Careers 2035: What does AI mean for the future of career guidance?

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Commissioned by Morrisby

Morrisby   **career** chat
PIONEERING INNOVATION

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She is an Honorary Legacy Fellow of the UK Career Development Institute and one of three Vice-Presidents of the International Association for Educational and Vocational Guidance (IAEVG). In 2012, she was awarded an OBE in the Queen's Birthday Honours List for services to lifelong guidance. Deirdre and Chris Percy co-founded CareerChat (UK) in 2022, an award-winning AI and careers technology company.

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In the careers sector, he has made invited appearances before the House of Commons Select Committee on Education, served as an on-screen expert in a prime-time, three-part Channel 4 documentary on work experience and social mobility, and authored over 50 research publications. Chris's current R&D work with Deirdre Hughes focuses on the potential for large language model AI to improve careers support provision.

Preface

"Who is more foolish? The fool, or the fool who follows him?"

Obi-Wan Kenobi, Star Wars: A New Hope

I quote this neither because Star Wars (the original and best) is the greatest film of all time, nor only because it is a science-fiction film which assumes tremendous technological advances, but because Obi-Wan's words are cautionary at the start of any publication which gazes in any way forward rather than back. Let me explain.

The "fool" in this instance would be tantamount to being a soothsayer: in this case, I suppose, a futurologist, somebody who, with confidence, predicts the future, based on some understanding of the past and a huge piece of mildly educated guesswork about the future. How often are these predictions in any way accurate? Forty-year-old episodes of Tomorrow's World would suggest that humans are remarkably bad at really knowing how and at what speed new technology will become mainstream.

The "fool who follows him" is then... the rest of us, if we choose to be. Slavishly betting on a future "predicted" by self-proclaimed experts may pay off – and we will surely hear those success stories - but probably won't, especially during the pioneering stages of new advances. Sensible experimentation with a healthy dose of caution is a wiser path.

The point of this preamble is to say: this paper, which we at Morrisby are delighted to have commissioned and published, is by no means meant to be a prediction of how the future will work out. But, we do know that it will be different, that new technologies do become mainstream, that we will live in a world mediated by technology in new and different ways; we just don't know how. It will no doubt be an exciting ride!

So the work that Deirdre and Chris have done with the staff team at Morrisby and other thinkers and practitioners is to imagine different futures, the better to inform policy and commercial thinking. It has been a complete pleasure to work with them; they have brought energy and focus to ideas and developments which otherwise get crowded out by the busy day-to-day. To those of you with the publication now in your hands or in front of your eyes, I hope it too energises you in your wrestling with these important developments, and that we can create a new future together.

Chris Glennie
Chief Executive Officer, Morrisby

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Executive Summary

In early 2024, Morrisby and CareerChat (UK) formed a partnership to explore potential thought-provoking scenarios designed to stimulate discussions about the UK careers support ecosystem. The ongoing work aims to inform conversations about future possibilities through the 2030s, with implications for AI career-tech policies and practices.

This thinkpiece aims to spark discussion in the UK and beyond about future scenarios for career guidance and employability support. It focuses on exploring the potential of harnessing career-technology innovation through a human-centred, AI-enhanced 'hybrid' approach. We do not claim to have all the answers in this report, but we are convinced that more focused discussion is needed to make this work. This discussion should involve diverse stakeholders, focus on specific use cases rather than generic technological risks, and investment in evaluations that benchmark against current practice, not idealised models, while keeping an eye on the wide range of plausible scenarios over the next 5 to 15 years.

The evolving landscape of careers and employability support necessitates the development of new pathways that integrate human-centred approaches with advanced AI technologies. As AI becomes increasingly integral to our daily lives and work environments, it presents both opportunities and challenges in reimagining career guidance and career-tech solutions. Nine key questions are posed in the main paper, alongside five foresight future scenarios.

Current Landscape

AI's impact on career development is profound, reshaping educational, vocational, and employment experiences (Bankins et al., 2024). The UK AI market is predicted to grow to over $1 trillion (USD) by 2035 – unlocking everything from new skills and jobs to life saving treatments like treating cancer, Alzheimer's and dementia. Despite the growing role of AI, access to career support remains limited in the UK, with up to 9.7 million individuals lacking essential guidance (Demos, July 2024). This gap in support adversely affects educational achievement, productivity, financial security, job satisfaction, and overall wellbeing. Additionally, recent findings highlight a significant dissatisfaction among young people, with increasing numbers of 15-year-olds reporting low life satisfaction (Children's Society, August 2024).

Much has happened in the UK labour market since 2019, most notably the exacerbation of labour and skills shortages. The UK is the only major European economy, alongside Italy, whose workforce remains around or below its pre-pandemic level. Simultaneously, workplaces are undergoing significant changes, driven by advances in automation and AI. Routine and repetitive tasks are likely to be automated, leading to a reduction in some job categories e.g. meet Rover Robodog, the canine security guard at Jaguar Land Rover (September 2024).

However, AI is anticipated to create new opportunities, particularly in fields that require higher-order cognitive skills, creativity, and human-centred roles such as healthcare and education (WEF, 2023).

Opportunities

AI-driven tools offer the promise of scalable, personalised and data-rich careers support, enabling individuals to make informed decisions about their careers. Unlike before, individuals can now use AI to explore career options in a more dynamic and interactive way, accessing real-time data and personalised insights that were previously unavailable. Generative AI technologies, including large language models (LLMs), are poised to transform career guidance by providing tailored recommendations and real-time labour market insights. These advancements can enhance the role of human advisers by complementing their skilful efforts.

Personalisation is key to more equitable career guidance, as individuals and groups with shared characteristics often face unique challenges. New technology offers exciting opportunities to address these challenges by tailoring support to individual needs. For example, by integrating AI into CV, job search and interview practice, candidates can benefit from personalised, data-driven insights that improve their job application materials and performance in interviews, ultimately increasing their chances of securing employment to which they are well-suited.

Challenges and Considerations

The integration of AI into career support systems must address key challenges:

- **Ethical Concerns**: Issues such as data privacy, bias, and the transparency of AI systems need careful management to prevent adverse impacts, particularly on vulnerable populations.

- **Human-AI Collaboration**: AI should enhance, not replace, the human touch in career guidance. The synergy between AI and human advisers is crucial for providing comprehensive and empathetic support.

- **Regulatory and Practical Barriers**: The public sector's cautious approach to AI adoption contrasts with the rapid advancements in the private sector, necessitating collaboration to optimise AI career-tech products and services.

By adopting a dynamic, human-centred, AI-enhanced approach, there is scope to create a more inclusive and effective all-age careers support system.

This can serve to prepare individuals better for the future workforce, ultimately fostering greater economic and social outcomes.

Observations

There are encouraging signs via key policymakers in all four home nations coming together to jointly consider AI advancements and ethical implications in the context of careers and employability services. Regardless of the arrangements in a specific country, a new AI phenomenon is here. AI and human creativity are intersecting, offering an exciting opportunity to reimagine how to support teachers, careers advisers, employability specialists and the young people and adults they serve.

New technology advancements present an opportunity to rethink how careers support is structured and delivered, making it more flexible, personalised, and accessible to people across all life stages. While AI can provide valuable tools for career development, the human element remains critical. Education and career support systems are under significant pressure as a growing number of students face a shortage of qualified teachers, careers advisers and employability support workers.

With AI, "it is still very early", as the application of frontier technologies to specific use cases and widespread adoption typically unfolds over years, not months. This pattern mirrors earlier trends seen with the internet, where the transformative impact took time to fully materialise. AI should not replace human interaction in career guidance but instead augment it, allowing educators, careers professionals and their partners to focus on providing deeper, more meaningful support.

Ethical dilemmas

Cutting-edge AI technology is posing unprecedented ethical dilemmas such as "a lack of transparency, gender and ethnic bias, grave threats to privacy, dignity and agency, the danger of mass surveillance, and a growing use of unreliable AI technologies in law, to name a few" (UNESCO, 2022).

AI examples & literature research findings

The report discusses four examples from EU countries that show how AI is being used in careers support services at a national and/or higher education level, alongside other illustrations of generative AI tools and new capabilities in the careers support context. The impacts of future AI systems will depend on the extent to which individuals and organisations use them, what for, and why. A literature review of 101 journal publications on AI and career development (Pandya & Wang, 2024) and our latest research highlight key themes such as: (i) educational use of ChatGPT; (ii) AI in enrolment predictions; (iii) building AI chatbots; (iv) responsible AI implementation; (v) governance, ethics and risks; (vi) AI in career guidance; and (vii) future perspectives. Nonetheless, analysis is held back by a scarcity of literature in the UK and further afield on attitudes and responses towards AI in an education and work-related context.

Foresight future scenarios

Scenario-building can help practitioners, managers and policymakers anticipate potential challenges and opportunities by considering various social, economic, technological and environmental trends. This context takes into account other allied factors such as major demographic issues (e.g. falling birth rate, ageing population); productivity risks amid growing economic inactivity; concerns with mental health and wellbeing; cost of living crises; digitisation/remote work/overseas competition/wage pressure on knowledge jobs; growing student expectations on tech, immersion, "engaging-ness", and personalisation; expectations that online information and services are free/cheap, with more self-paced, asynchronous learning; ongoing speed-up of societal and jobs disruption; and more diverse routes into jobs with fewer "obvious paths" for people to follow – all exacerbating the need for ongoing reskilling/sector transitions. **See page 30.**

Our scenarios are informed by broad economy-wide factors, such as economic wealth, workforce composition, social conditions, education and training, sectoral trends, and working environments, identifying four broadly positive factors and four broadly negative factors that play a role to differing extents across all the scenarios:

Potential Positive Economy-wide Factors

1. **Government Collaboration with AI Innovators**: The government is expected to work more closely with AI careers tech innovators, leading to improved productivity, skill development, and growth within sectors.

2. **Pandemic-driven Adaptations**: During the pandemic, businesses in the careers and employability sectors became more resilient and efficient due to the adoption of technology. This trend is likely to continue, benefiting both the workforce and employers.

3. **Increased Workplace Flexibility**: There has been a shift in working behaviours, leading to increased flexibility, which could positively impact both employee satisfaction and productivity if handled well, particularly regarding support for onboarding and mentoring new generations of employees.

4. **Regional and Sectoral Growth**: AI and technological advancements could spur growth in specific regions and sectors, helping to level the playing field and distribute economic benefits more widely.

Potential Negative Economy-wide Factors

1. **Public Sector Constraints**: High levels of public sector debt could limit investment in education, skills, and the careers ecosystem improvements, potentially stifling progress in preparing the workforce for future challenges.

2. **Long-term Scarring of Young People**: There is a risk that young people (and adults) may experience long-term difficulties in engaging with learning or transitioning into new employment opportunities, exacerbating social inequalities.

3. **Workforce Burnout and Disengagement**: As AI and automation change the nature of work, there is a concern that workers could face burnout, disengagement, or a depletion of resources, particularly in sectors struggling to adapt.

4. **AI Exhaustion**: In a scenario where AI is not regulated properly, there could be uncoordinated, unchecked development, leading to negative societal impacts, including the reinforcement of inequalities or unpredictable economic disruptions.

To meet the challenges of the next decade, we argue that the careers support ecosystem must be co-created by key stakeholders, including educators, employers, municipalities, career development professionals, technology developers and policymakers. Collaboration is essential to build a robust system that is both technologically advanced and deeply rooted in the needs and aspirations of individuals.

The march of frontier tech is unlikely to reverse. In the careers sector, we are only beginning to use the powerful AI tools already available, let alone the new capabilities likely to develop in the coming decade. In this context, it seems wisest to engage in good faith. We should pursue the positive impacts, mitigate the negatives, and be mindful of the range of possible scenarios ahead. Ultimately, we see potential in co-creating a human-centred and AI-enhanced careers and employability ecosystem. Indeed, there is little alternative given the considerable challenges facing careers provision worldwide and the ongoing transformation of workplaces and recruitment. Such a co-creation process should include leveraging AI for personalised support, fostering lifelong learning and skills development, ensuring equity and inclusivity, balancing AI with human interaction, and adapting to future workplace trends. Developing an experimental AI careers tech sandbox is one practical policy lever for the short-term that can set us up for greater success, no matter how the future scenarios play out.

In conclusion, the future of AI in career guidance holds a spectrum of possibilities, each with profound implications for career advisers, the individuals they support and their work with employers. As we navigate scenarios ranging from gradual adaptation to chaotic expansion, it becomes clear that the role of career guidance professionals will be more critical than ever. They will need to remain adaptable, continually enhancing their skills through continuous professional development (CPD) to integrate emerging technologies while preserving the essential human elements of empathy and support.

Looking ahead, it is imperative for policymakers to prioritise equitable access to AI-enhanced resources, ensuring that all individuals—including those with special educational needs and disabilities—can benefit from the transformative potential of these technologies. By championing inclusivity and providing tailored support, we can empower every person to navigate the evolving landscape of education, skills and work with confidence and competence. The future of career guidance must not only embrace innovation but also champion the breaking down of barriers, ensuring that no one is left behind in this new era of opportunity.

Section 1:
Introduction

How can we co-create new pathways to success in careers and employability? A crucial part of the answer lies in co-designing a dynamic, human-centred, AI-enhanced support system.

Artificial Intelligence (AI) is a system that learns from data, identifies patterns, and makes decisions or predictions, mimicking human cognitive processes but at much greater speed and scale.

Natural Language Processing (NLP) is a subset of artificial intelligence that enables machines to understand and respond to human language.

Large Language Models (LLMs) are trained on very large text datasets (typically significant proportions of the Internet) and characterised by billions of parameters in an architecture which allows them to generate human-like text following on from a prompt or question, producing language across a wide range of topics and styles.

LLMs differ from currently widely used technology by leveraging advanced algorithms to understand and generate human-like language, enabling more nuanced interactions. Unlike earlier systems that relied on rigid rule-based approaches, these technologies can learn from vast datasets, allowing for greater adaptability and context awareness in their responses.

See Appendix 1 – Glossary of Terms

The world is undergoing a profound transformation, with new forces reshaping how we learn, work, and build livelihoods (WEF, 2024[1]). From jobs and skills to regulations and governance, artificial intelligence (AI) now permeates discussions more than ever before. These systems are redefining career choices, development, and vocational experiences (Bankins et al., 2024[2]). The rapid evolution of generative artificial intelligence (GenAI), large language models (LLMs), and shifts in the economy and workplace dynamics are poised to dramatically alter the world of work, education, career guidance and employability support services. For example, researchers in OpenAI and the University of Pennsylvania (Eloundou et al, 2023[3]) estimate that 80 percent of the US workforce could have at least 10 percent of their work tasks affected by GPTs (Generative Pre-trained Transformers). There are also recent findings of productivity gains from AI (Jung & Desikan, 2024[4]; Zheyuan et al, 2024[5]).

"With the advent of generative AI, the game has changed. Rather than having to reason about possible future technical capabilities, a technology now exists that has now been proven to produce high quality outputs that are often indistinguishable from human ones, in a fraction of the time that a human would take, across a wide range of applications." *(Jung & Desikan, 2024[6])*

As we consider the implications of GPTs for the workforce, it is crucial to explore how AI can be integrated into education, career guidance and employability services to enhance, rather than replace, human expertise. Careers support, as a human-centred and personalised process, can facilitate effective career exploration when complemented by AI tools and an understanding of their limitations.

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This think piece aims to spark discussion in the UK and beyond about future scenarios for career guidance and employability support. It focuses on exploring the potential of harnessing career-technology innovation through a human-centred, AI-enhanced 'hybrid' approach. We do not claim to have all the answers in this report, but we are convinced that more focused discussion is needed to make this work. This discussion should involve diverse stakeholders, focus on specific use cases rather than generic technological risks, and investment in evaluations that benchmark against current practice, not idealised models, while keeping an eye on the wide range of plausible scenarios over the next 5 to 15 years.

Too few people in the UK currently have access to careers and employment advice, with up to 9.7 million individuals missing out on crucial support, according to a recent Demos report (July 2024[7]). This has serious implications for educational achievement and attainment, productivity growth (or lack of it), individuals' financial security, relationships, job satisfaction, confidence and motivation to upskill and reskill, health and wellbeing, particularly for those most vulnerable. A recent Children's Society report (August 2024[8]) indicates more 15-year-olds are reporting low life satisfaction in Britain than anywhere else in Europe, amid what experts are describing as a 'happiness recession'.

"Geoffrey Hinton, known as the 'AI godfather' for pioneering neural networks, advised the British government to implement a universal basic income to mitigate the economic effects of AI displacing workers. Hinton believes AI will boost productivity but make the rich richer, hurting those who lose jobs without universal basic income (UBI)."[9]

This is not unique to the UK; many countries are facing similar challenges, with limited access to career guidance support contributing to widespread issues around educational attainment, economic productivity, and individual wellbeing across the globe.

Evidence shows investment in careers information, advice, and guidance generates substantial returns on investment (RoI) by improving education, economic, and social outcomes (Percy, 2023[10]). In this regard, the field of career guidance has long been a cornerstone of education, employability, and community development. Career guidance is defined as:

"Services which help people of any age to manage their careers and to make the educational, training, and occupational choices that are right for them. It helps people to reflect on their ambitions, interests, qualifications, skills, and talents – and to relate this knowledge about who they are to who they might become within the labour market."

(Cedefop, OECD, European Commission, ILO, UNESCO, & ETF 2019; 2021[11]).

In today's rapidly changing world, career guidance is less about specific occupational choices and more about equipping individuals with the cognitive skills needed to navigate the disruptive and unpredictable nature of modern work and life. Highly trained careers advisers perform this distinctive role, working closely with other professionals such as teachers/lecturers, social workers, youth, probation and community workers, employability, disability, health, housing, and mental health specialists.

AI-driven tools offer the promise of scalable, personalised, and data-rich careers support, enabling individuals to make informed decisions about their careers. Unlike before, individuals can now use AI to explore career options in a more dynamic and interactive way, accessing real-time data and personalised insights that were previously unavailable. Generative AI technologies, including large language models (LLMs), are poised to transform career guidance by providing tailored recommendations and real-time labour market insights. These advancements can enhance the role of human advisers by complementing their skilful efforts.

Personalisation is key to more equitable career guidance, as individuals and groups with shared characteristics often face unique challenges. New technology offers exciting opportunities to address these challenges by tailoring support to individual needs. For example, by integrating AI into CV, job search, and interview practice, candidates can benefit from personalised, data-driven insights that improve their job application materials and performance in interviews, ultimately increasing their chances of securing employment to which they are well-suited.

Young people and adults living in a volatile, uncertain, complex, and ambiguous world need access to high-quality career guidance in 'places' and 'spaces' (both online and offline) at a time and place that suits their needs best. Amidst uncertainty, people often delay decisions to engage in learning and work. AI-driven tools are increasingly available, sophisticated and accessible, including algorithms to analyse vast datasets of labour market information/intelligence (LMI), user profiles and preferences, enabling them to provide personalised and tailored recommendations. Skills assessment and job matching are also readily available. Recent findings from a Jisc research report examining large language models (LLMs) in higher education show that advisers are typically not aware of how extensively students are using AI, especially for career guidance questions (Hughes, Percy & Tolond, 2024[12]).
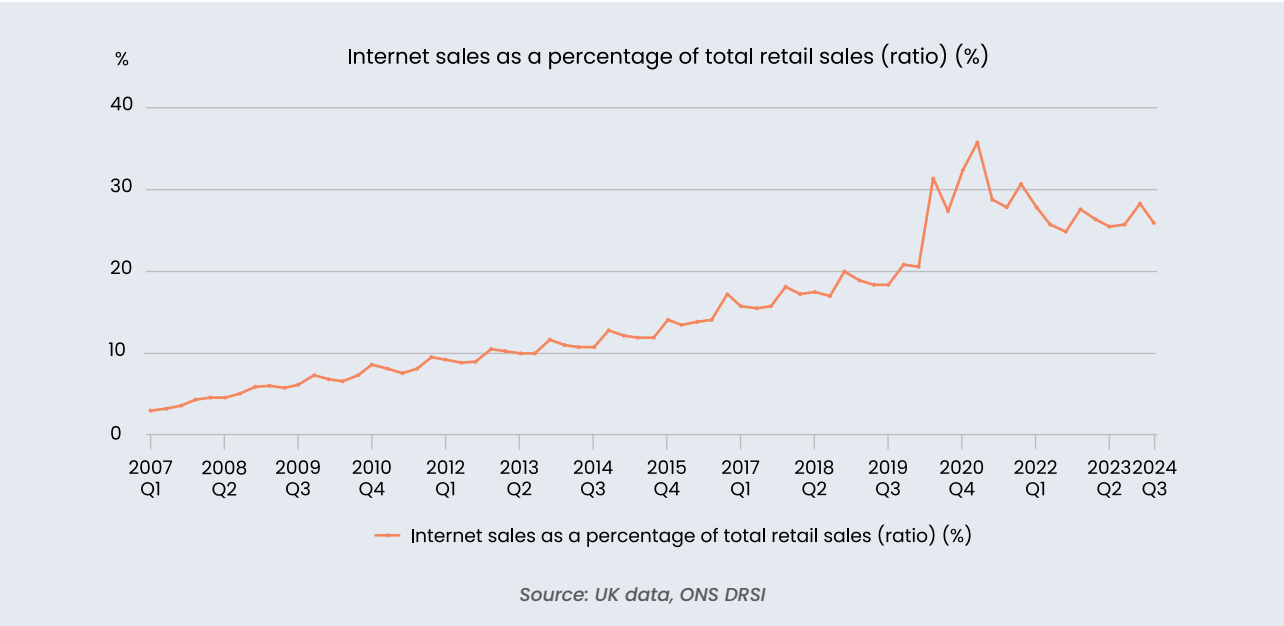
By 2030, the world of work is expected to be fundamentally different, with AI, automation, and digital platforms playing a central role in how individuals navigate learning and work opportunities (McKinsey, 2024[13]). Traditionally, careers education, information, advice and guidance has been provided mainly by human advisers who offer personalised support, share experiences, and provide emotional care. Generative AI can now create personalised text, images, speech, videos, music and code, automating tasks and streamlining access to data. Algorithms that analyse social media content, such as Facebook interactions, can enhance career exploration by providing personalised recommendations. For example, an algorithm can identify users interested in environmental advocacy and suggest career profiles in sustainability. It can also detect skills shared in posts to recommend potentially suitable pathways. By leveraging users' social networks, the algorithm can connect them with industry mentors and generate tailored job recommendations based on engagement with specific job postings. Additionally, the algorithm could curate and recommend articles, webinars or online courses that align with a user's career interests.

As the landscape of AI and career guidance evolves with the integration of AI technologies, it becomes essential for users to navigate these changes thoughtfully. Individuals and organisations must be prepared for disruption. We must carefully consider the future relationship between expert human-centred and AI-enhanced careers support services. AI can be excellent for generating ideas and options, but processing and reflecting on AI-generated content with a skilled helper remains a crucial step.

With AI, "it is still very early", as the application of frontier technologies to specific use cases and widespread adoption typically unfolds over years, not months. This pattern mirrors earlier trends seen with the internet, where the transformative impact took time to fully materialise. The impacts are 'spiky' across sectors and highly dependent upon specific leadership approaches.

It's still very early: Adoption, adaptation, exploitation take time.

Internet sales as a percentage of total retail sales (ratio) (%)

— Internet sales as a percentage of total retail sales (ratio) (%)

Source: UK data, ONS DRSI

Public sector organisations have AI high on their agenda whilst adopting a cautious approach until the ethics and effects are better understood. The use of artificial intelligence (AI) in a career guidance context has emerged in Austria, Belgium (especially in Flanders), England, Finland, Ireland, Norway, and Scotland, among others (Hughes, 2024[14]). Private sector AI career-tech innovation is advancing rapidly, often outpacing public sector adoption. Companies can move faster due to fewer regulatory constraints and a greater ability to take risks in deploying cutting-edge technology. Collaboration between public, private and third sectors can potentially lead to efficiency gains and enhanced hybrid services.

This major AI transformation presents both opportunities and challenges for education, careers and employability support systems. It demands the co-creation of a dynamic human-centred and career-tech ecosystem that can effectively support individuals in managing their learning and work journeys on a lifelong basis.

Political commitment highlights the urgency of reimagining education, careers and employability services for people of all ages. In 2021, the European Union published a renewed policy initiative aimed at setting out a common vision for high-quality, inclusive and accessible digital education in Europe: the Digital Education Action Plan (DEAP) 2021-2027 (European Commission, 2020[15]). The ILO (2023[16]) highlights digital transformation is associated with a country's industrialisation and level of development (p. 2). The rapid advancements in AI technology are reshaping economies and labour markets worldwide, prompting urgent discussions about the social and economic consequences of this.

As part of this evolving landscape, the UK government has pledged in its manifesto (Labour Party, 2024[17]) to establish "a national jobs and careers service, focused on getting people into work and helping them advance in their careers." In England, a major curriculum review (DfE, 2024[18]) is underway, designed to look closely at the key challenges to attainment for young people and the barriers which hold children back from the opportunities and life chances they deserve – in particular those who are socioeconomically disadvantaged, and/or with special educational needs or disabilities (SEND).

While teachers, advisers, and support workers may worry that the human touch and empathy they provide could be devalued, AI done well can instead complement their roles, helping to identify strengths and support areas that may otherwise go unnoticed. The ability of these professionals to learn, critique and adapt to AI advancements will be essential for harnessing these benefits. However, AI systems must be designed and trained with care to avoid perpetuating bias and inequalities, especially in the context of vulnerable individuals who already face challenges in the job market. These tools, if used ethically and sensitively, have the potential to create more inclusive environments, but privacy and data security concerns must also be addressed to ensure that personal data is protected and used responsibly.

There are at least five potential advantages of AI in an education, careers and employability context:

1. **Scalability** – AI-driven careers information and advice can reach a broader audience, connecting to para-professionals and fully trained professional careers advisers when needed.

2. **Personalisation** – AI can offer personalised recommendations based on interests, skills and occupational preferences.

3. **Data-driven insights** – AI can easily leverage big datasets and provide real time access to job vacancies and labour market trends, supporting well-informed choices.

4. **Cost-effective** – AI can quickly respond to frequently asked questions and make more in-depth guidance referrals to human advisers, if needed, thereby saving time and money within organisations, and

5. **Empowerment** – AI-driven careers information and advice equips career guidance professionals to "stay ahead of the curve" in keeping up to date with labour market trends, learning more about their clients/ customers career exploration in advance of a 1:1 or group meeting, and analysing data trends to feed into local, regional and national education, skills and economic growth strategies (Hughes, 2023[19]).

Cutting-edge AI technology is also posing unprecedented ethical dilemmas such as "a lack of transparency, gender and ethnic bias, grave threats to privacy, dignity and agency, the danger of mass surveillance, and a growing use of unreliable AI technologies in law, to name a few." (UNESCO, 2022[20]). This raises crucial questions about regulation and evaluation, as AI tools are developed in profit-driven markets, leaving individuals and institutions ill-equipped to assess their quality. Independent bodies are needed to evaluate how AI tools impact guidance and outcomes, as we cannot rely on developers to do this.

Mann et al. (OECD, 2024[21]) in their analysis of PISA data in England highlight that student use of the internet has grown – this is the most common resource used for career research – but so has the concentration of career aspirations. Analysis of longitudinal cohort studies show that students in England and across the OECD fail to engage sufficiently in career development by the age of 15. In England, students from lower socio-economic backgrounds engage less consistently in career development than their more socially advantaged peers.

The career expectations of all students align poorly with patterns of labour market demand. Will AI further accentuate or alleviate this trend? A further risk of AI in career development is that it may encourage individuals, even at a young age, to explore career options independently of human guidance, which is vital for providing challenge, support, and addressing emotional wellbeing.

It is crucial to explore how human and AI input might complement each other to create a more responsive, lifelong careers support system that nurtures individuals' ambitions, wellbeing and future prospects. Without such a holistic approach, there is a risk of widening inequalities in access to opportunities, leaving individuals without the necessary support to succeed in the workforce of the future.

Section 2:
Methodology and Focus

In early 2024, Morrisby and CareerChat (UK) formed a partnership to explore potential thought-provoking scenarios designed to stimulate discussions on the UK careers support ecosystem. The ongoing work aims to inform conversations about future possibilities through the 2030s, with implications for careers tech AI policies and practices.

Our methodology activities included:

- **A rapid assessment of evidence**: Review of 46 academic/technical studies and government department policy reports short-listed from 85 studies in a structured literature review. We ran a structured search on the Scopus database (a comprehensive, multidisciplinary database of academic publications) for the initial search, identified grey literature and used our personal libraries
- **Group consultations**: Three internal workshops with Morrisby staff, supplemented by 1:1 in-depth interviews with managers and senior leaders
- **Meetings with UK careers and employability policymakers**: Two online presentations of ideas on AI challenges and opportunities in the UK, with participants from all four home nations
- **Discussions with key expert informants**: Eight individuals acted as 'critical friends' reviewing and commenting on the report and future scenarios.

Key Questions for Consideration

These nine questions guide the discussion, providing a framework for exploring possible human-centred and AI careers-tech scenarios in a rapidly evolving landscape:

1. What are the current challenges and limitations of existing careers and employability support systems?
2. What impact is AI expected to have on education, careers and employability services over the coming decade, and how can information, advice and guidance systems adapt to these changes?
3. How can we ensure that the AI used or developed won't harm individuals or groups?
4. How worried should we be that AI will replace jobs?
5. How can stakeholders, including educators, employers, career development professionals and policymakers, collaborate to develop a cohesive and forward-thinking human-centred and careers-tech support ecosystem?
6. How can AI technologies be integrated into careers and employability support systems to enhance personalisation and effectiveness without compromising the human elements of career guidance?
7. In what ways can hybrid careers and employability support systems be designed to be more inclusive and accessible, particularly for under-represented and disadvantaged groups?
8. What role should human advisers play in the future of career guidance, and how can their expertise be effectively combined with AI tools?
9. How can the evolving needs of the careers and employability workforce in relation to careers technology be identified and addressed?

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Section 3: Context

The UK careers and employability services vary in their arrangements in each of the four home nations.

All government-funded national careers services are reportedly all-age, multi-channel and deliver careers support in a wide range of education, training, employment and community settings, but with significant differences in how these principles are implemented in practice. Since 2013 in England, careers support for young people and adults takes the form of different agencies providing differing forms of local, regional and national careers and employability support including the:

- **National Careers Service** - https://nationalcareers.service.gov.uk/ - the careers offering to young people begins at age 13. A cadre of career guidance providers typically work alongside government-funded allied initiatives

- **Jobcentre Plus** - a combined benefits administration and employment support service, mostly available for people receiving benefits and who are required to look for work under benefits rules. A cadre of employability providers typically work alongside government-funded allied initiatives

- **The Careers and Enterprise Company (CEC)** - https://www.careersandenterprise.co.uk/ - funded mainly by DfE (not exclusively), leading on the promotion and implementation of Gatsby Benchmarks in schools and colleges, the ASK apprenticeship service, and offering some financial support for targeted work in communities

- **Local and Combined Authorities** – various websites and local/regionally delivered initiatives, typically seeking to support vulnerable young people and adults

- **Dedicated websites and sectoral bodies** – such as the https://www.bbc.co.uk/bitesize/careers, https://www.jobs.nhs.uk/candidate, and other organisations

- **Schools, Colleges and Higher Education Institutions**.

- **Community and voluntary organisations** inter alia probation services, housing associations and charities

- **Private sector companies** - which sometimes receive government funding to provide career guidance to adults and young people, as well as advisers and coaches who charge for career guidance that individuals may choose to access.

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In the Celtic nations, a longstanding career guidance partnership approach prevails between the national careers services, education, employment, training, local authorities and community organisations. For example, the Welsh Government has introduced a service called Working Wales (#ChangeYourStory)[22] which is designed to simplify access to careers information, advice and guidance, while the Northern Ireland Executive has introduced Local Labour Market Partnerships (LLMPs) to co-ordinate activity across council areas, and Skills Development Scotland is actively exploring opportunities to embed AI within a new My World of Work national portal.

Regardless of the arrangements in a specific country or place, a new AI phenomenon is here. AI and human creativity are intersecting, offering an exciting opportunity to reimagine how we support teachers, careers advisers, employability specialists and the young people and adults they serve.

Education and career support systems are under increasing pressure as too many students face a shortage of qualified teachers and careers advisers [23][24][25]. This strain is particularly evident in the provision of career guidance, where limited resources make it challenging to provide personalised and impartial support. By harnessing AI's capacity for data analysis and personalisation, alongside the nuanced insights of human creativity, we can develop new innovative careers and employability policies and practices. These advances have the potential to enhance educational outcomes, career guidance, and support systems in ways previously unimagined.

The Shifting Landscapes of Education, Employment and the Workplace

By 2030, the traditional boundaries between education and work will become increasingly blurred (ESPAS, undated[26]). Extending long-running, gradual, trends, learning will be increasingly less confined to the early stages of life; instead, continuous, lifelong learning will be the essential norm as individuals live longer (WEF, 2024[27]) and have to adapt to rapidly changing local, regional and national labour market requirements. The future of education is expected to emphasise skills development over formal qualifications, driven by a growing demand for adaptable, inter-disciplinary skills such as creativity, problem-solving, emotional intelligence and digital literacy (OECD, 2024[28]). This shift will require a rethinking of how careers education, information, advice and guidance support is structured, making it more flexible, personalised, and accessible to people across all life stages. The idea of an experimental AI careers tech sandbox – a secure environment in which to explore generative AI innovation, ethics and safety – should be considered to shed light on how governance, regulation and work with new technologies all interact to give the best possible outcomes in this context.

Much has happened in the labour market since 2019, most notably the exacerbation of labour and skills shortages. The UK is the only major European economy, alongside Italy, whose workforce remains around or below its pre-pandemic level (Houston & Hunsaker, 2024[29]). ONS (2024[30]) data estimates that in June to August 2024, there were 857,000 job vacancies, down 42,000 on the quarter and 143,000 on the year. However, this is still 61,000 more than pre-Covid.

Meanwhile, youth unemployment has soared to 13.3% – its highest level in three years. Among 18-24-year-olds, the percentage out of work in the three months to July had last been as high in January 2021, amid Covid lockdowns. Global trends outperform the UK in places, but the latest 2024 analysis from the ILO makes for sobering reading[31]. Resilience in global jobs growth is offset by falling real wages, deteriorating financial conditions, and weak productivity. The ILO's closing headline is that the "outlook remains cloudy as a poly-crisis worsens social justice."

Simultaneously, workplaces are undergoing significant changes, driven by advances in automation and AI. Routine and repetitive tasks are likely to be automated, leading to a reduction in some job categories e.g. meet Rover Robodog, the canine security guard at Jaguar Land Rover (JLR, 2024[32]). However, AI is anticipated to create new opportunities, particularly in fields that require higher-order cognitive skills, creativity, and human-centred roles such as healthcare and education (WEF, 2023[33]). Workers will need to develop resilience and adaptability to thrive in this changing environment, with support systems that enable them to anticipate and navigate expected and unexpected career shifts effectively (Hughes et al, 2021)[34].

Section 4:
AI developments

The UK AI market is predicted to grow to over $1 trillion (USD) by 2035 – unlocking everything from new skills and jobs to life saving treatments like treating cancer, Alzheimer's and dementia (ITA, 2022[35]).

The UK's AI industry is thriving, employing over 50,000 people and contributing £3.7 billion to the economy in 2023. Britain is home to twice as many companies providing AI products and services as any other European country and hundreds more are created each year (HMG, 2023[36]).

There are also encouraging signs via key policymakers in all four home nations coming together to jointly consider AI advancements and ethical implications in the context of careers and employability services. Detailed information within the 'Guidance to Civil Servants on the Use of Generative AI' provides a steer on managing risk and ethical concerns (CO & Central Digital & Data Office, 2024[37]). Government has issued 'Guidelines for AI Procurement' (HMG, 2020[38]). The Alan Turing Institute provides guidance on 'AI ethics and safety in the public sector' (Leslie, 2019[39]). The Welsh Government has recently teamed up with OpenAI to enhance ChatGTP in Welsh (WG, 2024[40]). In September 2024, the UK government signed its first international treaty addressing the risks of artificial intelligence (MOJ, 2024[41]).

Earlier in 2023, the Department for Science, Innovation and Technology[42] set out five possible future AI scenarios: (i) Unpredictable advanced AI; (ii) AI disrupts the workforce; (iii) AI Wild West; (iv) Advanced AI on a knife-edge; and (v) AI disappoints. We build upon and adapt these scenarios to relate to career guidance and employability future service design and developments, as discussed in section 5.

Examples of international AI developments from research in a career guidance and employability context:

- **Austria**: 'AMS Berufsinfomat' AI-based chatbot for information research integrates advanced AI tech
- **Finland**: Osaamistarvekompassi.fi provides data on job transitions, along with insights on near-future skills derived from AI-assisted data mining. This includes support material for career guidance workers on how to utilise forecasting information and the content of the Finnish 'Skills Needs Compass'
- **Ireland**: MyCareerPath an online career and learning pathways service, established by the Atlantic Technology University (ATU), including AI and recognition of prior learning for adults
- **Norway**: Karriereveiledning This national Digital Careers Service uses OpenAI's GPT-4 AI to analyse anonymised chat that feeds into the development of self-help tools.

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Overall, there are notable increases in generative AI capability[43] including:

- Producing more complex, structured, and accurate text[44]
- Higher quality images[45] [46]
- Improvements in creating video[47], audio[48] [49] [50]
- 3D objects[51]
- Retrieval Augmented Generation (RAG) software.[52]

The trend is expected to continue, with models expected to become able to:

- Be increasingly multimodal – able to use multiple types of data, including video/audio stream inputs
- Be personalised to individual users[53]
- Create more long-form structured text
- Solve more complex mathematics
- Carry out data analysis and visualisation
- Work with low-resource languages
- Have more agentic capabilities, e.g. Introducing Devin the first AI software engineer.[54]

Current releases of LLMs have improved on previous generations in the quality of text output, accuracy, and complexity of responses (Borji & Mohammadian, 2023[55]; Bushwick 2023)[56]. However, they still regularly produce inaccurate text responses. These errors are called 'hallucinations' and can be significantly risky if LLMs are used in important tasks without fact checking. Zarifeh (July 2024[57]) argues "this has urgent implications for teaching AI future readiness skills both within and outside of the classroom." Nonetheless, the potential – and perhaps the temptation – to use these tools is hard to deny.

Various generative AI tools include:

- **Chatbots and virtual assistants** e.g. ChatGPT and versions tailored to careers provision created by the report authors: CiCi the curated careers chatbot[58] and Huxby[59] including psychometric testing and career guidance
- **Content generation** text and email writing tools e.g. Jasper and Writesonic that create blog posts, marketing content and social media posts based on user input
- **Image and video generation** e.g. DALL·E generates images from text descriptions
- **Music and sound creation** e.g. Jukedeck AI platform that creates royalty-free music for media content, based on style and genre inputs from users
- **Data and analytics generation** e.g. Tableau's "Explain Data": provides AI-generated insights and explanations of data visualisations
- **Game content and story generation** e.g. Minecraft interactive text-based game where the AI generates unique, evolving storylines based on player input
- **Personalised learning and education** e.g. Squirrel AI generates personalised learning paths and content based on individuals' strengths, weaknesses, and preferences, continuously adjusting based on progress to enhance outcomes
- **Visual design and marketing** e.g. Canva's AI-designed tools used to generate design elements such as templates, layouts and graphics for marketing materials
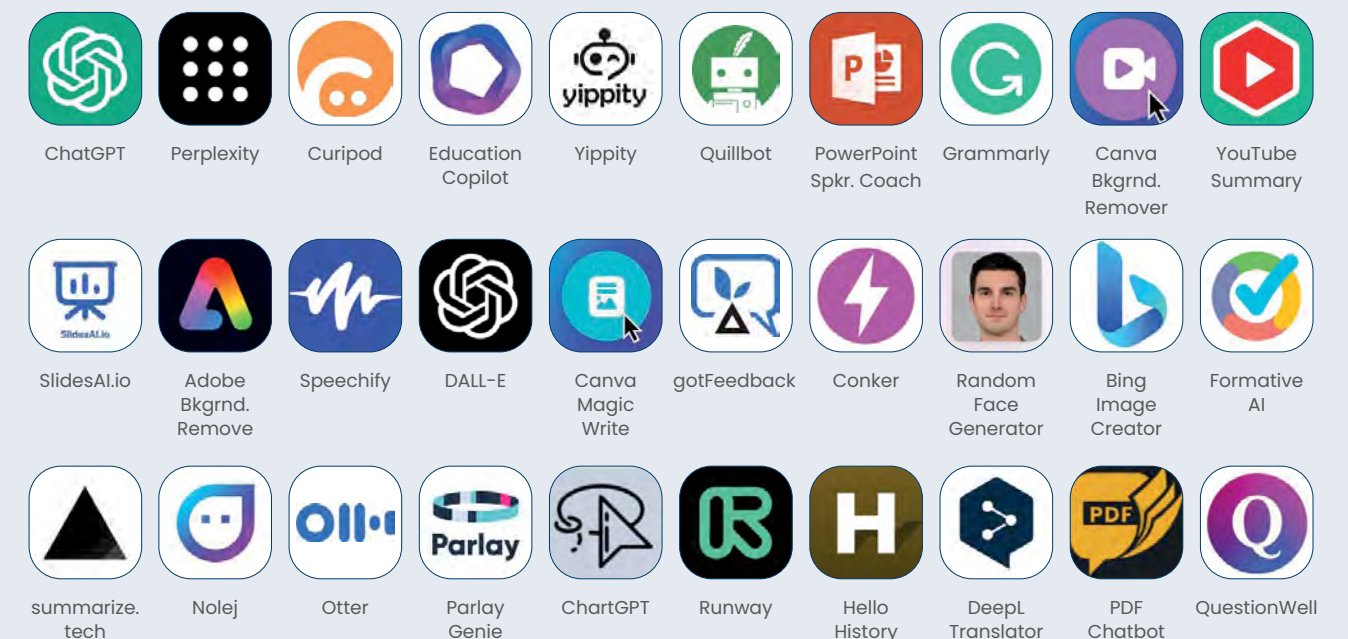- **Coding and advances** in mathematical problem solving e.g. OpenAI's new O1 model (September 2024).

Each of these generative AI approaches leverages machine learning models (typically based on large datasets) to create new content, from text and code to visuals and music, providing automation and creative solutions across various fields.

120 Mind-Blowing AI Tools

Source: Marie Laffey, Galway University, Ireland – permission granted to share this image.

30 AI tools to use in the classroom

ChatGPT · Perplexity · Curipod · Education Copilot · Yippity · Quillbot · PowerPoint Spkr. Coach · Grammarly · Canva Bkgrnd. Remover · YouTube Summary

SlidesAI.io · Adobe Bkgrnd. Remove · Speechify · DALL-E · Canva Magic Write · gotFeedback · Conker · Random Face Generator · Bing Image Creator · Formative AI

summarize.tech · Nolej · Otter · Parlay Genie · ChartGPT · Runway · Hello History · DeepL Translator · PDF Chatbot · QuestionWell

The impacts of future AI systems will depend on the extent to which individuals and organisations use them, what for, and why. Use will be determined by how AI systems are integrated into products, services and into peoples' daily practices. Barriers to access and how user friendly they are will also be a factor. A literature review of 101 journal publications on AI and career development (Pandya & Wang, 2024[60]) and our latest research highlight:

- how ChatGPT can be used by educators to promote learning, considering challenges, ethics and limitations (Crompton & Burke, 2024[61]; Bonner et al, 2023[62]; Bozkurt et al, 2023[63]; Crawford et al, 2023[64] Ipek et al, 2023[65])

- ChatGPT aimed at specific groups e.g. those visually impaired and blind (Kuzdeuov et al, 2023[66])

- AI tools applied to estimate the likelihood of students enrolling in institutions of their choice; (Prathibha et al, 2023[67])

- explanations of how to build an AI chatbot using the Facebook Messenger SDK as the toolset and Facebook as the interface (Suresh et al, 2021[68]; Goyal et al[69])

- shaping the future of education by exploring potential and consequences of AI and ChatGPT in educational settings (Grassini, 2023[70])

- strategies for responsible AI implementation (Halaweh, 2023[71])

- reviews of governance, ethics and risks associated with AI (Čartolovni, 2022[72]; Corrêa et al, 2022[73])

- the coming of age of robo-careers advisers or coachbots and responses to the threat of AI coaching (Hughes, 2023[74]; Diller et al, 2024[75])

- on-demand and personalised career guidance via AI-powered career advisers like Jobiri (cited by the European Council for Innovation, 2023[76]; Bankins et al, 2024[77]).

There is, nonetheless, a scarcity of literature in the UK and further afield on attitudes and responses towards AI in key workplace contexts (Castagno & Khalifa, 2020[78]; Yu et al., 2023[79]). There is scant academic literature on AI and career development for several reasons. First, the integration of AI into career guidance is a relatively new field, and the pace of technological advancements often outstrips the ability of academia to research and publish peer-reviewed studies. Additionally, the interdisciplinary nature of the topic can make it difficult to consolidate research under a single field of study.

Funding and resources may also be limited. Lastly, ethical concerns and data privacy issues surrounding AI in personal development contexts may slow down empirical research, as frameworks for responsible AI use are still being developed.

AI could play a transformative role in a careers and employability support ecosystem by enhancing the ability to deliver personalised, data-driven careers information and advice at scale. AI-powered platforms can analyse vast amounts of data to provide real-time insights into job market trends, skills gaps, and career pathways, enabling individuals to make informed decisions about their education and employment options. For example, AI algorithms can match job seekers with opportunities that align with their skills and aspirations, suggest training programmes to fill skills gaps, or forecast emerging career development trends based on labour market data.

However, while AI can provide valuable tools for career development, the human element remains critical. AI should not replace human interaction in career guidance but instead augment it, allowing educators, careers professionals and their partners to focus on providing deeper, more meaningful support. A human-centred approach ensures that individuals receive not only the data-driven insights that AI can offer but also the empathetic, contextual and emotional in-depth guidance that only a human adviser can provide.

Emotional support, long-term mentorship, intersection with other services, professional accountability, and ethical considerations are areas where AI falls short at present and where human careers advisers will remain indispensable. The quality of the relationship between the human adviser, the young person or adult and the application of AI is under-researched.

How could generative AI help careers and employability provision?

CMS Sandpit (creativity/brainstorming)	• Provide it a CV / parts of a CV / letter and ask for ideas how to improve the language generally • Provide a CV & job advert and ask for *first* draft of a cover letter ("blank page problem") • Ask for keywords to use on a CV for a particular career / job advert • Tell it your activities and ask what transferrable skills are related to it • Help building a personal website or managing a LinkedIn profile; simplify CV to 100 word bio
Interview Prep	• Ask it to provide example questions/answers to a standard interview for a given job advert • Ask it to score and suggest improvements for your answers to the standard questions • Help researching a company/sector/key trends
Career Exploration	• Provide high level information and generic advice on what different careers are like to help someone think about options (initial stage of career decision making) • Find adjacent roles/sectors or alternative job titles for something you're interest in • Effectively a navigation tool over large corpus of internet text
Virtual Adviser (with limitations)	• Simply talk with it as you would a person • Perhaps with a few sentences worth of preamble/caveats to help users understand the tool

AI applications in careers and employability activities also include broader machine learning and AI technologies, potentially integrating generative AI into parts of the workflow, e.g.:

AI-enriched tools for applications	• Automated CV feedback as part of tools specialised for CV support • Send or record yourself doing interviews and get feedback • Gamification across the pipeline • Language translation and cross-cultural communication • Personalised tutors / personalised & adaptive learning platforms • ML predictive models to find your course/career interests + application success rates
Supercharged LMI	• UK ONS project to code SICs/SOCs from free-text descriptions in surveys • AI to analyse job adverts and company websites to better understand trends (currently relies on NLP and coded logic, misses much unstructured data)
Recruitment / system support	• E.g. AI to screen or rank CVs or AI tests as part of round 1 candidate screening • Supporting candidates to thrive in such settings • ML to help predict students at risk of NEET, analyse links from subjects to jobs

Section 5:
Foresight future scenarios

Foresight future scenarios involve developing multiple, plausible visions of the future to help governments, organisations and individuals plan for uncertainty.

We (and others such as the International Monetary Fund, 2023[80]) have used this scenario-building approach to inform and support practitioners, managers and leaders to anticipate potential challenges and opportunities by considering various social, economic, technological, and environmental trends. Rather than predicting a single outcome, foresight encourages flexible thinking, helping stakeholders prepare for a range of possibilities. This approach is particularly useful in complex environments where rapid change is the norm.

By imagining different futures, organisations can better navigate uncertainty and make informed decisions that are robust under different conditions.

This study took an approach of examining societal, technological, economic, environmental, and political factors to identify the most significant and plausible trends shaping the future of AI careers-tech in the UK by 2035. There are many potential factors that will influence or impact on careers support systems in the UK as illustrated below.

Credit to Firetail foresight team for graphic format & global context.

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This context takes into account other allied factors such as major demographic issues (e.g. falling birth rate, ageing population); productivity risks amid growing economic inactivity; concerns with mental health and wellbeing; cost of living crises; digitisation/remote work/overseas competition/wage pressure on knowledge jobs; growing student expectations on tech, immersion, "engaging-ness", and personalisation; expectations that online information and services are free/cheap, with more self-paced, asynchronous learning; ongoing speed-up of societal and jobs disruption; and more diverse routes into jobs with fewer "obvious paths" for people to follow - all exacerbating the need for ongoing reskilling/sector transitions.

We have considered various **scenario elements** such as economic wealth, workforce composition, social conditions, education and training, sectoral trends, and working environments, which identify four broad positive factors and four broad negative factors that are likely to play a role to differing extents across all the scenarios:

Potential Positive Economy-wide Factors

1. **Government Collaboration with AI Innovators**: The government is expected to work more closely with AI careers-tech innovators, leading to improved productivity, skill development, and growth within sectors.

2. **Pandemic-driven Adaptations**: During the pandemic, businesses in the careers and employability sectors became more resilient and efficient due to the adoption of technology. This trend is likely to continue, benefiting both the workforce and employers.

3. **Increased Workplace Flexibility**: There has been a shift in working behaviours, leading to increased flexibility, which could positively impact both employee satisfaction and productivity if handled well, particularly regarding support for onboarding and mentoring new generations of employees.

4. **Regional and Sectoral Growth**: AI and technological advancements could spur growth in specific regions and sectors, helping to level the playing field and distribute economic benefits more widely.
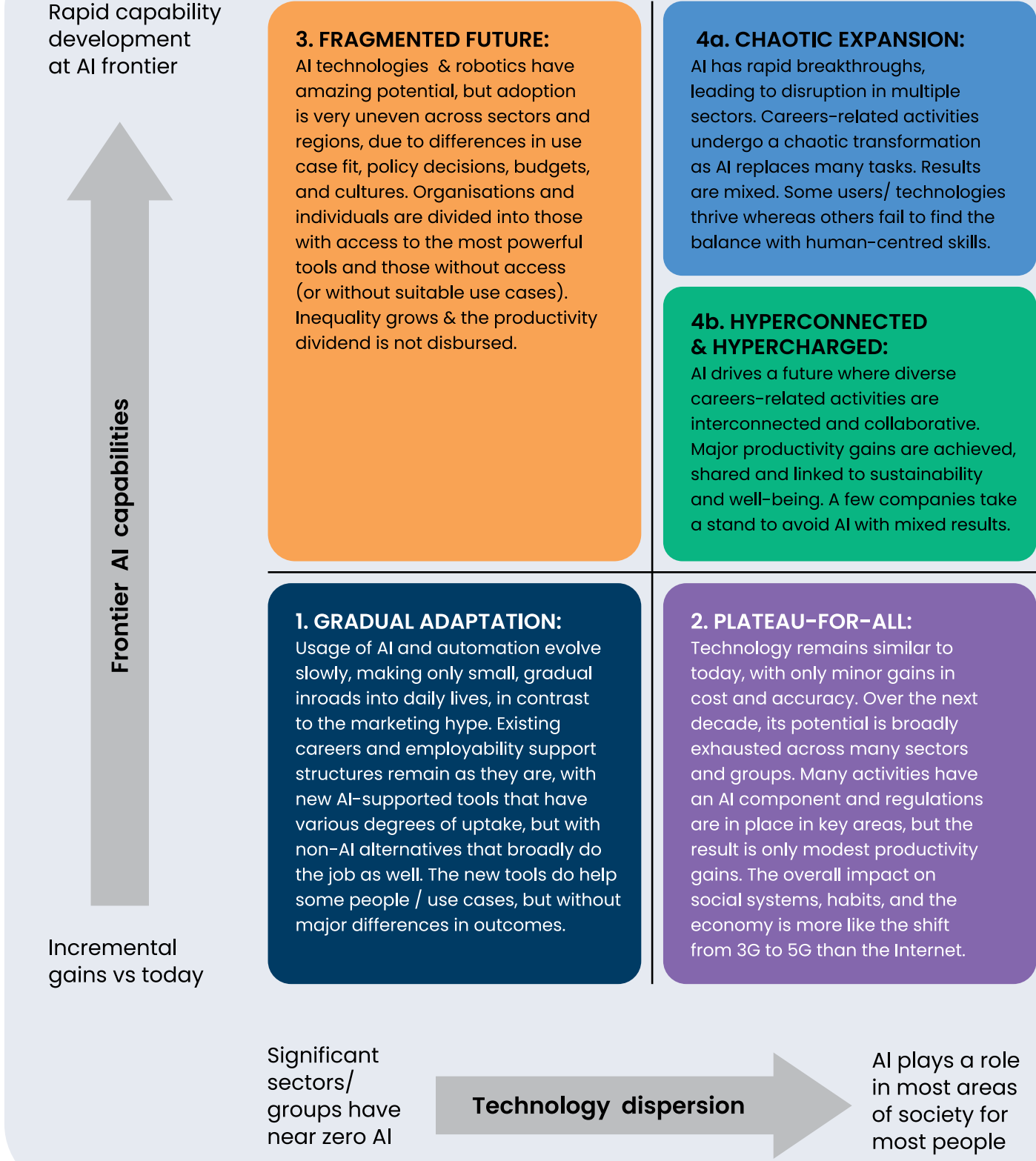
1. **Public Sector Debt Constraints**: High levels of public sector debt could limit investment in education, skills and the careers ecosystem improvements, potentially stifling progress in preparing the workforce for future challenges.

2. **Long-term Scarring of Young People**: There is a risk that young people (and adults) may experience long-term difficulties in engaging with learning or transitioning into new employment opportunities, exacerbating social inequalities: the new, permanent "left-behinds" if people do not upskill to work alongside AI.

3. **Workforce Burnout and Disengagement**: As AI and automation change the nature of work, there is a concern that workers could face burnout, disengagement, or a depletion of resources, particularly in sectors struggling to adapt. One important risk is the loss of purpose and identity that work so often provides.

4. **"AI Exhaustion"**: In a scenario where AI is not regulated properly, there could be uncoordinated, unchecked development, leading to negative societal impacts, including the reinforcement of inequalities or unpredictable economic disruptions. Also, concentration of power risks decision-making that takes an overly Western perspective, despite the huge risks to the developing world with the potential AI automation of back office roles - mainstay jobs in key parts of the global south.

Based on these considerations, we have organised the scenarios across two major axes: the level of AI capability at the frontier and how widely that capability is dispersed or used across different aspects of society. A third key axis, not explicitly represented, is the extent to which governments and society take proactive, effective action to manage AI. In the case of the highest impact scenario – with high AI capability at the frontier and widespread usage of that capability – we split the scenario into two variants along this third key axis, one with high coordination/action (4b) and one with little coordination/action (4a).

The scenarios are not intended to be normative or convey a 'preferred' future. Each contains a diverse mix of pros and cons and a different set of potential 'winners' and 'losers' relative to diverse individual preferences under different circumstances. Rather, the scenarios seek to create coherent, plausible stories from complex socio-economic and technological situations – a prompt for discussion-informed decision making, rather than a central prediction.

Scenario Overview

Rapid capability development at AI frontier

Frontier AI capabilities

Incremental gains vs today

3. FRAGMENTED FUTURE:
AI technologies & robotics have amazing potential, but adoption is very uneven across sectors and regions, due to differences in use case fit, policy decisions, budgets, and cultures. Organisations and individuals are divided into those with access to the most powerful tools and those without access (or without suitable use cases). Inequality grows & the productivity dividend is not disbursed.

4a. CHAOTIC EXPANSION:
AI has rapid breakthroughs, leading to disruption in multiple sectors. Careers-related activities undergo a chaotic transformation as AI replaces many tasks. Results are mixed. Some users/ technologies thrive whereas others fail to find the balance with human-centred skills.

4b. HYPERCONNECTED & HYPERCHARGED:
AI drives a future where diverse careers-related activities are interconnected and collaborative. Major productivity gains are achieved, shared and linked to sustainability and well-being. A few companies take a stand to avoid AI with mixed results.

1. GRADUAL ADAPTATION:
Usage of AI and automation evolve slowly, making only small, gradual inroads into daily lives, in contrast to the marketing hype. Existing careers and employability support structures remain as they are, with new AI-supported tools that have various degrees of uptake, but with non-AI alternatives that broadly do the job as well. The new tools do help some people / use cases, but without major differences in outcomes.

2. PLATEAU-FOR-ALL:
Technology remains similar to today, with only minor gains in cost and accuracy. Over the next decade, its potential is broadly exhausted across many sectors and groups. Many activities have an AI component and regulations are in place in key areas, but the result is only modest productivity gains. The overall impact on social systems, habits, and the economy is more like the shift from 3G to 5G than the Internet.

Significant sectors/ groups have near zero AI

Technology dispersion

AI plays a role in most areas of society for most people

In each scenario, there are different specific tools within career guidance that are AI-powered, with different levels of success and uptake. Each scenario also has potential for these tools to be developed in a more hybrid fashion, for more equitable and higher quality provision.

Scenarios at a glance

The worst excess of any scenario can be mitigated by proactive governance, regulations, robust ethical frameworks and widespread education focused on critical thinking and digital literacy. A new hybrid approach, combining human oversight with advanced AI tools, is essential to balance innovation with ethical considerations and ensure that technological progress benefits all. Investment in workforce development is a key issue. By ensuring transparency, accountability, and equitable access to AI technologies, society can navigate challenges while fostering ways of ensuring inclusive growth and innovation.

Scenario 1:
Gradual Adaptation reflects only incremental improvements in the use of AI rather than transformative innovations. The deployment of AI across various sectors may take longer than anticipated, especially in industries with high barriers to change or where human oversight is preferred.

Scenario 2:
Plateau-for-All reflects a potential plateau in AI development. This could happen if breakthroughs slow down or if the most accessible, low-hanging fruits of AI applications have already been picked.

Scenario 3:
Fragmented Future reflects a world where AI adoption is uneven across different sectors and regions and highlights the risk of deepening social and economic inequalities unless large and historically unprecedented steps are taken to avoid this.

Scenario 4a:
Chaotic Expansion reflects a series of rapid, but uncoordinated and unregulated breakthroughs, leading to widespread disruption and inequality and inequitable provision for individuals, organisations, sectors, and regions.

Scenario 4b:
Hyper-connected & Hyper-charged reflects significant gains in AI technology alongside a more equitable distribution of AI resources, contributing to societal goals like environmental sustainability and improved quality of life.

Usage of AI and automation evolve slowly, making small and gradual inroads into daily lives, despite the claims of marketing hype. Existing careers and employability support structures remain as they are, with new AI-supported tools that have various degrees of uptake, but with non-AI alternatives that broadly do the job as well. The new tools do help some people/use cases, but without leading to major differences in outcomes.

Education, training and skills: Schools, colleges and higher education institutions make limited and uneven use of career-tech tools with only occasional adoption of resources like virtual reality headsets, chatbots, educational gaming etc. Professional development efforts to upskill workers, young people and adults using AI, including LLMs, are sporadic and lack coordination, leading to minimal impact and slow progress in embedding these. No material national policy levers are used to support, standardise or optimise uptake.

Career Pathways: Employees face increasing pressure to engage in ongoing learning to stay relevant as AI, including LLMs, advances. However, participation is inconsistent, with many struggling to keep pace. Traditional career ladders remain largely unchanged, with only a modest and often superficial emphasis on acquiring digital skills and AI literacy, leaving significant gaps in workforce readiness.

Employment Practices: AI is gradually introduced into initial candidate screening and matching, but its impact is limited, with many organisations continuing to rely on traditional methods. Performance evaluation systems begin to incorporate AI analytics, but adoption is patchy and often results in mixed outcomes, with many assessments remaining as imprecise as before.

Work Environment: AI tools see limited and selective use, primarily for automating routine tasks within traditional job roles. Most organisations adopt AI cautiously, with minimal impact on overall productivity and efficiency. A few sectors, such as software engineering or animation, might see large transformations, but with limited spill-over to the rest of the economy. Efforts to enhance careers and employability support, such as career exploration and decision-making, maintain the status quo. Virtual assistant technologies are introduced slowly, but their integration into everyday practice is uneven and lacks widespread adoption.

Pros

Predictable Integration: Slow AI and automation evolution ensures gradual and predictable changes in careers and employability support. This stability allows for smooth adaptation without major disruptions.

Minimised Disruption: The gradual integration of AI avoids significant upheavals in existing career and employability support structures. Traditional practices remain largely intact, maintaining continuity.

Humans in the Loop: Humans remain central to decision-making and creative processes, with AI enhancing rather than replacing these human capabilities, preserving essential human judgement, creativity and empathy.

Stable Practices: The overall impact on career support services is minimal, preserving established methods and practices. This stability can benefit both providers and users who are accustomed to existing systems.

Reduced Risk: Slow evolution reduces the risks associated with rapid technological changes, such as potential errors or unforeseen consequences in career guidance and employability support.

Gradual Skill Alignment: Gradual advancements provide time for teachers and career guidance advisers to align their skills and tools with new technologies at a manageable pace. This helps in maintaining effectiveness in support roles.

Sustained User Familiarity: Users of career and employability services benefit from consistent tools and processes, avoiding the confusion that can come with more dramatic technological shifts. More educational online platforms offer free courses (endorsed by employers) and free resources including careers and employability (similar to the Khan Academy **https://www.khanacademy.org/about).**

Cons

Limited Innovation: Slow AI advancements lead to missed opportunities for significant innovations in education, career services and employability support, potentially making traditional practices outdated from the perspective of students and end-users.

Slow Adaptation: Career services and employability reforms often fail to fully leverage advanced AI tools, resulting in only gradual improvements in effectiveness. Incremental advancements may limit breakthrough innovations, causing practitioners and leaders to miss out on leading-edge technology.

Stagnant Practices: A culture around minimal changes leads to resistance to even modest AI advancements, hindering progress and adaptation to new challenges. Relying on traditional approaches also limits opportunities for innovation and collaboration in human-AI partnerships.

Limited Impact: Gradual AI integration proves insufficient to address significant systemic issues or transform practices meaningfully, with few other policies or technologies rising to meet the challenge. Slow adoption of AI in traditional careers and employability services results in missed efficiencies and enhancements, leading to suboptimal guidance and support.

Fragmented Progress: Uneven adoption of AI advancements across different regions and sectors results in disparities in the quality and access of services.

Resource Disparities: Institutions with fewer resources struggle to keep pace with even minor AI advancements, potentially exacerbating existing inequalities, although these effects are less severe than in scenarios 3 and 4a.

Scenario 1 – Gradual Adaptation

Technology remains similar to today, with minor gains in cost and accuracy. Over the next decade, its potential is broadly exhausted across many sectors and groups. Many activities have an AI component and regulations are in place in key areas, but the result is only modest productivity gains. The overall impact on social systems, habits and the economy is more like the shift from 3G to 5G than the internet or smartphone.

Education and Training Systems: see incremental improvements due to AI, with only minor enhancements in cost and accuracy. AI tools help personalise learning and provide additional resources, but these changes are modest. Traditional teaching methods and curricula continue to dominate, with AI serving as a supplementary tool rather than driving a fundamental overhaul.

Career Pathways: experience gradual refinement as AI integrates into career guidance and planning tools. While AI provides improved data on job market trends and skill requirements, these advances lead to only modest shifts in career trajectories. Traditional career paths remain largely intact, with AI supporting rather than revolutionising the way individuals navigate their learning and work journeys offering enhancements without dramatic changes.

Employment Practices: see gradual updates with the integration of AI tools for career guidance and employability workers. AI contributes to small improvements in efficiency and accuracy, but the core practices of hiring, management and employee relations remain largely unchanged.

The Work Environment: undergoes slight adjustments as AI handles routine tasks and optimises certain workflows. However, the fundamental nature of work culture and organisational dynamics remains stable. AI's role is to support and streamline operations, enhancing productivity in a modest way without fundamentally altering the work environment.

Pros

Steady Technology Evolution: Technological advancements provide incremental improvements in cost and accuracy. The changes are manageable on a small-scale basis and less disruptive compared to major innovations.

Widespread AI Integration: AI components are embedded in many careers support activities, enhancing operational efficiency. This integration occurs across various sectors, making processes more streamlined.

Regulatory Oversight: Regulations ensure responsible and ethical use of AI in critical areas. This oversight helps mitigate potential risks associated with AI deployment, career guidance and employability support.

Modest Productivity Gains: Productivity gains are incremental rather than transformative, leading to steady career-tech advancements and gradual social and economic benefits without causing major disruptions.

Steady Education and Social Systems: The impact on education and social systems and daily habits is minimal and predictable. The transition is mostly smooth, lagging some of the more dynamic changes in the corporate sector, avoiding significant changes in societal norms but it feels like more change could be round the corner. Many people feel uncertain about AI's role in the future and some also have AI-related anxiety.

Economic Shifts: Economic shifts are gradual and less abrupt, similar to previous technology upgrades. This stability helps businesses and individuals adjust without major upheavals.

Incremental Technological Progress: Technological progress mirrors past shifts, such as from 3G to 5G. The evolution is steady, providing enhancements without causing major disruptions. The benefits of minor technological advancements could be shared more evenly across different sectors and regions.

Cons

Limited Impact: Minor AI advancements in career support tools result in only small improvements in efficiency and effectiveness. The overall enhancement to careers and employability services is relatively limited.

Stagnant Innovation: The careers-support AI technology reaches its potential quickly, with few significant new developments. This stagnation restricts the evolution of career guidance practices and tools.

Minimal Disruption: The incremental changes in career support technologies fail to address deeper issues in career development and employability services. The limited impact means systemic issues remain unresolved.

Regulatory Challenges: While regulations are in place, they do not fully cover emerging ethical concerns in AI careers technology. Mixed compliance with imperfect and patchy regulation also slows down the implementation of new tools and practices and results in different groups with de facto different experiences/rights.

Uneven Benefits: Modest improvements in career support tools do not sufficiently address disparities in access to career guidance across different regions or sectors. Inequities persist in the support provided.

Underwhelming Technological Progress: Slow AI technological advancements in career support lead to dissatisfaction among some users seeking more impactful changes. Careers and employability services might not fully leverage new opportunities.

Economic and Social Lag: The gradual pace of change in career and employability support tools mostly does not keep up with evolving job market demands. This lag affects the ability of services to adapt to new trends and challenges.
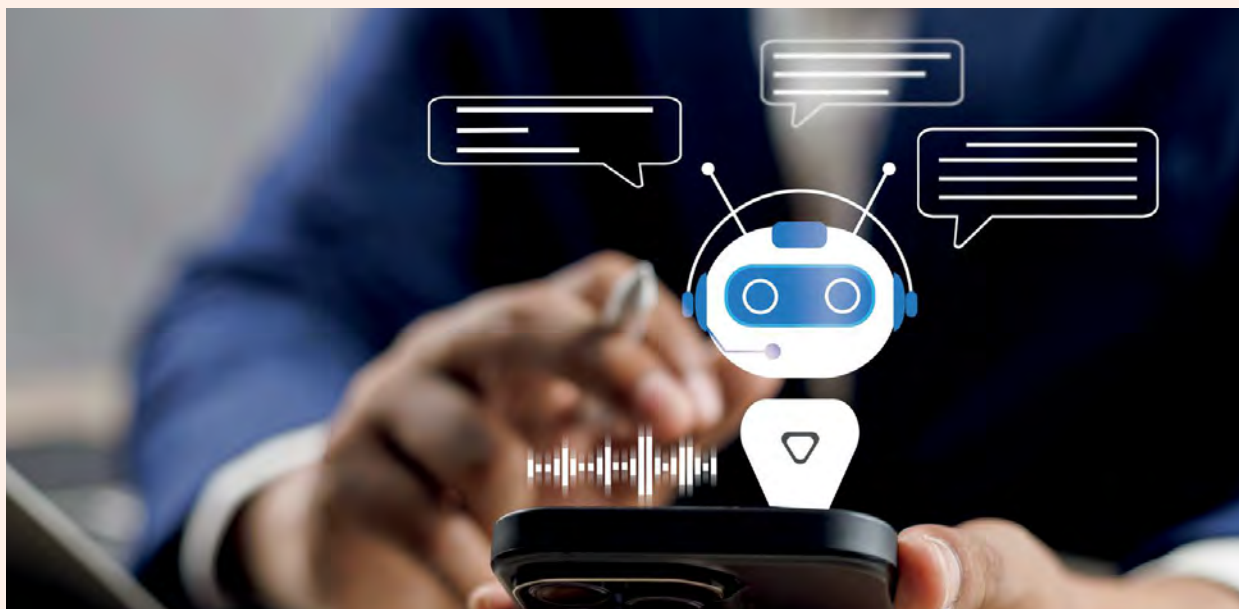
Scenario 2 – Plateau-For-All

AI technologies & robotics have amazing potential, but adoption is very uneven across sectors and regions, due to differences in use-case fit, policy decisions, budgets and cultures. Organisations and individuals are divided into those with access to the most powerful tools and those without access (or without suitable use cases). Inequality grows & the productivity dividend is not disbursed.

Education and Training: Disparities in access to quality education and training resources widen. Advanced AI training is readily available in urban centres and wealthy regions, while rural and less developed areas struggle to keep up.

Career Pathways: Access to jobs and career progression becomes highly dependent on geographic location and industry. Workers in tech-savvy regions and sectors enjoy more opportunities and higher salaries, while those in lagging areas face stagnation.

Work Environment: High-tech industries and large corporations leverage AI extensively, while smaller businesses and certain regions lag behind. This results in a bifurcated job market with significant disparities in opportunities, wages and working conditions.

Employment Practices: Gig economy platforms powered by AI become more prevalent in fragmented regions, offering flexible but precarious employment. Traditional full-time positions are more common in AI-rich areas, where companies can afford to invest in AI infrastructure or leverage the gains of AI to maintain more traditional hierarchies.

Pros

Personalised and Tailored Solutions: In sectors and regions that successfully adopt AI, careers support becomes highly personalised and tailored, offering advanced tools and insights that lead to more effective career guidance, decision-making and exploration for those with access.

Humans in the Loop: In tech-savvy organisations, human creativity is key to maximising AI's potential, with AI tools like VR, gaming and chatbots enhancing careers and employability support. Collaboration among experts has the potential to address careers tech issues and best practices, but some organisations use AI primarily to replace human decision-making, improving speed and cutting costs but risking volatile outcomes.

Innovation in Leading Areas: Regions and sectors embracing AI become innovation hubs, creating new job opportunities and setting benchmarks in careers and employability support. AI fosters niche markets and opportunities, while Innovation Sandboxes for specific use cases lead to the development of unique, effective career tools and practices, but they are not always well integrated into a broader ecosystem of services.

Localised Expertise: Areas with strong AI adoption develop localised expertise and advanced labour market information (LMI), leading to better-informed career decisions and strategies tailored to local and regional markets. High-tech regions and specialist providers cultivate cutting-edge skills and expertise.

Competitive Advantage: Some sectors and regions with advanced AI capabilities gain a competitive edge, attracting talent and investment and driving economic growth, although it was not always obvious which sectors would do well. Concentrated efforts in these areas can lead to significant technological advancements, with research and evidence-based practices driving change and innovation in the careers support ecosystem, but with limited spill over to other areas.

Focused Resource Allocation: Resources are concentrated in areas where AI adoption is more advanced, potentially leading to more efficient use of technology and data in those sectors.

Cons

Fragmented Labour Market: Uneven AI adoption creates disparities in career opportunities and employability support, exacerbating inequality between regions and sectors.

Access Disparities: Limited access to AI-driven services and LMI in less advanced regions widens the gap between those with and without access to modern support.

Inequitable Opportunities: Job seekers in areas with lower AI adoption face fewer opportunities and less effective career guidance and employability support, hindering their competitiveness in the job market.

Social and Economic Inequality: Disparities in AI adoption contribute to widening social and economic inequality, with lagging regions missing out on growth and innovation benefits.

Regional Imbalance: Uneven AI adoption leads to imbalances in workforce development and skills, causing inefficiencies in education, careers support and the labour market.

Difficulty in Bridging Gaps: Addressing the divide between advanced and less advanced regions requires significant careers-support investment and policy intervention for young people and adults' equitable access.

Outdated Skills Sets: Slow or fragmented AI adoption results in outdated skills, making it difficult for workers and advisers to keep up with the opportunity structure for young people and adults.

Scenario 3 – Fragmented Future

Scenario 4a – Chaotic Expansion

AI and automation experience a series of rapid breakthroughs, leading to widespread disruption across multiple sectors. Education, career guidance, employability services and workforce development undergo a chaotic transformation as AI replaces or automates many routine tasks, but with mixed results as some technologies/users thrive whereas others fail to find the balance with human-centred creative, strategic and emotional intelligence skills.

Education and Training: Traditional education is increasingly overshadowed by the rapid rise of AI tools & robotics, unregulated online courses, and fleeting AI certifications. Some individuals receive advanced, highly personalised guidance while others contend with outdated resources and uncoordinated support. There is a deepening divide in access to education, training and career development opportunities.

Career Pathways: The surge of misinformation/disinformation related to career opportunities across the Internet and LLMs causes some individuals to make poorly informed and costly decisions, resulting in confusion and a negative impact on skills and wellbeing. Market-driven provision produces flashy tools and credentials over genuine skill development.

Work Environment: The adoption of AI in businesses comes with ethical risk. Unfair algorithmic recommendations compete with calls for more expensive, human-led robustness checks. Inadequate governance leads to a crowding out of authentic human tasks and support services. The working and career development experience of employees becomes diminished for many, although a few technologically-sophisticated and well-resourced people thrive in the new environment, albeit often at the expense of others.

Employment Practices: Companies take steps to protect themselves for both the short and long-term. There are new guidelines for employment practice and the effects on jobs are complex and uneven, with periods of job destruction and displacement in certain sectors. AI grows in power exacerbating the 'haves' and 'have nots' in society.

Pros

Significant Productivity Gains: AI-driven automation dramatically enhances efficiency across industries, education and career guidance with conversational interfaces that are easy to use, reducing costs, speeding up production, improving service design and delivery, and access to personalised services.

Widespread Innovation and New Opportunities: Rapid AI advancements drive innovation across nearly all education, employability and careers sectors, but with uneven distribution, few evaluations, and highly volatile outcomes – a 'wild west' of creative destruction. Beacon sites of inspiration emerge for those who can afford investment with encouragement of others lagging behind to do more.

Workforce Flexibility and Lifelong Learning: Individuals' sentiments gleaned from nuances of language and subtle signals of interest or distrust – in emails, conversations, posts on social media – produce powerful new insights, which lead to better decisions and better recommendations in those cases where they are actively interrogated. Some people feel virtually connected in a highly personalised way and engage more in learning and work.

Better Access to Opportunities: A lack of regulation or legislation leads to a fast-paced environment where AI-driven products and services are created and released without delay. This opens doors for new entrepreneurial ventures. In this chaotic landscape, people willing to take risks may find unique opportunities.

New, unconventional career paths emerge: Individuals have greater flexibility to pivot between industries or roles. This enables workers to pursue diverse opportunities, experiment with multiple career trajectories, and adapt quickly to shifting job markets, empowering those who thrive in dynamic environments.

Cons

Widespread Job Displacement: AI technologies and robotics cause significant job losses in routine roles, resulting in widespread unemployment or underemployment for those unable to transition to new roles.

Polarisation of the Labour Market: The job market splits into high-skill, AI-related roles (and roles subsidised by AI-productivity) and low-wage service jobs, deepening income inequality and leaving many workers struggling for stable employment.

Economic and Social Inequality: Rapid AI adoption widens the gap between those with access to advanced resources and those without, concentrating wealth and increasing social inequality.

Ethical and Privacy Concerns: AI deployment raises issues like biased algorithms and loss of privacy, posing challenges for ensuring fairness and transparency, especially in sectors and use cases where regulation is most behind.

Social Disruption and Psychological Impact: The chaotic transformation of careers and employability structures leads to greater anxiety, mental health challenges, and a loss of identity for workers as traditional roles disappear. There is no social consensus around what to do about this and no compelling social narratives for disenfranchised workers to engage with as part of a journey back to workplace fulfilment.

Increased Skill Disparities: The rapid shift towards AI-driven roles exacerbates skill gaps, making it difficult for workers to keep up with new demands and transitions.

Scenario 4a – Chaotic Expansion
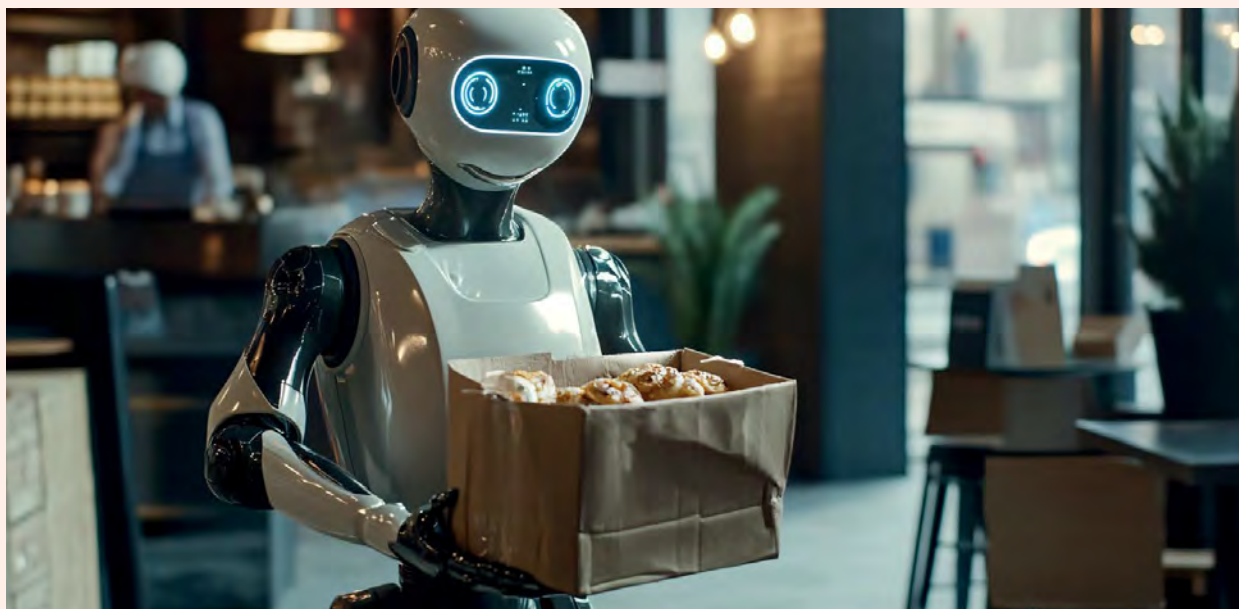
AI drives a future where education, training, careers, employability support and workforce development are highly interconnected and collaborative. Productivity gains are achieved in many areas, with (at least partial) social sharing of these productivity gains linked to sustainability and enhanced wellbeing. A few people/companies make a deliberate stance of avoiding AI with mixed results.

Education and Training: Most people make use of AI technologies & robotics for learning and work. It personalises education to individual needs, provides real-time feedback and adaptive learning experiences. Traditional degrees become less relevant as experiential learning, AI credentials and portfolios. Showcasing skills and achievements are paramount.

Career Pathways: Career trajectories and AI-driven continuous professional development (CPD) become more fluid and dynamic. Integrated AI systems enhance service design, offering tailored careers support that adapts to individual or group needs in real-time. This professionalisation boosts productivity while promoting wellbeing and sustainability. Collaborative efforts between AI and human expertise create more inclusive opportunities and environments for personal growth and lifelong learning.

Work Environment: AI and robotics perform most routine and manual tasks, shifting the focus to creative, strategic and interpersonal roles. Human workers collaborate with AI systems in cities and towns, leveraging their strengths in decision-making, creativity and emotional intelligence. Regular use of AI as co-workers is also established.

Employment Practices: AI oversees many HR functions, from hiring and onboarding to performance management and career development. Ethical considerations and regulatory frameworks ensure that AI systems promote fairness and inclusivity in the workplace.

Pros

Enhanced Interconnection: AI fosters a highly interconnected careers ecosystem across education, training, and workforce development, leading to more cohesive and hyper-connected 24:7 careers support services.

Productivity Gains: AI usage becomes commonplace. AI-driven advancements result in significant innovation and productivity gains embraced by the career guidance sector. Most people use AI as part of their daily and working lives and have at least a basic 'digital mindset' making their work more flexible, responsive and productive.

Social Sharing of Gains: AI's computational power helps tackle significant challenges such as improving work experience opportunities, greater alignment of individuals' unique circumstances, values and interests to opportunities e.g. grand challenges and competitions with social, economic and wellbeing benefits linked to jobs and career development. Universal basic income (UBI) is rolled out by governments.

Improved Collaboration: AI facilitates greater collaboration among educational institutions, training providers, careers and employability services and employers, aligning efforts for better outcomes for individuals.

Workforce Flexibility and Lifelong Learning: Emerging solutions and new approaches and models emerge with teachers, careers advisers and students better educated on how to critically assess AI, seek transparency and differentiate between fake and real information, empowering them to navigate the digital landscape with confidence.

Innovative Solutions: AI drives innovation in career development tools and practices, leading to the creation of new and more effective methods for workforce support.

Strategic Stance: While some individuals or companies may choose to avoid AI, this deliberate stance can sometimes lead to falling behind, highlighting the importance of staying engaged with AI technological advancements. There is also partial societal push back from employer bodies and trade unions, winning important rights for workers and a stronger social safety net, but with only limited effect on slowing down the uptake of technology.

Cons

Over-Reliance on AI: Heavy dependence on AI leads to reduced human oversight and intuition in education, employability and career guidance, potentially undermining the range, depth and quality of support.

Social Inequality: The benefits of AI-driven productivity are not evenly distributed, exacerbating social and economic inequalities if gains are not shared equitably.

Privacy Concerns: Increased data collection and analysis by AI systems raises significant privacy and security concerns, potentially impacting individuals' personal information.

Resistance to Change: Some individuals and organisations resist adopting AI, potentially leading to a digital divide where those who do not adapt fall behind in career and employability advancements.

Dependence Risks: Excessive reliance on AI systems leads to vulnerabilities, where failures or inaccuracies in AI and career development tools significantly impact education and career support outcomes.

Unequal Access: Limited access to AI tools and resources in less advanced regions or sectors hinders the effectiveness of interconnected systems, leaving some individuals without adequate support.

Productivity Disparities: Not all sectors or regions benefit equally from AI-driven productivity gains, leading to imbalances and inequalities in economic and social outcomes for young people and adults.

Section 6:
Co-creating a Human-Centred and AI-Enhanced Career Guidance Ecosystem

To meet the challenges of the next decade, we argue that the careers support ecosystem must be co-created by key stakeholders, including educators, employers, municipalities, career development professionals, technology developers and policymakers.

Collaboration is essential to build a robust system that is both technologically advanced and deeply rooted in the needs and aspirations of individuals. This co-creation process should involve:

1. **Leveraging AI for Personalised Support**: AI tools should be harnessed to offer tailored careers information and advice based on individual needs, preferences and circumstances, providing adaptive learning and development pathways that adjust as career goals and labour market conditions change.

2. **Fostering Lifelong Learning and Skills Development**: As the demand for continuous skills development increases, the ecosystem must provide accessible learning opportunities, both formal and informal, that are aligned with current and future workforce needs and individuals' aspirations. Micro-credentials, flexible learning pathways, and partnerships between educational institutions, career development professionals and employability workers and employers will play a key role in this evolution.

3. **Ensuring Equity and Inclusivity**: The career guidance and employability support ecosystem must ensure that AI and other technologies are accessible to all, preventing the creation of new inequalities in young people's and adults' access to careers support opportunities. Special attention must be given to marginalised and disadvantaged groups to ensure that they have the resources and guidance needed to thrive in a technology-driven workforce.

4. **Balancing AI with Human Interaction**: A successful ecosystem will strike a balance between technological innovation and the irreplaceable value of human connection and relationships.

5. **Adapting to Future Workforce Trends**: The ecosystem must remain agile, responding to and anticipating changes in workforce demands and equipping individuals with the tools, confidence and experiences to be able to adapt. This includes preparing for the roles of gig and freelance work, remote and hybrid work environments, and the growing importance of sustainability and ethical considerations in careers.

6. **Developing an Experimental AI Careers Tech Sandbox**: Innovating and delivering on the vision above would ideally work through a sandbox infrastructure and test & learn pilots. The sandbox would provide a secure environment in which to explore generative AI innovation, ethics and safety, with access for approved technologies, user representatives and experts to test tech in a structured fashion before wider deployment and function as an environment for exploring how governance, regulation and work all interact with new technologies to give the best possible outcomes in specific contexts.

06

Conclusion

The future of AI in career guidance holds a spectrum of possibilities, each with profound implications for career advisers, the individuals they support and their work with employers.

As we navigate scenarios ranging from gradual adaptation to chaotic expansion, it becomes clear that the role of career guidance professionals will be more critical than ever. They will need to remain adaptable, continually enhancing their skills through continuous professional development (CPD) to integrate emerging technologies while preserving the essential human elements of empathy and support.

Moreover, the demand for digital competence will be paramount, as career advisers must familiarise themselves with AI tools and platforms to effectively guide clients in navigating the complexities of the job market. Whether facing the challenges of uneven AI adoption, grappling with a potential plateau in advancements, or embracing a hyper-connected future, careers and employability advisers will serve as crucial navigators for young people and adults alike, guiding them through an evolving landscape marked by both opportunity and uncertainty.

Looking ahead, it is imperative for policymakers to prioritise equitable access to AI-enhanced resources, ensuring that all individuals—including those with special educational needs and disabilities—can benefit from the transformative potential of these technologies. By championing inclusivity and providing tailored support, we can empower every person to navigate the evolving landscape of education, skills and work with confidence and competence. The future of career guidance must not only embrace innovation but also champion the breaking down of barriers, ensuring that no one is left behind in this new era of opportunity.

Appendix 1 – Glossary of Terms

Agency: Ability to autonomously perform multiple sequential steps to try and complete a high-level task or goal.

Agentic: Describing an AI system with agency.

Artificial General Intelligence (Also: General AI, Strong AI, Broad AI): Artificial general intelligence (AGI) describes a machine-driven capability to achieve human-level or higher performance across most cognitive tasks.

Artificial Intelligence: Machine-driven capability to achieve a goal by performing cognitive tasks.

Autonomy: The ability to operate, take actions, or make decisions without direct human oversight.

Capability: The range of tasks or functions that an AI system can perform and the proficiency with which it can perform them.

Career guidance: Services which help people of any age to manage their careers and to make the educational, training, and occupational choices that are right for them. It helps people to reflect on their ambitions, interests, qualifications, skills, and talents – and to relate this knowledge about who they are to who they might become within the labour market.

Cognitive Tasks: A range of tasks involving a combination of information processing, memory, information recall, planning, reasoning, organisation, problem solving, learning, and goal-orientated decision-making.

Compute: Computational processing power, including CPUs, GPUs, and other hardware, used to run AI models and algorithms.

Disinformation: Deliberately false information spread with the intent to deceive or mislead.

Employability: The skills and abilities that allow you to be employed (personal assets).

Foundation Models: Machine learning models trained on very large amounts of data that can be adapted to a wide range of tasks.

Frontier AI: Highly capable general-purpose AI models that can perform a wide variety of tasks and match or exceed the capabilities present in today's most advanced models.

Generative AI: AI systems that can generate content based on statistical extrapolations from a training set of content, such as extrapolating plausible images or text based on a specific user-entered prompt and statistical loss function implemented by the system designer (e.g. to favour more polite responses of a certain length or style).

Labour Market Intelligence/Information (LMI): Data and insights about employment trends, job opportunities, skills demand, wages, and workforce patterns that help individuals and organisations make informed decisions about education, careers, and training.

Large Language Models (LLM): Machine learning models trained on large datasets that can recognise, understand[81], and generate text and other content.

Machine Learning: An approach to developing AI where models learn patterns from data and how to perform tasks without being explicitly programmed.

Misinformation: Incorrect or misleading information spread without harmful intent.

Narrow Artificial Intelligence: AI systems able to perform a single or narrow set of tasks, such as playing Go, labelling images, or reading handwriting.

NEET: Not in education, employment or training.

Psychometrics: A field of study within psychology concerned with the theory and technique of measurement. Psychometrics generally covers specialised fields within psychology and education devoted to testing, measurement, assessment, and related activities.

Retrieval Augmented Generation: A technique for refining the output for an LLM so that it draws particularly strongly on a corpus of text that has been retrieved specifically in response to a user question (e.g. text subsets identified via a vector similarity search to the user's question and its provided context).

SEND: Special Educational Needs and Disabilities. A pupil is identified as having Special Educational Needs if they are finding it harder than other pupils to make progress. This may be due to a specific learning difficulty, a recognised disability such as a hearing impairment, emotional, mental health or social difficulties, or speech and language difficulties.

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81 It's worth noting that while LLMs can "understand" text in the sense of processing and generating relevant responses, their understanding is not the same as human comprehension. They analyse patterns in data rather than truly grasping meaning in a human-like way.