

HIGH-SKILLED PROFESSIONAL JOBS IN SINGAPORE MAY BE MOST IMPACTED BY AI, ACCORDING TO FOUR-YEAR GLOBAL STUDY

- *AI innovation in major digital hubs, including Singapore, tends to fragment professional roles.*
- *Human-centric strategies exist to use of AI technologies to elevate lower- and middle-skilled jobs and unlock greater value.*

SINGAPORE, 1 NOVEMBER 2023 – A global team of 20 social scientists studying artificial intelligence (AI) activities across key digital hubs around the world over a four-year period spanning 2019 to 2023 today revealed findings that high-skilled professional jobs in major digital hubs¹, including Singapore, may be the most impacted by AI. Public and private sectors, along with individuals, must collaborate to ensure the AI revolution is sustainable and benefits all, necessitating human-centric digital strategies, job redesign and upskilling for roles at all levels.

These findings were unveiled during the Digital Futures of Work Global Conference 2023, to be held from 1 to 3 November 2023 and organised by the Institute for Adult Learning (IAL). Over 250 participants are expected to gather throughout the three-day conference to discuss findings from the Digital Futures of Work Research Programme. This extensive study, comprising more than 500 in-depth interviews and quantitative analyses, explored AI adoption patterns in more than ten global hubs, including Silicon Valley, Singapore, and London.

Contrary to the expectation that AI would affect low and middle-skilled roles the most, the global findings suggest that AI-driven corporate innovation is focused on high-skilled professional work. Tasks like decision-making as well as domain skills like consulting and marketing, are being put through the process of "cognitive capture"² enabled by digital platforms. This direction of corporate innovation makes high-skilled jobs the most at risk, potentially posing challenges to economies in adding jobs that boost social mobility. Therefore, societal leaders have an urgent role to in jointly shape the use of AI technologies towards shared prosperity.

"We've studied AI trends in top global companies to understand its direction," said **Professor Phillip Brown, Distinguished Research Professor, Cardiff University and Director, Digital Futures of Work Research Programme**. "Contrary to beliefs that AI creates better jobs, our data suggests it often fragments professional roles for cost-efficiency, impacting middle-class aspirations. Our evidence suggests the consequences are already being felt, even if they do not appear decisive in the statistics. Societal leaders must ensure that the right questions about AI and the future of work are being asked and adapt accordingly."

Not all AI innovation activities lead to the fragmentation of knowledge work. Digital hubs such as Helsinki and Berlin, as well as a smaller proportion of firms in other digital hubs, give focus to **AI technologies as assistive technologies** to preserve professional work and enhance lower and middle-skilled jobs. Firms engaged in such activities argue that such strategies are **frontier-expanding strategies** that unlock new value-creation. In contrast, cognitive capture strategies are driven by efficiency-driven, cost-cutting approaches that would not yield sustainable value-creation. Technologists likewise shared with the research team of the enormous potential for AI to augment human capabilities. These perspectives open up opportunities for societal leaders to shape the use of AI technologies to enhance productivity and shared prosperity.

¹ Digital hubs refer to areas with a relatively high concentration of firms and talent engaged in digital innovation activities.

² Cognitive capture encompasses automation, standardisation, and distribution. Automation uses technology to perform tasks, reducing human decision-making. Standardisation creates uniform work processes, limiting professional judgement and autonomy. Distribution reallocates jobs, giving rise to high-skills platform work and precarious remote working conditions in knowledge work.

Key Findings in Singapore

In Singapore, in-depth interviews with more than 80 business and technology leaders from 60 leading firms demonstrate similar results of an ongoing process of cognitive capture. Corporate innovation is being applied to professional jobs requiring high levels of education and training, professional experience, and judgement. These include credit decision-making, field engineering services, curriculum design and consultancy services. These tasks are being put through processes of automation, standardisation and redistribution, the latter referring to how complex tasks are being parcelled across economies out through high-skills platform and/or remote working. Cognitive capture risks reducing the overall demand for professional labour, deskilling professional work to perform less complex tasks or making them more precarious through redistribution.

Additionally, a quantitative analysis of the impact of technological change on jobs in Singapore was also conducted using data from the Singapore Skills and Learning Survey. Conducted between 2021 and 2022, the survey included questions asking respondents to indicate the digital tasks they performed at work and the effect of technological change on their work, including but not limited to AI technologies.

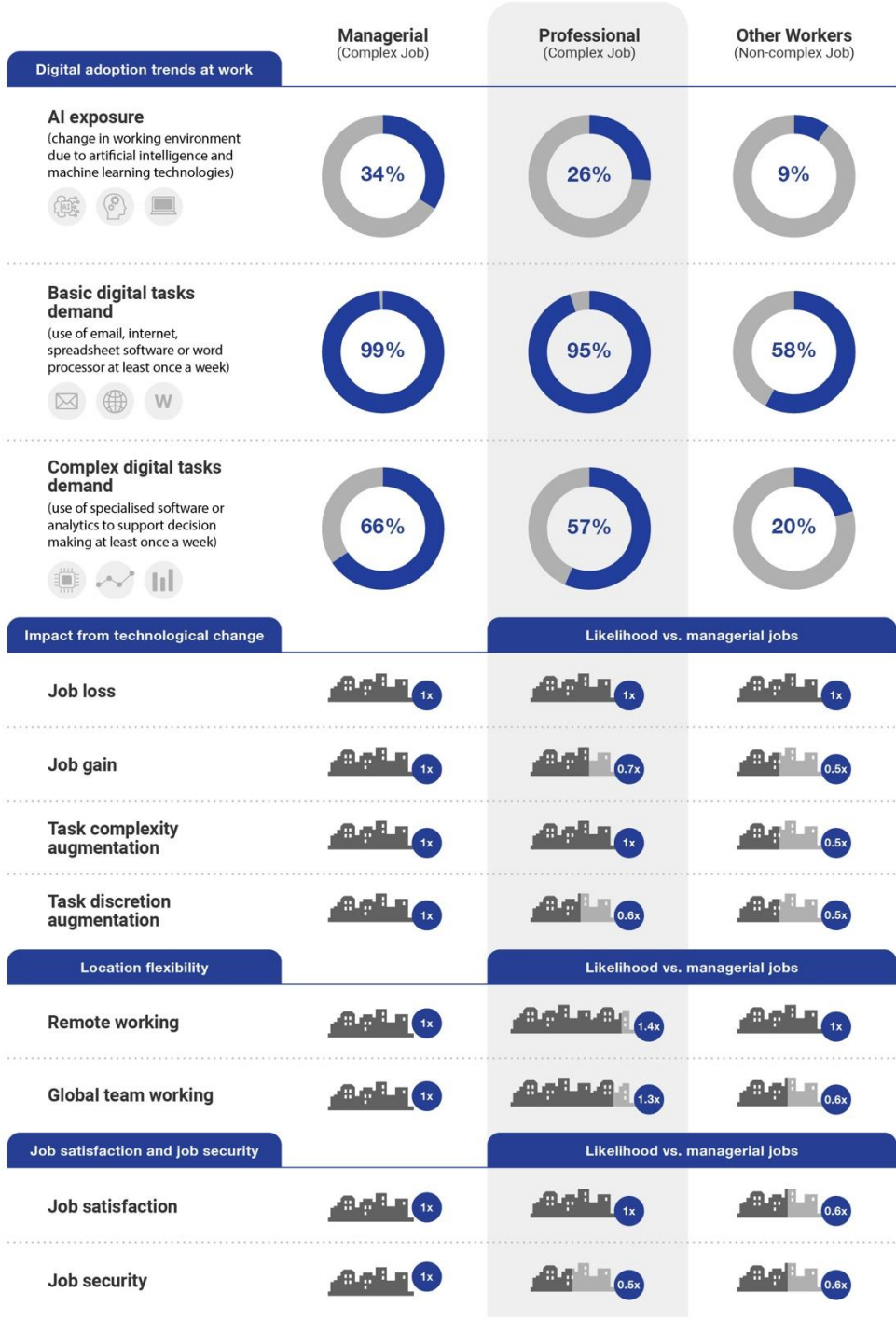
Data from 4,218 resident job holders were analysed, and the results indicate that while technological changes primarily benefit managerial roles³, they pose risks to professional roles⁴ and have a minimal impact on the job quality of other workers. While all categories of workers are equally at risk of job losses due to tech advancements, the number of professional jobs is less likely to grow. Moreover, professional roles also face reduced task discretion compared to managerial roles. Meanwhile, other workers doing less complex work are also less likely to experience an increase in task complexity and task discretion, compared to managers.

Of concern is that professional roles are more likely than other types of work to be able to be done remotely and requiring global team working. This reduces the location stickiness of such jobs, that is associated with a heightened risk of digital offshoring.

³ Managerial roles were defined as complex, challenging jobs that required performing managerial functions and duties.

⁴ Professional roles were defined as complex, challenging jobs that did not involve performing managerial functions and duties.

Technological Change and Jobs in Singapore



Source: Skills and Learning Survey, Singapore

Human-centric use of digital technologies can similarly be found in Singapore, albeit in small numbers. Firms employing such strategies include transnational corporations, SMEs and start-ups in a range of industries including engineering, agritech, medtech, fintech, cleantech and F&B. Job roles that are found to be enhanced include professional work as well as less-skilled work such as customer service, and technicians.

Sahara Sadik, Assistant Director (Research) at the Institute for Adult Learning and Deputy Director of the Digital Futures of Work Research Programme said, “Interviews with leading Singapore companies give us advanced insights into their business priorities when it comes to AI innovation. The use of AI technologies to make professional work more cost-efficient is evident. When coupled with existing data that technological change has been weakening professional jobs and not enhancing other types of work, it underlines the pressing need that we manage the AI transition more deliberately towards shared prosperity. Strategies may include nudging businesses to employ productive, human-centric business transformation strategies, building up know-how on how AI can be used more purposefully in job enlargement, and boosting the AI capabilities of the workforce in sectors and occupations with uneven AI adoption.”

Chia Ying, Senior Researcher at IAL, who led the quantitative investigation, said, “Alongside the threat on professional roles by automation, standardisation and redistribution, lower-skilled workers are not being freed up from routine tasks to do more interesting and complex work unlike commonly assumed. This has implications on the learning they will be motivated to seek. The use of AI technologies to enhance jobs, skills and learning needs to be pursued more decisively.”

Strengthening middle-class jobs

Pursuing human-centric strategies are crucial to reduce the risks to professional work, given the interest of national governments and key international players such as the Organisation for Economic Co-operation and Development (OECD) and the International Labour Organisation (ILO) to strengthen the middle class.

In the United States, United Kingdom and Singapore, professionals and degree holders now form the fastest growing category of workers earning middle wages, defined as those earning 75-150% of median income. Corporate innovation strategies of automation, standardisation and redistribution of knowledge work aimed at reducing labour costs will further weaken the capacity of economies to add professional jobs to power social mobility. Human-centric strategies have the opportunity not only to strengthen professional work, but to enhance other types of occupations. These include jobs that are currently seen as less-skilled such as clerical, sales, and service staff.

A highly skilled middle class in most economies

Growth of degree holders and professionals earning middle wages

The middle class forms the foundation of any stable and prosperous society.

Data in the US, UK, and Singapore show that the proportion of middle-wage earners – defined as those that earn 75 to 150 percent of the median wage – has remained stable.

However, the composition of middle-wage earners has changed dramatically. Degree holders and professional workers are now the fastest-growing category of middle-wage earners.

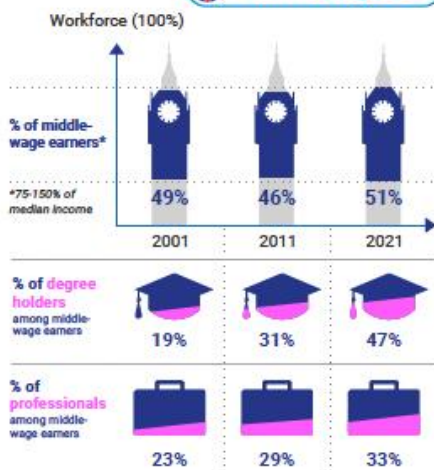
In the US, UK, and Singapore,

- 35% to 47% of middle-wage earners are degree holders
- 23% to 33% of middle-wage earners are professionals

United States



United Kingdom



Singapore



Source: American Community Survey | Labour Force Survey, UK | Skills and Learning Survey, Singapore

Sahara Sadik said, “Early stages of the fourth industrial revolution show digital technologies being applied to low-skilled industries such as ride-hailing industries and hospitality, in ways that have not enhanced low-skilled jobs. We are now in the midst of a different type of digital innovation that targets knowledge work. If left unchecked, it will weaken how human potential can flourish and thrive. Societal investments in education, training and lifelong learning must be utilised sustainably for economic and social good. That there are human-centric firms in Singapore demonstrate the possibilities. We need to seize the opportunity to identify how human-centric strategies can proliferate in Singapore.”

You may download the infographics and full report at <https://digitalfuturesofwork.com/>.

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About the Digital Futures of Work Research Programme

The Digital Futures of Work Research Programme seeks to enable societal leaders to make careful assessments and take vital steps to directly shape the fourth industrial revolution towards human augmentation, social inclusion and shared prosperity. This comprehensive study spans multiple countries and methodologies, focusing on more than ten major digital hubs, including Silicon Valley, Singapore, Seoul, Berlin, and Bengaluru, among others. The research programme is hosted by Cardiff University and the Institute for Adult Learning Singapore, together with the University of Bristol and Oxford University’s Centre for Skills, Knowledge and Organisational Performance as programme affiliates. Funded by SkillsFuture Singapore, this extensive research involved a global team of 20 experts delving deep into the future work landscape.

About the Institute for Adult Learning

The Institute for Adult Learning (IAL) is an autonomous institute of the Singapore University of Social Sciences. As the National Centre of Excellence for Adult Learning, IAL works closely and supports Adult Education professionals, businesses, human resource developers and policymakers through its comprehensive suite of programmes and services on raising capabilities and catalysing innovations in Continuing Education and Training (CET). IAL also champions research in sustaining economic performance through skills, shaping employment and CET decisions, and developing innovations through learning technology and pedagogy to heighten adult learning.

For more information, visit www.ial.edu.sg.