The Digital Transformation of Workplaces

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INTRODUCTION

I welcome the opportunity to contribute to the Digital Transformation of Workplaces inquiry. I am a Vice-Chancellor Senior Research Fellow in Economics at RMIT and a research affiliate of the ARC Centre of Excellence for Automated Decision-Making and Society (ADM+S). In September 2023, with the support of Digital3 at RMIT, I launched the FLOW-GenAI initiative (Future of Labour, Organisation and Work with Generative AI) focused on providing evidence-based research on the transformation of work with generative AI. Please note that this submission is based on my research publication and prior submissions to inquiries and consultations.[1]. Opinions expressed in this submission are my own and do not represent the views of my employer or the research centres to which I am affiliated.

I am a labour and innovation economist focusing on researching the interaction between technology and work for two decades in Europe, the UK, the US and Australia. I analyse the changing nature of work associated with digital transformation, investigating how technologies, such as AI and automated systems, are integrated into current work processes through reorganising workplaces (Behaghel et al., 2012; Greenan et al., 2014; Walkowiak, 2023a, 2006) and change decision-making, considering the cost and properties of AI technologies. My research on generative AI (GenAI) is centred on the Australian labour market and evaluates AI risks for workers (Walkowiak, 2023a; Walkowiak and MacDonald, 2023; Walkowiak and Potts, 2024). This research measures AI risk exposure associated with its increased diffusion in Australia, how we can address them, what it means for productivity and the economy, and the development of AI risk mitigation strategies at work.

Another aspect of my previous research on this topic lies in international comparisons of the transformation of work and workplaces, showing the role of institutions on labour market outcomes, including inequalities in wages, employment, satisfaction at work or career prospects. I investigated international differences between the quality of working conditions and working lives of workers in Europe (Greenan et al., 2014) and new forms of specialisation and upskilling of digital crowdworkers of the gig economy in 125 countries worldwide (Walkowiak and Tong, 2023).

Finally, my research participates in a humanisation of work movement for the digital economy, where the well-being, inclusion, and efficiency of workers are all considered together to support actionable models for sustainable technology deployment. Regarding inclusion, I identified deployment models of technologies that favour the inclusion of vulnerable workers, such as neurodiverse workers (Spoor and Walkowiak, 2024; Walkowiak, 2021a, 2023b), alongside productivity gains.

My opinion: Generative AI is the most transformational technology for our economy and society, particularly knowledge workers, as GenAI will transform how we generate various

[1] Previous submissions to inquiries on The Evaluation of JobKeeper, Adopting AI, Consultation for the Employment White Paper- Job and Skills Summit

content. GenAI creates content that cannot be distinguished from human work, blurring the definition of work (Walkowiak, 2023a) and raising new challenges for our society. GenAI is a tech that is both generative and conversational. This means that GenAI's outputs depend upon our interaction with the technology. GenAI represents a profound transformation in human-machine interaction and collaboration (Walkowiak, 2023a), as machines and workers can "communicate" through a common language. GenAI involves new ways of working with technology. Gen AI will highly transform work. However, nothing is predetermined about the impact on work and workers at this early adoption stage. How the technology will be deployed in workplaces will fundamentally change how we work, produce, create and collaborate. It is time to act to ensure a safe, inclusive and productive technology deployment.

THE BENEFITS FOR PRODUCTIVITY, SKILLS DEVELOPMENT, CAREER PROGRESSION AND JOB CREATION IN AUSTRALIA

Let's take a perspective on the rapidity of the evolution in digital technologies; three months after its release to the public in November 2022, ChatGPT of OpenAI reached 100 million active users per month, with 13 million unique visitors per day in January 2023, it took Instagram 2.5 years to get this penetration. In 2023, using the Australian Skill Classification and Australian Labour Force surveys[2], I found that 37% of Australians' work is exposed to GenAI (Walkowiak & MacDonald, 2023). When combined with complementary investments like machine learning systems or other technologies, the exposure of the Australian worker is vastly higher. This potential significant impact on the workforce is comparable to what is observed in the US (Eloundou et al., 2023). We don't yet know what it means regarding productivity gains or labour displacements since GenAI exposure differs from GenAI adoption. But for sure, it will be an important shock on the labour market, impacting a large share of workers, tasks and business processes at an unprecedented rapidity and scale.

For AI, automated decision-making technologies, machine learning, as for all other technologies, the net impact of a technology depends on the magnitude of three effects on the task content of jobs: 1) the displacement effect (which is a major concern for workers); 2) the productivity effect (which raise the labour demand); 3) the reinstatement effect with the creation of new jobs.

AI technologies have replaced routine tasks in the past, leading to a polarisation of the labour market known as a mechanism of routine-biased technological change. The story is different for current technologies since highly skilled non-routine tasks of knowledge workers or professionals are directly exposed to the technology. Moreover, most of the current literature in economics demonstrates rapid productivity gains due to a better performance of less able or less experienced workers (Brynjolfsson et al., 2023). This result suggests that the last wave of AI technologies can complement (less able) workers rather than substitute them, at least in the short term. The immediate translation of the adoption of generative AI into productivity gains (for less able workers) was not observed for previous technologies. For example, during the nineties, the adoption of computers was associated with what we called the productivity paradox, which means no productivity gains when using technologies since technological

[2] Note that the estimates produced by Deloitte, McKinsey, or even the OECD, ILO, or IMF use the American O*Net classification to extrapolate exposure indicators for Australia. Walkowiak and MacDonald (2023) or Walkowiak and Potts (2024) exclusively use Australian classifications to analyse the Australian workforce since these classifications account for the specificities of the Australian labour market.

change requires upskilling and organisational adjustments to deliver its full productivity benefits. I believe the same will apply to GenAI when adoption scales since business reorganisations to mitigate AI risks are required to deploy the technology safely.

The measurement of these three effects (displacement, productivity, reinstatement) in Australia is not currently possible due to the absence of representative surveys on the use and adoption of technologies within the workplace. Without these representative surveys, in (Walkowiak and MacDonald, 2023; Walkowiak and Potts, 2024), we measure the exposure to a technology, rather than its adoption. A key priority should be to develop an employer-employee data infrastructure on the adoption of different technologies in Australia, that can be matched with administrative datasets on labour flows. It is essential to open the black box of workplaces to understand the interaction between the workers, work organisation and the use of technologies as part of the same transformation. Paradoxically, in a period of abundance of information, the quality of the datasets to measure the impact of the digital transformation on work is very limited. Representative firm/employer datasets are needed to inform on organisational and technological choices made by managers within workplaces, factors favouring or impeding this evolution. Employee datasets inform how people work and use technologies at the workplace (or any place where they complete a task). Building this data infrastructure is necessary to guide managerial choices regarding technology impact and policy decisions relevant to the Australian context. It is inappropriate to rely on data collected in the US or EU to design policies implemented in Australia. Matched employer-employee surveys (that need to be combined with administrative data) are urgently required to guide evidence-based policies and to capture productivity gains and evolving skill content of jobs associated with the adoption of technologies.

We must also consider that firms' upskilling strategies to cope with technological change depend on their organisational context (Walkowiak, 2006). For example, (Behaghel et al., 2012) identified the magnitude of different upgrading strategies of the workforce: 1) the shift of the occupational structure of workplaces done via promotions of incumbent workers (which is an internal labour market strategy) or by hiring workers with new skills and/or firing workers with obsolete skills (external labour market strategy); 2) Adjustments through external labour market, known as excess turnover (or churning)—i.e. turnover in excess to what is necessary to upgrade the occupational structure—if firms try to acquire new skills by the hiring ‘fresh’ workers. 3) The training of workers. In addition to these three strategies, it is worth mentioning a fourth strategy: 4) outsourcing work to platform workers, a strategy that is increasingly developing (Walkowiak and Tong, 2023) due to its flexibility, cost and time efficiency. These four upskilling strategies can lead to different consequences on wages, promotion of workers and inequalities between workers.

THE RISKS, OPPORTUNITIES, AND CONSEQUENCES FOR THE NATURE OF WORK, INCLUDING EFFECTS ON HIRING, ROSTERING, WORK INTENSITY, JOB DESIGN, WAGE SETTING, MONITORING, SURVEILLANCE AND JOB QUALITY

The critical question is whether these technologies create a gap between workers who use them ethically to improve their performance and those who don't. Technologies provide opportunities to 1) accelerate the completion of some tasks, freeing up time for workers to focus on higher-value tasks; 2) generate additional ideas; and 3) complete tasks that require

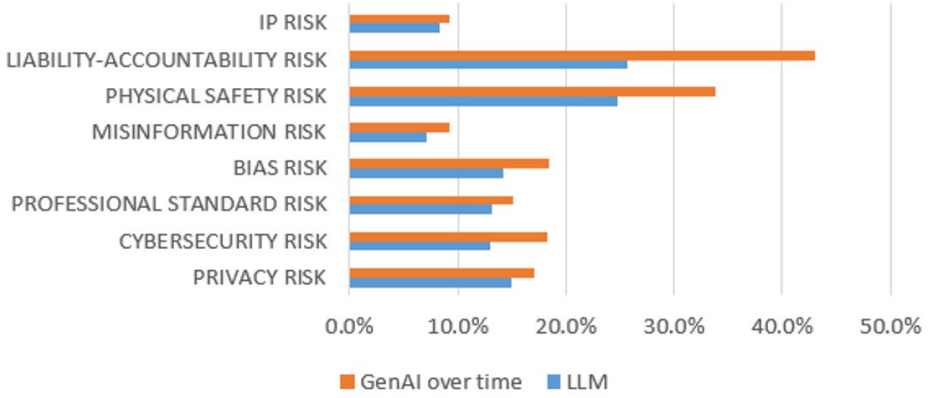
additional skills that a worker may not hold. The skill content of jobs is changing with digital transformation, involving redesigning jobs and redefining the nature of work.

New tasks are also emerging transversally in the labour market, with the emergence of AI risks. The economic rationale driving the adoption of AI within workplaces cannot be separated from the potential diffusion of new risks (Walkowiak, 2023a). Looking at the diffusion of AI risks within the workforce of cultural and creative industries in Australia, Walkowiak and Potts (2024) identify zones of job transformation where upskilling and mitigation strategies to manage privacy, cybersecurity, breach of professional standards, bias, misinformation, accountability, and intellectual property are required. These zones of job transformation are characterised by the intensity, timing and nature of AI risks associated with using technologies at work.

AI risks are irreversible when they occur (for example, once there is a privacy breach, it is too late to act; the repair is not possible), the diffusion of AI will drive a substantial change in the nature of work. The graph below gives the Australian workforce's exposure in June 2023 to AI risks by measuring the proportion of time that workers spend completing tasks exposed to AI risks. Risks associated with using large language models (LLMs) are reported in blue, and in orange, risks also include other AI and generative AI capabilities.

I recommend to urgently develop guidelines on upskilling programmes and AI mitigation strategies within workplaces to ensure a safe deployment of technologies. Technological-driven organisational changes have two properties: their rapidity and irreversibility (Greenan and Walkowiak, 2010). Organisational choices made today to mitigate AI risks at work are likely irreversible.

Graph: GenAI risks in the Australian workforce



Source: Walkowiak and MacDonald (2023). Risk exposure rates representative of the Australian Labour Force in June 2023.

Finally, it is essential to understand how automated systems change working lives, work intensity, and job quality, which have been extensively analysed in social science studies. Indeed, a country's productivity, innovative ability, and competitiveness lie in the quality of employees' working lives (Greenan et al., 2014). Using employee data sets from European Condition Surveys, Greenan et al. (2014) show that the physical strain, work intensity and work complexity represent important dimensions of the quality of jobs that may impact the productivity and well-being of workers. GenAI is impacting all these dimensions. Better data

on workers' use of technologies is needed to evaluate the impact of technologies on working conditions and the quality of jobs in Australia. In Greenan et al. (2007), we point out that workers can provide more accurate information on important questions such as: How does introducing digital technologies impact how they work? Do the new technologies lead to the enrichment of jobs or, on the contrary, to more repetitive work? What is going on in terms of supervision and control? How do workers react individually and collectively to the introduction of new technologies? Understanding the transformation of workplaces/workstations through the lens of employees is essential to understand how productivity gains arise and how it is transforming the quality of jobs (Greenan and Walkowiak, 2005). Given the rapid transformation of the tasks and content of jobs, I recommend to collect this data on working conditions of workers.

THE EFFECTS OF THESE TECHNIQUES ON THE SCOPE OF MANAGERIAL PREROGATIVE, LABOUR RIGHTS, ABILITY FOR WORKERS TO ORGANISE, PROCEDURAL FAIRNESS, EQUALITY, DISCRIMINATION, AND DIGNITY AT WORK

The role of collective negotiation in the deployment of technologies is central to its social acceptance. Worker monitoring systems can significantly expand managerial control and oversight over work processes and employee performance. This increased surveillance, data-driven management, and spread of AI risk at work could undermine traditional boundaries of managerial authority. Having worker representatives actively involved in negotiating the implementation of new workplace technologies can help balance managerial prerogative with protecting worker interests and rights. Many workers and advocates view technologies like wearable monitors, pervasive surveillance systems, and tracking software as dehumanising and infringing on basic human dignity and autonomy at work. However, when deployed ethically, these technologies can also favour inclusion (Walkowiak, 2023b). Workers should have a meaningful voice in developing and using technologies that impact the human dimension and experience of work to preserve workplace dignity. Collective negotiation is essential to guarantee an ethical and inclusive deployment of technologies.

The rebalancing between human and artificial intelligence represents a critical juncture for diversity and inclusion (Walkowiak, 2023b), with the emergence of new inclusion and exclusion mechanisms, where digital and physical worlds can replicate and amplify stigma, biases and stereotypes. I recommend the development of multidisciplinary frameworks combining IT, Economics, HR, feminist and disability studies, and ethics to advance on questions related to questions of equity when using technologies and to identify actionable solutions harnessed in different disciplines. A multidisciplinary approach leverages complementary knowledge bases, methods, and stakeholder involvement to analyse, mitigate, and prevent algorithmic harm to marginalised populations. For example, the prolific literature on algorithmic biases/discrimination can directly be related to theories of discrimination extensively developed in Economics (Walkowiak, 2023b):

- cognitive and human biases of workers encoded into algorithms strongly echo mechanisms of taste-based discrimination formulated by (Becker, 1971)
- statistical biases generated by data collected to train algorithms strongly echo mechanisms of statistical discrimination formulated by (Arrow, 1973)
- socio-economic biases related to the context where algorithms are implemented directly relate to economic mechanisms (Lambrecht and Tucker, 2019)

Without developing more the question of algorithmic bias, a multidisciplinary approach is essential for analysing and mitigating algorithmic bias or discriminating systems. By combining insights from computer science, ethics, and social sciences, we can identify technical sources of bias in algorithms and AI systems while evaluating fairness, accountability, and moral implications through ethical frameworks. Moreover, an intersectional lens from fields like gender studies and disability studies allows us to understand how algorithmic bias compounds for populations with multiple marginalised identities. Quantitative methods reveal patterns of discrimination in algorithmic outputs, while qualitative research captures the lived experiences, context, and root causes behind the numbers. Crucially, a multistakeholder collaboration involving impacted communities, policymakers, industry, and advocacy groups ensures that proposed solutions are ethical and practical and address the systemic roots of bias. Finally, promoting representation across STEM, social sciences, and humanities disciplines brings first-hand perspectives from underrepresented groups to the study of the question of digital equity.

APPROPRIATE SAFEGUARDS OR REGULATORY INTERVENTIONS TO GUIDE RESPONSIBLE IMPLEMENTATION IN THE WORKPLACE, INCLUDING THE DIGITAL SKILLS AND RESOURCES NECESSARY FOR EMPLOYERS TO APPROPRIATELY UTILISE THESE TECHNOLOGIES;

At the firm level, I recommend to:

- Establish AI governance frameworks and standards: it involves advocating for AI governance at the highest leadership levels in organisations, ensuring transparency, stakeholder engagement, and accountability, and developing guardrails and safety standards for AI risks. Concerns around employee surveillance, safeguarding workforce data privacy, and ensuring AI systems provide transparent explanations for decisions impacting employees should be part of these frameworks to support their social acceptance by workers.
- Prioritise workforce upskilling and reskilling: it necessitates providing AI literacy training for all employees to understand how AI works and its implications, upskilling technical teams on the latest AI tools, and reskilling employees whose roles are exposed to technologies. The different mappings presented above (Walkowiak and MacDonald, 2023; Walkowiak and Potts, 2024) can help to target workers to prioritise. Vulnerable workers should be prioritised in these trainings.
- Promote inclusive AI development: it requires involving diverse perspectives, in AI product design and testing, ensuring AI training data and models do not perpetuate biases related to race, disabilities, gender, age, etc., and prioritising accessibility and equitable access to AI-powered tools and upskilling.
- Promote an inclusive deployment of technologies: ensure that all workers are equipped by technologies and that allocation of digital technologies is not based on gender, age, disability or other socio-demographic characteristics.
- Invest in digital skills and AI education resources: it necessitates providing digital skills training and partnering with academic institutions to create AI curricula and learning opportunities.

I recommend that the government promotes community-based education to build AI literacy by subsidising programmes for vulnerable communities. Empowering workers through education and upskilling is the best way to prevent risk and unleash the benefits of GenAI. These upskilling strategies should be free, secure and provided as a public service. Moreover,

as the digital divide is still very important in Australia, free access to technologies should be guaranteed for the most disadvantaged communities.

Deciding regulatory intervention to mitigate AI risks is complex. An essential drawback of regulatory interventions is that they create barriers for Australian businesses and innovation without preventing per se the diffusion of risks that, by definition, will not be anticipated. In my submission on the evaluation of JobKeeper (Walkowiak, 2023c), I pointed out that the government should prepare employment policies, such as short-time wage subsidies, in case of significant cyber-attacks on Australian businesses. How JobKeeper was implemented during the COVID-19 pandemic (Walkowiak, 2021b) demonstrates the importance of anticipating labour market intervention. For example, in France, the employment policy "Activite partielle" already includes wage subsidies for firms facing cyber-attacks. I encourage the government to design extensive cyber-attack experiments to determine what kind of employment policies would be needed to support firms and workers.

THE EFFECTS ON GENDER EQUALITY, JOB SECURITY, SMALL BUSINESSES, CLOSING THE GAP AND DISADVANTAGED AND VULNERABLE COHORTS OF WORKERS.

While the design and access to technologies represent critical challenges for fairness and discrimination, it is even more essential to identify deployment strategies for these technologies that support inclusion. I explored how inclusive neurodiversity initiatives combined with digital transformation can drive productivity gains at the workplace (Walkowiak, 2021a, 2023b). The results identified mechanisms by which a coordinated implementation of neurodiversity initiatives with appropriate technological deployment generates productivity and inclusion gains at the individual, organisational and macro levels. Technologies have the potential to improve the abilities, motivations and opportunities of autistic workers (Spoor and Walkowiak, 2024), with, for example, virtual reality simulations used to create immersive and radical learning experiences that allow neurotypical colleagues to improve their empathy for neurominorities. With the diffusion of AI tools, there is considerable potential for technologies to drive better inclusion of workers in the labour market. Importantly, technologies and, more specifically, GenAI, lower the cost and accessibility to learning and upskilling, potentially transforming how individuals develop their skills. For example, Khan Academy is using generative AI to customise tutoring activities at scale, which is fantastic news for children, single mums or parents who cannot afford to pay a personal tutor. This evolution in education and learning can improve the balance between the family and professional life.

Finally, with technologies, barriers to entry are reduced for small businesses since GenAI offers new capabilities to entrepreneurs at a low cost. At the same time, small businesses do not have large AI capacities "in-house" to learn from data. In the short term, the productivity dynamic is more likely by innovation and entrepreneurship(Waters-Lynch et al., 2024). The emergence of entrepreneurs using GenAI in niche markets without employing any workers represents a new form of free-lancing activity (Walkowiak, 2023a) that should be analysed.

Should the Committee require further information about this submission, I welcome the opportunity to expand on any contribution by appearing for a hearing. I look forward to seeing the result of this inquiry.

Dr. Emmanuelle Walkowiak

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