Written evidence

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1. To what extent are businesses in Wales making use of AI and planning to do so in the future?

1.1 Many companies in Wales are both excited by the opportunities presented by AI and robotics and concerned about the future of their businesses. This sentiment aligns with findings from a recent survey conducted across 14 countries (Achelpohl, 2024), which revealed widespread enthusiasm for digital transformation. Among the 508 industrial operators interviewed, 90% were already utilizing AI, yet 38% felt they were lagging behind their peers.

1.2 Advancements in the 4th Industrial Revolution (Industry 4.0) have enabled many Welsh manufacturing companies to adopt AI for various applications, including design optimisation, quality inspection, predictive analytics, inventory management, predictive maintenance, process monitoring and control, and supply chain optimisation. These implementations have led to lower costs, enhanced operational efficiency, and real-time quality control.

1.3 The rapid advancements of Artificial Intelligence (AI), particularly Generative AI (GenAI), have gained significant attention among businesses in Wales, driven by the virality of platforms capable of creating human-like text and image content. While these businesses actively participate in discussions with leaders and academia through business groups, leadership forums, and professional networks, their primary focus remains on understanding AI technologies and identifying opportunities where AI can enhance their operations.

1.4 Businesses have begun experimenting with AI technologies, making gradual advancements in areas such as marketing, communication, translation, rapid testing, and coding, with many companies reporting notable productivity gains. Efforts are concentrated on skill-building, developing expertise, and recognising the need for investments in both people and technology. These improvements are largely driven by GenAI's remarkable capabilities, including summarising complex topics, answering questions in a human-like manner, and offering translation and editorial assistance.

1.5 A growing number of high-tech businesses in Wales are leveraging AI extensively across their operations and supply chains, unlocking new revenue streams. Investments have been directed toward customer services, sales, inventory management, and business analytics. Notable uses of GenAI include drafting

customer service responses, generating code for rapid testing, and creating images for marketing purposes. These efforts are aimed at building competitive advantages and exploring new business opportunities.

1.6 A study by McKinsey (Chui et al., 2023) estimates that GenAI could contribute trillions of dollars in value to global productivity. Despite its transformative impact in life sciences—advancing protein structure research, genomics, and pathogen studies through access to large datasets and open resources—similar breakthroughs in the manufacturing sector have yet to materialise. Furthermore, GenAI currently falls short in generating hypotheses, posing critical questions, explaining its decisions and recommendations, and delivering the trustworthiness and reproducibility, which is essential in many social and business contexts.

2. What are the potential economic opportunities and risks that AI may present for Wales, and how might these vary across different parts of Wales and different sectors?

2.1 A small-scale survey by Gartner (2023) revealed that 45% of the organisations interviewed have increased their AI investments following the release of ChatGPT. Additionally, 68% of executives expressed the belief that the benefits of Generative AI outweigh its associated risks.

2.2 The greatest opportunity for Wales lies in tackling the productivity gap, marked by a persistently low economic activity rate (jobs per head of population) and low labour productivity (value added per job). Over the past 20 years, these metrics have remained steady at approximately 80%-90% of the UK average (Henley, 2021).

2.3 GenAI offers faster development cycles compared to traditional AI methods, presenting a significant opportunity to drive productivity growth by reaching higher operational targets and lowering costs. This transformative shift can help align businesses in Wales with the principles of public value manufacturing, fostering economic and societal benefits.

2.4 Public value manufacturing focuses on generating both economic and social value by upskilling workers and creating better jobs that benefit individuals, organisations, and society as a whole. This innovative concept integrates the principles of prosperity, sustainability, and well-being, and can be realised through the transformative capabilities of GenAI.

2.5 Open access to data and expertise has the potential to generate significant public value, particularly in fields like life sciences and healthcare. As one of the 2024 Nobel Laureates in Chemistry recently stated, the real business opportunity lies in using the same data as others but extracting more insights from it. However, not all businesses have the resources to develop their own AI applications. The key is to

offer businesses equal opportunities by supporting them in taking the initial steps toward AI adoption.

2.6 One of the most exciting opportunities for Wales lies in promoting the use of the Welsh language through enhanced translation services. As noted by the co-founder of a company offering bilingual services, Welsh is a smaller dataset compared to languages like German or Spanish. This area has been highlighted by the Welsh Government Minister responsible for the Welsh language as particularly important. It serves as a prime example of how GenAI can help create significant public value by supporting the preservation and growth of the Welsh language.

2.7 Research has demonstrated a clear link between the skills gap and lower productivity, with this effect being more pronounced in industries that rely on a knowledge-intensive skill base (Morris et al., 2020). For Wales, the main risk lies in exacerbating the productivity gap between high and low-performing companies due to underinvestment in human capital, tangible assets like sensors and connectivity, and intangible assets such as domain knowledge and datasets.

2.8 The generic risks associated with AI, which apply beyond just Wales, include overreliance on AI systems, biases in training datasets, data leakage (such as the use of private, proprietary, sensitive, or confidential information during training), privacy and security concerns, developing applications without engaging end-users or conducting thorough validation, and misinterpreting AI hallucinations as legitimate insights. As highlighted by the same Nobel Prize winner, we must prepare for the possibility of an AI "Fukushima event" during our lifetime.

3. How is AI likely to affect jobs and workers in Wales, and what actions might the Welsh and UK governments need to take in response?

3.1 Similar to the disruptive technologies of early industrialization, AI and robotics present both promising opportunities and concerns about job security. A few years ago, the concept of Industry 4.0 caused significant uncertainty, yet there is little evidence to suggest that a large number of jobs have disappeared as a result.

3.2 Experts (Chui et al., 2023) predict that AI could enable technology to reach human-level performance in certain technical capabilities sooner than previously anticipated. A recent report by Goldman Sachs (Hatzius et al., 2023) suggests that GenAI could potentially automate the equivalent of 300 million full-time jobs. Another influential study analysed 19,265 tasks across 19 major industries, finding that 44% of working hours could be impacted by GenAI. This includes 72% in banking, 68% in insurance, and 67% in capital markets. The study also revealed that almost all job categories analysed are expected to be affected by Large Language Models (LLMs), with impacts ranging from 9% to 63% at the high end (Ghosh et al., 2023).

3.3 Traditionally, automation has primarily replaced low-skilled labour. However, recent advances in AI pose a significant threat to higher-level workers, including data analysts, media content creators, project managers, and certain types of designers. Activities exposed to automation include processing and evaluating information, scheduling, planning and prioritising work, documenting and recording information, interpreting information for others, and performing administrative tasks. Automating these functions offers substantial potential for productivity gains, as many roles across various sectors—beyond just industry—involve such activities.

3.4 AI's impact on jobs will differ across sectors and skill sets. Based on an informed understanding of GenAI's capabilities, job replacements are most likely to occur in administrative roles, banking, and the legal profession. AI is expected to complement, rather than replace, workers in fields such as education, finance, computing, sales, management, healthcare, farming, engineering, arts, and media, enhancing their productivity. Little impact is anticipated in sectors like construction, cleaning, maintenance, and transportation.

3.5 Technological progress often leads to the creation of new types of jobs. As anticipated, many of the new roles will be focused on working with foundational AI models. Examples include prompt engineers, content auditors to ensure quality, accuracy, and appropriateness, security specialists, AI literacy educators, and AI ethics officers. Additionally, there will be an increased demand for data scientists to customise and fine-tune foundational models using company-specific proprietary data and knowledge repositories.

3.6 As part of the workplace transformation, there will be a shift towards thinking about tasks rather than jobs, focusing on the knowledge required to perform specific tasks. While many routine tasks can be automated, others demand creative reasoning and the ability to reach mutual understanding through collaboration and discussions with experts and colleagues within the same organisation.

3.7 The expected impact of GenAI on jobs will be transformative not because jobs will vanish, but because many roles will be redefined, and talent will be redirected. As a result of the analytical breakdown of existing jobs, new high-value human tasks are expected to emerge. This shift will need to be managed thoughtfully, using the process as an opportunity to foster creativity and the development of new AI-related skills.

3.8 Central to this transformation is the development of human-centred approaches to AI that prioritise well-being and integrate human factors and social dynamics with AI capabilities.

3.9 The Welsh Government's response can acknowledge the challenges faced by the business community, support the development of pilot projects, and foster a dynamic innovation ecosystem that involves all stakeholders.

4. What skills are likely to be needed as a result of increased use of AI in the workplace, and how well placed is Wales to deliver these?

4.1 Wales has made significant strides in digital transformation. The Digital Strategy for Wales (2021) has successfully improved digital services across the country, while also enhancing digital skills, capabilities, and confidence to engage with the digital world. There have been notable advancements in digital connectivity, providing fast and reliable infrastructure. Public confidence in e-commerce is strong, and digital skills are now prioritised alongside literacy and numeracy. Employers increasingly recognize the value of digitalisation and are supportive of meeting the evolving needs of their workforce.

4.2 The Welsh Government and Welsh universities have made significant investments in data science and AI through multimillion-pound initiatives, including the Wales Data Nation Accelerator (in Cardiff, Swansea, Aberystwyth, and Bangor), the National Software Academy at Cardiff, the Computational Foundry at Swansea, and the Research Centre in AI, Robotics, and Human-Machine Systems (IROHMS) at Cardiff, among others. These efforts have strengthened the country's expertise and capabilities in emerging technologies.

4.3 However, the complexity of GenAI adds new layers to the existing digital divide. It has exacerbated disparities, not only in technical skills but also in the ability to critically evaluate AI, understand how algorithms are trained and generate content, and address ethical concerns regarding authorship, authenticity, and misinformation. The widening digital divide due to GenAI has profound implications. For instance, in the job market, the lack of GenAI skills goes beyond mere disadvantage; it actively excludes individuals, as many companies now use AI for resume screening (Hendawy, 2024).

4.4 AI upskilling must be tailored to specific roles. For instance, employees with clerical responsibilities should be educated not to use GenAI for editing meeting transcripts and sensitive company information. Those in analytical roles need to learn how to use AI-powered tools, interpret algorithm-generated content, and integrate AI insights with their own judgment. Software developers must be trained in conducting rigorous testing and evaluations, as well as implementing explainability features in the applications they develop. Business leaders require training in scientific methods and a structured framework to navigate the broad landscape of opportunities and risks for their companies. In manufacturing, employees must acquire new skills for collecting real-time data, optimising workflows, and using algorithms for predictive analytics. Additionally, all stakeholders should be trained in ethical AI practices that emphasize fairness, inclusivity, transparency in decision-making, accountability for outcomes, and ensuring safety and security.

4.5 The business community requires more support during this transformational change. While on-the-job training can be a viable option, it may only be feasible for high-tech companies that have already made substantial investments in human

capital. Providing additional support for higher skill levels and addressing region-specific skill gaps would create synergies for further productivity growth, driving additional investment and enhancing competitiveness across diverse regions (Morris et al., 2020).

4.6 Additional funding is required to support flexible AI upskilling. The recently introduced DSIT pilot scheme is a promising initiative, offering support for up to 50% of training costs. However, the allocated funding is insufficient to meet the growing demand. Further resources for AI projects are available through UKRI/Innovate UK and Knowledge Transfer Partnerships (KTPs) in collaboration with academia, which can help fill this gap.

4.7 Leadership programs and networks are valuable tools for raising AI awareness, promoting action learning, and fostering mentoring through the sharing of tacit knowledge. Additionally, the GenAI community of practice requires easy access to AI tools, such as digital makerspaces, similar to those used for 2D printing and prototyping. For example, Georgia Tech has already pioneered the concept of instructor-led bootcamps for software engineers to enhance their GenAI skills and knowledge.

4.8 There is a need for a broader public discussion on AI. A recent study by the Office for National Statistics (ONS) (Harris et al., 2023) examined UK adults' awareness of AI and their perceptions of its benefits and risks. The study revealed significant differences across population groups and highlighted potential inequalities. For instance, only 14% of the public believe that AI offers more benefits than risks, a stark contrast to the 68% of business leaders who view the benefits of GenAI as outweighing its risks (Gartner, 2023).

4.9 AI holds immense potential to drive prosperity and enhance productivity. To fully harness this potential, it is crucial to deepen our understanding of the opportunities AI presents, as well as its intended and unintended consequences. By bringing together diverse perspectives, we can create holistic strategies that prioritise human-centric development of AI technologies. Establishing an innovation system that supports the business community is vital, as is implementing effective policy instruments and interventions to address unethical practices related to AI.

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