, 2025
[86] Donaldson, Jordan and Turner, 2025; Donaldson et al., 2025
[87] OECD, 2024b

diagnostic procedures may change fundamentally as decision making becomes increasingly AI assisted.[88]

6.2.2 An aspect that may limit the effective diffusion of AI across society is the ability of different groups to access and use it. A recent digital skills survey reported that 16% of the adult population in Northern Ireland have no digital skills.[89] Evidence from the Covid-19 pandemic demonstrates a 'digital divide' exists, which limited the ability to access public services for those affected, with this being a particular issue for the older population and rural communities.[90] AI has the potential to exacerbate these inequalities, limiting the benefits that can be gained across society from its implementation.

6.3 How will AI adoption interact with connectivity and infrastructure?

6.3.1 Having the right connectivity and infrastructure is important for supporting existing businesses and attracting new FDI. A key requirement for AI is connectivity to data centres. AI data centres are similar to traditional data centres in terms of hardware, except being AI-ready requires that they are built to withstand the extremely high-intensity demands of AI workloads, requiring significantly more space, hardware, and supporting infrastructure (see Box 6.1).[91] Northern Ireland currently has six major colocation data centres in operation, with four more planned or under construction.[92]

Box 6.1: Types of data centre

A data centre is a physical room or building that houses IT infrastructure that runs software services, and stores and manages data. There are two common types of AI data centres used by organisations: *hyperscale* and *colocation*. Hyperscale data centres are the exceptionally large and powerful centres used by major cloud and computing providers such as Amazon Web Services, Microsoft Azure and Google Cloud Platform. Colocation data centres are facilities that rent out capacity and services to other companies.

6.3.2 Whether data centres offer strategic advantages to local areas is unclear. They house important data such as healthcare, financial, and personal data, and for this reason the UK government recently designated data centres as critical national infrastructure, alongside water and energy systems.[93] Data centres also have the potential to contribute towards attracting FDI by offering access to large-scale computing facilities, while providing low latency services to local businesses.[94]

6.3.3 However, data centres impose significant demands on local electricity and water infrastructure, and have significant implications for meeting renewable energy and

[88] James, 2023; Berger et al., 2024; NHS England, 2023; D'Adderio and Bates, 2025; Sikström et al., 2025
[89] NISRA, 2026
[90] Baker et al., 2020; McHugh, 2021; DSIT, 2024; Ofcom, 2025
[91] Jonker, A. and Gomstyn, n.d.
[92] Pickering, 2025; Baxtel, n.d.; GreenScale, n.d.
[93] DSIT, 2026
[94] Stockman, 2020

carbon targets. Cooling typically requires large quantities of water, with a significant amount of water often coming from drinkable sources.[95] Data centres can also block new electricity grid connections, expose existing connections to risks such as blackouts, and raise local energy prices.[96] Several countries have experienced serious data centre-related energy concerns, including the UK, Ireland, and the US.[97] Ireland imposed a strict limit for new data centre connections, following evidence that their share of total electricity consumption rose from 5% in 2015 to 22% in 2024, which was placing additional pressure on local grids, and neutralising some of the gains from renewable energy production.[98]

6.4 What are the implications for Northern Ireland?

6.4.1 Improvements in the health and wellbeing of Northern Ireland's population is important to sustain long-term productivity growth, and AI has the potential to contribute towards this, by allowing finite public resources to be used more effectively. This will require public service transformation across multiple areas, alongside removing barriers to unequal access. The continuing pressures faced by the NI Executive's finances mean that difficult decisions must be taken that balance funding services today versus transformation for the future. If digital transformation is delayed or poorly implemented, this could lead to Northern Ireland's public sector missing out on the positive benefits from AI.

6.4.2 Data centres are perhaps the most obvious physical embodiment of AI. While they have the potential to be controversial in some local areas, they are a necessary feature of a digital economy. At this stage it is unproven whether there is a need for public investment in Northern Ireland to assist the creation of data centres, and they may be a poor focal point for attracting investment: the Atlantic Link Enterprise Zone in Coleraine has had a data centre as the main tenant, yet has struggled to attract investment to the remainder of the site.[99] Ultimately, Northern Ireland's relatively good broadband coverage means that businesses and people already have a strong foundation to access AI.

6.4.3 More widely, government policy, particularly around public infrastructure, has an important role in facilitating the adoption and diffusion of AI. Northern Ireland's current infrastructure gap already restricts its potential to attract investment and drive productivity growth, and the development of AI-related infrastructure has the potential to exacerbate this problem. A long-term, strategic approach is therefore required to ensure that the planning system and utilities infrastructure does not become a barrier to AI investment.

[95] Mytton, 2021
[96] Smyth, 2025; Saul et al., 2025
[97] Buckley, 2024; Cress, 2025; Saul et al., 2025; Smyth, 2025; Blunt and Hiller, 2026
[98] CRU, 2025; CSO, 2025; Daly, 2024
[99] Webber, 2022

7 Policy and Institutions

7.0.1 Public policy and government institutions have an important role in creating the right environment for productivity growth to take place. Understanding how the rise of AI will interact with policy and institutions is crucial if government is to assist in raising productivity. As a disruptor technology, AI will not only pose new challenges, but it will also test the ability of existing policy frameworks to adapt and provide the right support to businesses and people at the appropriate time.

7.1 How do policy and institutions affect NI's productivity?

7.1.1 Past policies to improve Northern Ireland's productivity have had limited success. This is due to raising productivity being an aspiration rather than a metric of policy evaluation, economic problems being misdiagnosed, and policy silos preventing joined-up interventions.[100]

7.1.2 More recently, productivity has been put at the centre of public policy in Northern Ireland. The NI Department for the Economy has included raising productivity as one of four key pillars as part of its economic strategy, and the NI Executive has included raising productivity as a key element of growing a globally competitive and sustainable economy in its Programme for Government 2024-27.[101]

7.1.3 Northern Ireland has a unique history of devolved government within the UK. Relative to other UK regions, Northern Ireland has experienced higher levels of political uncertainty around government policy, creating an obstacle to business.[102] While the contribution of legislation and regulation to this has recently declined, the outworkings of Brexit, geopolitical events, and the rise of AI continue to create external uncertainty.

7.2 What strategic approaches are governments taking to support AI adoption?

7.2.1 As a new technology, governments around the world are deciding how AI should be both regulated and supported. Most national AI strategies can be grouped as either focusing on the promise of AI, or are more concerned with producing a governance framework which sets out guardrails for how AI can be used.[103] The UK has taken a relatively light-touch stance, choosing a pro-innovation approach, while the EU has taken a more stringent, risk-based approach.[104] In this context, Northern Ireland is a rules taker, with little if any influence over what form regulation takes. The NI Executive's strategic approach must therefore focus on supporting AI adoption while adhering to best practice.

7.2.2 AI poses key design challenges for policymakers when deciding how to support businesses and people. AI technologies continue to develop at a fast pace, and are being implemented on an international scale, with supply chains that span continents.[105] This creates uncertainty for policymakers, as today's policy interventions could soon become

[100] Jordan and Turner, 2021, p.24-25
[101] DfE, 2024; NI Executive, 2025
[102] Donaldson et al., 2025, p.5
[103] Denford et al., 2023
[104] DSIT, 2023; European Commission, 2024
[105] World Bank, 2025

out-of-date as AI technologies evolve.[106] Similarly, not all policies can be universally applied: rather, a place-based approach is needed, which balances local risks and opportunities, while meeting relevant local and international regulation.[107] The presence of risk can slow decision making, with public organisations under pressure to make the right decision first time or be blamed for failure.[108] Therefore, when faced with risk and a highly complex but rapidly evolving landscape, the resulting uncertainty will bias towards policy inaction, slowing the availability of support to people and businesses for AI adoption.

7.2.3 How policymakers are approaching the strategic relationship between AI and productivity growth can be seen in the focus of productivity boards across Europe. These are independent institutions which help government design policies to improve long-term economic growth. They monitor and report on a country's performance in terms of productivity and its drivers, and play a role in helping governments commit to long-term policies which promote economic growth.[109]

7.2.4 Different strategic approaches are recommended by the productivity boards for how government should support AI adoption to boost productivity. There is a focus on skills, business uptake (particularly SMEs), and developing government protection and support. Priority sectors, such as health, are highlighted by several of the boards, due to the benefits of AI to this sector. Ireland's National Competitiveness and Productivity Council and the German Council of Economic Experts mention the potential for their respective countries to become leaders in AI and the digital economy.[110] The Australian Government Productivity Commission propose a back-seat approach to AI, given the competitiveness of the market, and instead recommend Australia finding its own niche.[111]

7.2.5 As with businesses and employees, government is also a user of AI. It therefore has the potential to see productivity gains through the same three main channels: improved efficiency, redeployment of resources, and the creation of new services. This goes beyond frontline public services, as AI can be used as a tool in policy development.[112] As with businesses, the ability to adopt AI will depend upon having the right complementary assets in place, including digital infrastructure and staff trained in how to use AI in their roles. An example of this is healthcare, a particularly resource intensive public service – both in terms of finances and staff – which provides the opportunity to be at the forefront of AI adoption. There is already substantial scope for gains from digitalisation with currently available technologies: examples of digital transformation include within NHS England and Ireland's Health Service Executive.[113] Positive effects will likely accumulate over time, as AI products and best practices diffuse, but this will require the right data infrastructure and management to be in place.

[106] Veale et al., 2023
[107] World Bank, 2025
[108] Tse and Karimov, 2022
[109] Donaldson, Jordan and Turner, 2025
[110] National Competitiveness and Productivity Council Ireland, 2025; German Council of Economic Experts, 2025
[111] Australian Government Productivity Commission, 2024a, 2024b
[112] Stennet, 2024; OECD, 2025b
[113] NHS England, n.d.; HTN, 2026

7.3 What are the implications for Northern Ireland?

7.3.1 Uncertainty around government, policy, and political institutions is a long-term issue which people and businesses in Northern Ireland have faced, and it has been a barrier to productivity growth. Policy churn has been particularly harmful for long-term decision making by people and businesses. The fast-paced development of AI, and its expansion into new areas of both business and society, has created new uncertainty for government, which has the potential to exacerbate existing policy problems.

7.3.2 While AI creates important challenges for regulators and legislators to consider, this is of indirect importance for productivity at the regional level. Devolution to the Northern Ireland Assembly and its Executive creates limits on the areas it can legislate for: AI regulation is a supranational challenge, and Northern Ireland's political and policy institutions have limited capacity to forge their own path by creating bespoke legislation, which would potentially conflict with both national and international practice. Instead, there should be a culture of adopting international best practice towards issues such as the ethics of AI, and signposting of guidance and advice to people and businesses for implementation.

7.3.3 Where regulatory attention in Northern Ireland should be directed is towards the potential for divergence between AI regulation in the UK and the EU. It is unclear how EU regulation of AI will interact with the unique post-Brexit settlement for Northern Ireland. It is likely that, even if indirectly, EU regulation will matter to businesses in Northern Ireland wanting to access the EU market.[114] Given the politically sensitive – and at times contentious – nature of UK-EU relations, full and transparent engagement between all parties involved will be required, with a clear examination of the economic implications of any decisions.

7.3.4 Policymakers' strategic approach to AI in Northern Ireland should therefore focus on practical efforts to support people and businesses, alongside strengthening the economic foundations that determine Northern Ireland's productivity potential. The policy levers available to the NI Executive cover the key productivity drivers in the economy.[115] Adopting a smart second mover strategy, which seeks to learn from best practice, and focuses on effective implementation of AI, is key to seeing economy-wide productivity gains. AI adoption should be seen as a tool to improve Northern Ireland's productivity performance, with AI policy directed towards this end, rather than simply as an end in itself.

7.3.5 AI provides the opportunity to improve the efficiency of public services, but it will also create opportunities to provide new services, such as in healthcare. AI adoption is not a silver bullet to solve the ongoing pressures on the NI Executive's finances. Indeed, finding a sustainable long-term footing for the public finances is required to ensure funding for effective adoption of AI throughout the economy.

7.3.6 Northern Ireland's finite policy capacity and public finances are constraints in a system which has persistently struggled with policy silos. A lack of joined-up policy is a key institutional barrier to addressing Northern Ireland's productivity gap. The fast-paced and uncertain development of AI poses deep challenges to this public policy environment, with a risk of fragmentation of policy efforts across government departments and delivery partners. An AI strategy for Northern Ireland should therefore be a policy priority, and it

[114] Bradford, 2019; Donnelly, 2025
[115] Donaldson, Jordan and Turner, 2025

should be owned by the NI Executive Office rather than individual government departments. We recommend three distinct strands should form the basis of this strategy:

1. Support to people and businesses for AI adoption
2. Public sector service transformation
3. Forward looking productivity-centred advice on AI adoption

7.3.7 Our *NI Productivity 2040* report recommended the creation of a Productivity and Growth Board for Northern Ireland, to advise the NI Executive on policy priorities to close the productivity gap, and to hold the government to account for its productivity performance, along the lines of Ireland's National Competitiveness and Productivity Council. We envisage that strand 3 of an AI strategy would be fulfilled by such an independent body.

8 Recommendations

8.0.1 The preceding analysis shows that the potential for AI to improve Northern Ireland's productivity will be determined by its interaction with the drivers of productivity. Our recommendations below focus on the three main stakeholder groups in Northern Ireland, and what they should do to maximise the opportunity AI provides for closing the productivity gap.

People:

1) Focus on **accessing opportunities to gain the new skills and qualifications** required to make effective use of AI in their current workplace.
2) Engage with opportunities for **lifelong learning** as a way to support personal development outside of the workplace.

Business:

1) **Adopt a smart second-mover approach**, which seeks out practical opportunities to implement new AI developments, learns from leading businesses, and follows best practice in use and ethics.
2) **Invest in complementary assets**, such as training for employees and digital infrastructure, to ensure that new AI tools can be implemented in ways which support productivity gains from efficiency, redeployment, and innovation.
3) **Improve management practices** throughout their organisation.

Government:

1) The NI Executive should **adopt a smart second-mover AI strategy overseen by a Productivity & Growth Board**. This strategy should focus on creating a world-leading business and employee environment that provides the conditions needed for effective, economy-wide adoption of AI, rather than trying to compete at the frontier of AI development or replicate regulation.
2) The NI Executive and its delivery partners should **focus on supporting people to gain the new skills required to effectively use AI**, particularly through funding an expansion of the provision of lifelong learning, using this as a channel to support SMEs.
3) As with business, the public sector should **embrace new digital and AI technologies which support transformation of services,** while ensuring equality of access and standards of service are maintained.

9 Appendix

Table 9.1: Examples of AI related training in Northern Ireland					
Provider	Course	Qualification	Duration	Delivery	Cost
Belfast Met	AI Marketing	Level 6	6 weeks PT	Belfast	£210-£540
Southern Regional College	AI level 4	Level 4	16 weeks PT	Online	Free
	Basic AI (SECBA)	Level 3	5 weeks PT	Online	Free
South Eastern Regional College	Understanding Artificial Intelligence in Business	Level 2	PT	Online	-
Northern Regional College	Understanding Artificial Intelligence in Business	Level 2	2 weeks PT	Causeway	Free
South West College	Cisco Introduction to Modern AI	Level 1	1 Year PT	Online	Free
The Knowledge Academy	Introduction to AI	Certificate of completion	1 day	Online or Belfast	£1995-£2995
	Machine Learning Course	Certificate of completion	1 day	Online or Belfast	£1995-£2995
	Artificial Intelligence (AI) For Project Managers	Certificate of completion	1 day	Online or Belfast	£1995-£2995
	OpenAI Training	Certificate of completion	1 day	Online or Belfast	£1995-£2995
	Generative AI Course	Certificate of completion	1 day	Online or Belfast	£1995-£2995
	Duet AI For Workspace Training	Certificate of completion	1 day	Online or Belfast	£1995-£2995
NI Chamber of Commerce and Industry	AI Academy - Hands On AI Masterclass	-	1 day	Online	£169-£199
Artificial Intelligence Collaboration Centre	AI Acceleration Tour 2026: Unlocking AI for Your Business	-	1 day	Belfast, Derry and Dungannon	Free
	Fundamentals of AI	-	-	-	Free
	Prompt to Prototype: AI-Assisted App building	-	-	-	Free
	Data Readiness for AI: From Raw to Reliable	-	-	-	Free
DUCO Digital Training	AI for Business	Certification of completion	1 year	Online	£799
Queen's University Belfast	BEYOND GenAI	-	2-4 days	Belfast	£2,000
	Digital Innovation and AI for Leaders	-	6 days	Online	£1,250*
Ulster University	Artificial Intelligence	PG Cert	8 months	Belfast	£2,400
	Ethical and Responsible Artificial Intelligence	PG Cert	8 months	Belfast	£2,400

Note: This is not intended to be a comprehensive list of all training opportunities available. Course details as of 14 April 2026.

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