

The latest wave of technological change has meant that many jobs and tasks can often be performed in geographic locations that are disconnected from where the services are being provided. This has given rise – exacerbated by the pandemic – to different types of work arrangements including remote work, teleworking, working at home and home-based work. This is particularly the case for jobs related to online web-based platforms. In this way, digital employment opens possibilities where the location of the tasks performed is entirely disconnected from the location of the goods or service being provided. This is particularly relevant in countries like Kazakhstan, where decent work deficits are typically high and can, under certain conditions, generate decent work opportunities including for young people and persons with disabilities. To boost economic growth in countries, the aim of national development strategies is typically to promote the development of higher value-added (and more productive) industries and services, and in so doing, promote job creation. But without a doubt, digitalization is already driving rapid changes in the scope of occupations that are available to a young person now compared to 20 years ago.

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Understanding AI’s role in reshaping labour markets

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Abstract: The rapid advancement of Artificial Intelligence (AI) impacts significant transformations across societies, economies, and the world of work. While AI holds immense potential to enhance productivity through task automation, personalization, and quality control, it also raises critical questions about its impact on labor markets. This paper explores the nuanced effects of AI on employment, emphasizing its dual potential to disrupt and augment human labor. Drawing on task-based frameworks and microdata, the study identifies varied outcomes across occupations, highlighting that task automation does not necessarily imply job losses but may complement human roles, fostering efficiency and productivity. However, the integration of AI technologies into workplaces raises concerns about job quality, worker autonomy, and employment stability, particularly in sectors driven by algorithmic management. Policymakers must address these challenges by fostering skill development, supporting workforce transitions, and ensuring equitable

access to AI-driven opportunities. The study underscores the importance of ongoing research to assess AI's dynamic interplay with labor markets and its broader socioeconomic implications, enabling a balanced and inclusive transition to an AI-integrated economy.

Keywords: Artificial Intelligence (AI), employment, occupations, workplace, labour, automation, job complementarity, integration.

The rapid advancement of Artificial Intelligence (AI) promises widespread transformations for our societies, our economies and the world of work. While AI will potentially affect many aspects of our daily lives, its impact is likely to be most acute in the workplace. Each new wave of technological progress intensifies debates on automation and jobs. The rapid development of Artificial Intelligence (AI) has sparked considerable discussion regarding its impact on labor markets. By automating tasks, personalizing experiences, and improving quality control, AI could dramatically enhance productivity across various sectors, presenting an unprecedented revolution in the workplace. Despite this promising outlook, the swift progress of AI creates substantial uncertainty surrounding its socioeconomic implications. Economists largely agree that AI could bolster societal wealth in the long run, yet concerns persist over its potential to disrupt employment in many industries. It remains unclear how AI technologies might serve as either substitutes or complements for human labor in specific tasks and occupations, ultimately leading to “winners and losers” in the job market. While it is impossible to predict how generative AI will further develop, the current capabilities and future potential of this technology are central to discussions of its impact on jobs. Labour-market transformations driven by technological breakthroughs, such as the coming of age of generative artificial intelligence (AI), are being compounded by economic and geopolitical disruptions and growing social and environmental pressures. The potential scope of automation and augmentation is expected to further expand over the next few years, with AI techniques maturing and finding mainstream application across sectors.

Data is fundamental to the development and operation of AI systems. Human-prepared data is fed into AI systems to help them learn the necessary connections and patterns for functionality. The sources of this data are diverse, depending on the system's purpose. Publicly available data, such as United Nations documents used for training translation programs, contributed to advances in natural language processing. Proprietary data is also crucial, particularly in workplace applications, like call center recordings used to train chatbots for customer service. With global connectivity, data collection continues to provide the essential raw material for future AI applications. To effectively evaluate AI's impact on the workforce, it is important to develop a worker-centric approach. This approach not only addresses the technical aspects of AI integration but also considers its broader social impact. A worker-centric framework should closely examine the specific tasks and skills affected by AI, looking at both the nature and extent of these impacts.

Research on the possible effects of AI on employment across the world suggests that while there are likely to be important transformative effects on some occupations, impacts in terms of job losses are much less than headline figures appearing in the media, and certainly do not point to a jobless future. According to an analysis undertaken by the International Labour Organization on the potential exposure of tasks to generative AI technology, clerical support workers are the most exposed occupational group with 24 per cent of the tasks in these jobs associated with high level of exposure to automation and another 58 per cent with medium-level exposure (see Figure 1). Other occupational groups are less exposed, with only 1 to 4 per cent of tasks considered as having high automation potential, and medium-exposed tasks not exceeding 25 per cent. It means that, while certain tasks in these occupations could potentially be automated, most tasks still require human intervention. Such partial automation could enable efficiency gains, by allowing humans to spend more time on other areas of work.

Importantly, task automation does not necessarily imply redundancies, as the technology can also complement or augment human labour when only certain tasks are automated. Whether the adoption of the technology leads to automation (job loss) or augmentation (job complementarity) depends on the centrality of the automated task to the occupation, how the technology is

integrated into work processes and management's desire to retain humans to perform or oversee some of the tasks, despite the potential of automation.

Another area of concern is about the impact of AI technology on working conditions and job quality when the technology is integrated into the workplace. While such integration into work tasks can potentially promote more engaging work if routine tasks are automated, it can also be implemented in ways that limit workers' agency or accelerates work intensity.

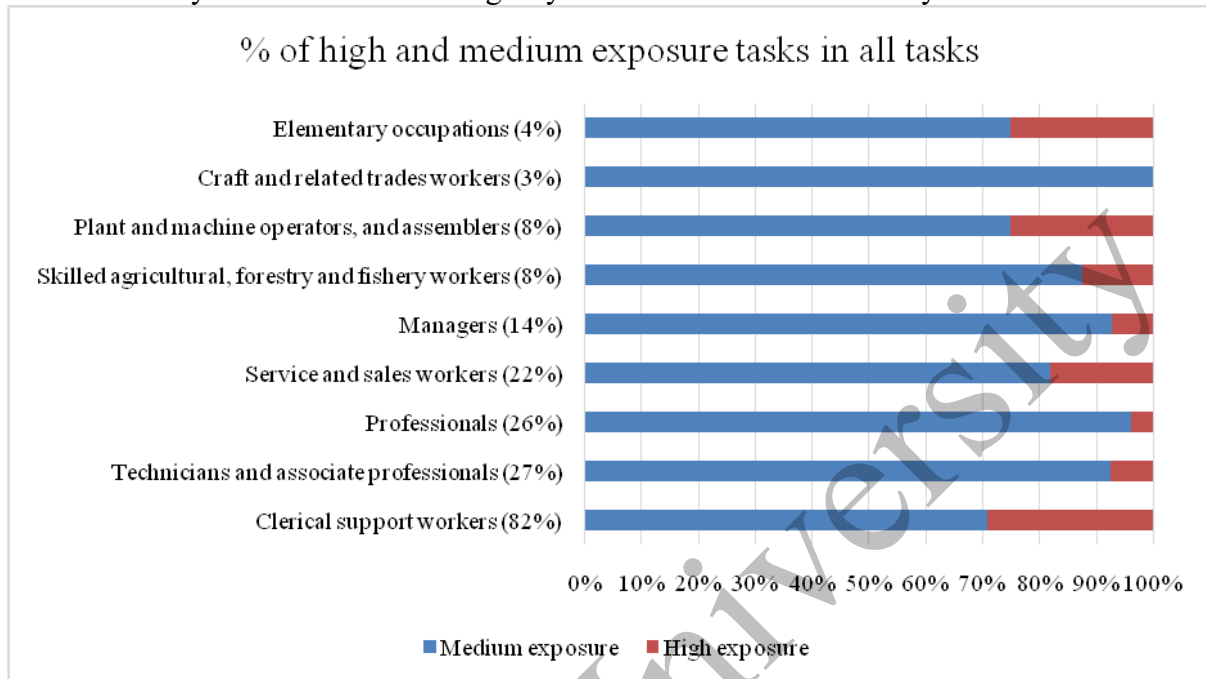


Figure 1. All tasks

Note – The study analyses the potential for automation with the 436 internationally standardized ISCO-08 occupations and then classifies the occupation based on the mean and standard deviation of the score. Source [1]

Concerns over AI's integration at the workplace has focused on the growth of algorithmic management, essentially work settings in which human jobs are assigned, optimized, and evaluated through algorithms and tracked data. Algorithmic management is a defining feature of digital labour platforms, but it is also pervasive in offline industries such as the warehousing and logistics sectors. In warehouses an automated, "voice-picking" system directs warehouse staff to pick certain products in the warehouse, while using data collection to monitor workers and set the pace of work. Besides lacking autonomy to organize their work or set its pace, workers also have little ability to provide feedback or discuss with management about the organization of work. The integration of generative AI into other fields such as banking, insurance, social services, and customer service more broadly may have a similar effect. The use of AI technology affects the way work is organized in the financial services sector. Increasing preference for online banking, strategies to reduce or close physical bank branches, and automation of tasks are increasingly driving the way job roles are defined and work is organized within the sector. Restructuring and consolidation in the financial services sector in the past decade have also raised concerns about the elimination or displacement of jobs, leading to increased job insecurity among the workforce.

Given AI's potential to perform highly complex functions, understanding how it could augment workers or reduce the demand for their labor is of great importance for policymakers and researchers alike. While some studies differentiate between substitution and complementarity, they build this distinction on a task-based framework. Workers in occupations highly exposed, but where AI has the potential to turn into a supporting technology are more likely to experience productivity gains, conditional on access to the necessary infrastructure and the appropriate skills to engage with the technology. On the other hand, workers in highly exposed occupations with lower potential for complementarity, and thus a higher risk of substitution, may experience a long-lasting fall in demand

for their labor along the lines of the negative shock inflicted by the past wave of routine-biased automation, with reduced employment opportunities and lower earnings.

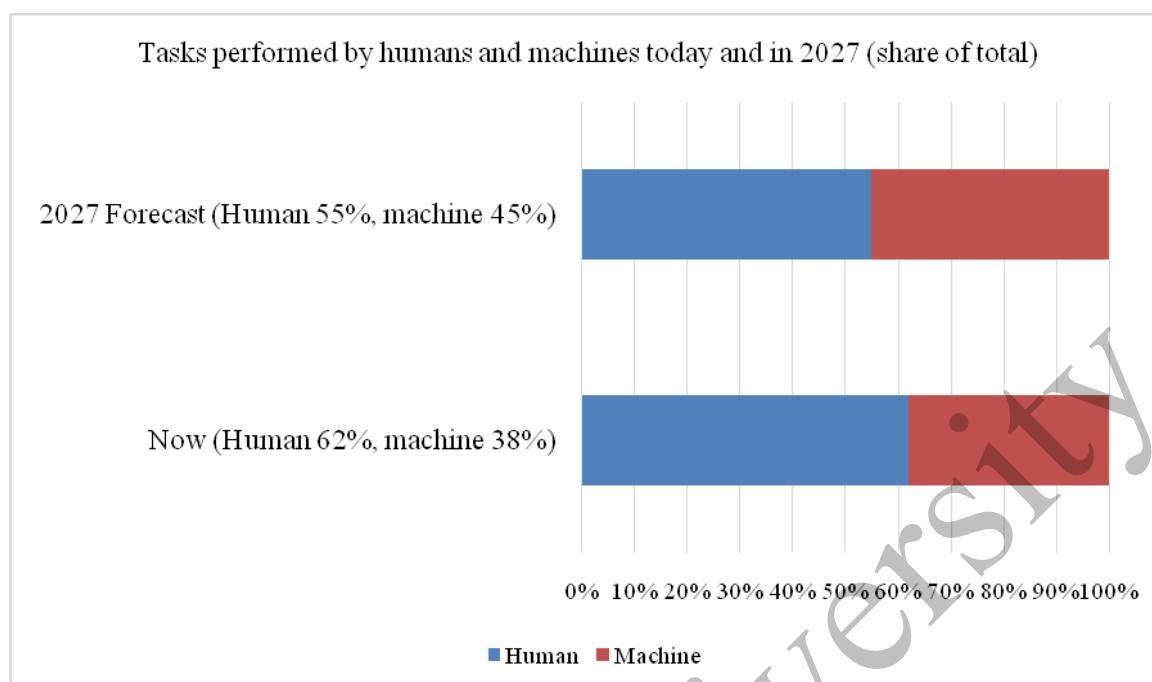


Figure 2. Human-machine frontier

Note – This bar chart shows the share of tasks performed by humans and machines today and in 2027, based on responses to “Currently/In five years, what proportion of time spent doing the following tasks in your organization cannot be automated (that is, performed by machines and algorithms) and is thus spent by your human workforce performing the task?”. Source [7]

At lower levels of AI exposure, a higher complementarity potential may still affect how AI is integrated into each occupation but, given the lower scope for interaction with human skills and tasks, it would likely be less influential for labor demand. It is also worth noting that, while lower complementarity reflects a risk of lower labor demand for workers in a given occupation, higher complementarity does not in itself signify no risks for individual workers. Those employed in a highly complementary occupation who do not possess the skills needed to engage with AI would likely face lower employment opportunities and wages. AI technologies demand a certain level of expertise to operate effectively, interpret outcomes accurately, and make informed decisions based on AI-generated insights. Occupations with already high education and long training requirements may have greater scope to integrate skills complementary to AI into their curricula.

In conclusion it's important to understand the potential impact of Artificial Intelligence (AI) on labor. By leveraging microdata and a granular occupational classification, our understanding of AI's potential to both disrupt and augment various occupations broadens. We notice a nuanced landscape: while AI poses risks of labor displacement due to task automation, it also holds promise in its capacity to enhance productivity and complement human labor, especially in occupations that require a high level of cognitive engagement and advanced skills. The potential for both negative and positive outcomes associated with AI is distributed across different demographic and income groups within and across countries in complex patterns. These findings thus challenge simplified narratives of AI as solely a threat to employment. Looking forward, countries must highlight the need for future research to delve deeper into understanding the dynamic relationship between AI and the labor market, taking into account the context of specific economies. It also underscores the importance of ongoing assessments of AI's potential for complementarity, which can significantly mitigate its disruptive impact. Furthermore, the potential socioeconomic implications of AI call for carefully calibrated policies to promote skill development and to support displaced workers' transitions. This, in turn, can ensure a smoother transition towards an increasingly AI-integrated economy while

mitigating the risk of labor market displacement and wider income disparity. Future studies could also explore the implications of AI exposure on labor mobility, job quality, and overall economic performance within and across countries, further enriching our understanding of this transformative technology.

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Перспективы зеленой экономики и устойчивого развития Казахстана

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Аннотация: Статья рассматривает перспективы развития зеленой экономики и устойчивого развития Казахстана, акцентируя внимание на значении экологической устойчивости для долгосрочного роста страны. В работе анализируются ключевые проблемы и вызовы, стоящие перед Казахстаном в процессе перехода к экологически чистым технологиям, а также рассмотрены возможности для диверсификации экономики через использование возобновляемых источников энергии, развитие «зеленых» технологий и улучшение экологической инфраструктуры. Автор исследует роль государственной политики, международных соглашений и частных инвестиций в формировании устойчивой и экологически ответственной экономики. В статье предлагаются рекомендации для оптимизации использования природных ресурсов, повышения энергоэффективности и снижения углеродного следа, что является основой для устойчивого развития Казахстана в условиях глобальных климатических изменений.

Ключевые слова: зеленая экономика, природные ресурсы, устойчивое развитие, Казахстан, экологическая устойчивость, возобновляемые источники энергии,