A Study on Impact of Artificial Intelligency in Labour Market

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Abstract

Recent developments in artificial intelligence (AI) have given rise to new fears on a large scale. loss of employment, resulting from the ability to automate a rapidly expanding set of tasks (including. non-routine cognitive tasks), and their potential to affect all economic sectors.

As well, there are concerns about employee welfare and work in general. Environment, linked to the idea that AI could soon become omnipresent in the workplace. Threatening and undermining the place of people in it. AI also has the potential to complete and increase human capacities, leading to higher, higher productivity. The need for human labor and the improvement of the quality of jobs.

It probably reshapes the work environment of many people, changing the content and design of their work, the way workers interact with each other and with machines, and how Work effort and effectiveness are monitored. AI can play a significant role in facilitation. Man-machine collaboration, assist workers in performing tedious or physical. demanding tasks while enabling them to make the most of their human abilities. However, the same AI applications may also result in significant work risks. Environmental, especially if applied wrong or with singular motivation to reduce costs.

Introduction

Recent developments in Artificial Intelligence (AI) have stoked new fears about large-scale job loss, stemming from its ability to automate a rapidly expanding set of tasks (including non-routine cognitive tasks), and its potential to affect every sector of the economy. Furthermore, there are concerns about employee well-being and the broader work environment, linked to the idea that AI may soon become pervasive in the workplace and threaten and undermine humans' place in it. However, AI also has the potential to complement and augment human capabilities, leading to higher productivity, greater demand for human labor and improved job quality.

From a theoretical perspective, the impact of AI on employment and wages is ambiguous, and it may depend strongly on the type of AI being developed and deployed, how it is developed and deployed, and on market conditions and policy. If AI facilitates the automation of tasks and delivers only modest increases in productivity, workers are unlikely to share in the benefits of this new technology. To produce positive outcomes for workers, AI must create new high-productivity tasks to replace those automated and boost productivity sufficiently to raise consumer demand, hence increasing demand for human labor.

The empirical evidence based on AI adopted in the last 10 years does not support the idea of an overall decline in employment and wages in occupations exposed to AI. Some studies suggest a positive impact of AI on wage growth.

The occupations judged to be most exposed to AI include high-skilled occupations involving non-routine cognitive tasks, such as lab technicians, engineers and actuaries. However, high exposure does not necessarily mean that jobs in these occupations will disappear. While AI's capabilities have expanded substantially, some bottlenecks to adoption still remain, and many tasks still require humans to carry them out. Thus, much of the impact of AI on jobs is likely to be experienced through the reorganization of tasks within an occupation, with some workers ultimately complemented in their work by AI, rather than substituted by it.

Workers may need to re-skill or up-skill in order adapt to the reorganization of tasks and the emergence of new tasks, and to weather potential job loss and navigate transitions to new jobs. This will not only mean acquiring AI-related skills, but also acquiring skills in areas that AI cannot perform so well, such as creative and social intelligence, reasoning skills, and dealing with uncertainty. The smoothness of the AI transition and the extent of the impact on workers will also depend on firm-level incentives to retain and retrain staff and on institutional factors, such as the general infrastructure for training and job-search available in the country, direct government funding, tax incentives and social benefit systems. Certain groups of workers may be more capable or better positioned to take advantage of the benefits that AI brings, use AI in a way that is complementary to their work, and avoid its negative impacts. While some high-skilled occupations are among those most exposed to AI, there is evidence that individuals in higher wage occupations and/or with higher educational attainment experience higher wage growth linked to AI, suggesting some degree of complementarity. This suggests that AI adoption could increase income inequality.

Similarly, some firms may be better placed than others to develop and/or deploy AI. Moreover, if the gains of AI accrue to a small number of superstar innovators or firms with excessive market power, this could produce a divide between innovators and workers and further reinforce the potentially negative impact of AI on inequality.

 AI is likely to reshape the work environment of many people, by changing the content and design of their jobs, the way workers interact with each other and with machines, and how work effort and efficiency are monitored. AI can play an important role in facilitating human-machine collaboration, helping workers in the execution of tedious or physically demanding tasks while allowing them to leverage their own uniquely human abilities. AI can offer cheaper, faster and more scalable solutions in the field of human resource management, enabling workers to advance their own careers, helping managers to manage, and enhancing training.

Literature Review with Research Gap

1. Artificial intelligence (AI) is reshaping economies and societies, offering new products and services, and promising to generate productivity gains through greater efficiency and lower costs. At the same time, AI also raises questions and fuels anxieties about its impact on the labour market and society. Therefore, the purpose of this literature review is to take stock of what is already known about the impact of AI on the labour market, identify gaps in the evidence base and inform research under the OECD's three-year programme on AI in Work, Innovation, Productivity and Skills (AI-WIPS), financed by the German Federal Ministry of Labour and Social Affairs (BMAS).

 2. AI-WIPS, which started in January 2020, will provide valuable resources and knowledge, including new in-depth analyses, measurement, international dialogue and concrete policy assessments on the impact of AI on labour markets and society. The AI-WIPS activity builds on previous OECD work on AI, including the OECD AI Principles, which promote an AI that is innovative and trustworthy and that respects human rights and democratic values. The OECD AI principles call on governments to build human capacity and

prepare for labour market transformation by: • Empowering people to effectively use and interact with AI systems, including equipping them with the necessary skills; • Ensuring a fair transition for workers as AI is deployed, including via social dialogue, training programs, support for those affected by displacement, and access to new opportunities in the labor market; and • Promoting the responsible use of AI at work, to enhance the safety of workers and the quality of jobs, to foster entrepreneurship and productivity, and aim to ensure that the benefits from AI are broadly and fairly shared.

3. This literature review presents what is known about the impact of AI on the labour market, including the impact on employment and wages, how AI will transform jobs and skill needs, and the impact on the work environment. The important ethical issues raised around the use of AI at work are not dealt with in this literature review, and are instead examined in detail in the forthcoming issues note, "Ethical issues arising from AI implementation at the workplace and associated policy challenges" (OECD, 2021[1]).

4. Two challenges had to be faced in establishing the scope of this literature review. The first is that there is no widely accepted definition of AI. While this review tries to cast a broad net, it is centred on the definition of an AI system established by the OECD's AI Experts Group (AIGO) (OECD, 2019[2]): An AI system is a machine-based system that can, for a given set of human-defined objectives, make predictions, recommendations or decisions influencing real or virtual environments. It uses machine and/or human-based inputs to perceive real and/or virtual environments; abstract such perceptions into models (in an automated manner e.g. with machine learning (ML) or manually); and use model inference to formulate options for information or action. AI systems are designed to operate with varying levels of autonomy.

5. The second challenge is that the development and deployment of AI has not happened in a vacuum, and as such, other technological advances (such as factory 18 | DELSA/ELSA/WD/SEM(2021)3 For Official Use automation and robotics) are frequently amalgamated with AI in the literature. Here, where possible, an attempt is made to focus on AI and its attributes, while treating automation as a potential consequence of AI and robotics as a potentially complementary technology.

6. In line with this, literature review begins by examining the capabilities of AI and what relevance they might have for the labour market. It questions what sets AI apart from previous technological changes, giving particular attention to the specific attributes of AI and the associated implications for the labor market.

7. The literature on the impact of AI on productivity, employment and wages. These potential impacts are a source of concern for many, who fear that AI will drive down demand for human labour and wages or even make human labour obsolete

8. literature looks deeper into the mechanisms driving the AI transition and how they may transform the way we work, reorganize tasks within any given occupation, and lead to the emergence of new tasks and occupations. It also examines the abilities of different groups to adapt to AI adoption and other factors that could drive inequalities.

9. literature discusses how AI can reshape the work environment, by changing the content and design of jobs, the way workers interact with each other and with machines, and how work effort and efficiency are monitored.

10. This literature focuses on the capabilities of AI and what relevance they might have for the labour market. It begins by laying out the characteristics of AI that are frequently cited by researchers, in particular, those characteristics that have convinced researchers that the impact of AI on the labour market (as distinct from the impact of technology or automation more generally) is worthy of special

attention. These include: AI's potential to affect multiple sectors and occupations across the economy, its ability to self-improve and to expand the set of tasks that can be automated (including highly skilled ones) – characteristics that could magnify the labour market impact, whether positive or negative.

Objectives

To study Impact of AI on productivity, employment and wages

To study the AI transition

To study AI and the work environment

Finding

1.Impact of AI on Productivity, Employment and Wages

Conversations about the prognosticated impact of AI on productivity, employment and stipend are filled with query. AI is anticipated to increase productivity but there's debate about the size of the impact, particularly when prognostications calculate on advances that have yet to be seen Indeed if AI boosts productivity mainly, it isn't clear that workers will inescapably partake in the benefit in the form of advanced employment and/ or stipend. This is because AI can grease robotization, contributing to downcast pressure on the demand for labour and a decoupling of productivity from labour request issues similar as employment and stipend. These forces may offset the productivity effect, which might else be anticipated to increase labour demand, employment and stipend

AI Will Increase Productivity but the Size of the Impact Ii Debated

Important of the available economics literature on AI centers on its eventuality to increase productivity, by reducing costs(including by enabling enterprises to replace labour with cheaper capital), completing labour and prodding reciprocal inventions(Agrawal, Gans and Goldfarb, 2019(5); Brynjolfsson, Rock and Syverson, 2017(6); Cockburn, Henderson and Stern, 2018(7)). still, the productivity paradox9 is the term used to relate to the fact that productivity growth has been lagging over the once decade or so(Andrews, Criscuolo and girl, 2016(36)), despite substantial progress in AI(in particular, improvements in machine literacy) and other technologies. Experimenters essay to understand the causes of this productivity incongruity, in order to be suitable to prognosticate how AI'll affect unborn labour productivity growth.

Theoretical Models are Ambiguous on the Impact of AI On Employment and Wages

- AI- eased robotization is anticipated to reduce labour demand and decouple stipend from productivity earnings Economists have proposed a theoretical frame centred on AI being an robotization technology to explain how AI has the implicit to enhance productivity while contemporaneously reducing labour demand, stipend and the labour share(Acemoglu and Restrepo, 2018(13)). One limitation of this frame is that, by treating robotization technologies together, they assume that AI is analogous to other robotization technologies, similar as artificial robots and other automated ministry – an supposition which has yet to be proven(Naudé, 2019(47)) – and don't pay attention to the essential capabilities of AI. This limitation is bandied in section3.2.3

The Limited Empirical Evidence Does Not Support the Idea that AI has Reduced Employment and Wages

Surveys of employers show that opinions are divided about whether they think that AI will increase or decrease employment in future. In a survey of executives whose companies have adopted AI (McKinsey, 2019[12]) the results pointed to an expected decrease in the number of employees over the subsequent three years due to AI, despite showing that AI had led to job growth in the preceding year. The reasons for this outlook were not probed further, for instance whether it derives from expectations that upcoming developments in AI would be more suited to substituting labour. In a survey of both tech executives and the general population (Edelman, 2019[55]), two thirds of tech executives surveyed believed that AI could increase employment. A minority within the general population surveyed agreed, although a majority did agree that AI could produce an increase in employment in the long term. Business surveys by Bessen et al. (2018[11]) and McKinsey (2019[12]) suggest that businesses support the view that the impact of AI on jobs is much more about the shifting of work from some occupations to others than about eliminating labour overall. 59. Furthermore, there appears to be consensus that the impact will differ by occupation and industry. The surveys by Bessen et al. (2018[11]) and McKinsey (2019[12]) suggest job creation is likely to be experienced in sales and marketing (occupations which, Bessen et al. note, involve the complementary use of AI) and that job loss is likely to be experienced in manufacturing and some clerical occupations. The survey by Bessen et al. shows that startups that sell AI products to customers in the agriculture, manufacturing, utilities and transportation industries are much more likely to say that their products reduce labour costs

AI Transition

The impact of AI on the labour market is likely to run much deeper than changes in employment and wages. The mechanisms underlying these changes could transform the way we work, reorganizing tasks within any given occupation. The adoption of AI may result in the emergence of new tasks and occupations, which only humans can perform.

Workers may need to re-skill or up-skill in order to adapt to the reorganization of tasks and the emergence of new tasks, and to weather potential job loss and navigate transitions to new jobs. Certain workers may be more capable or better positioned to do so, potentially exacerbating already existing inequality. For instance, workers in high-skilled occupations may have greater ability to learn new information, tend to possess skills which cannot be easily automated and have greater access to lifelong learning. Inequalities may also arise if the gains of AI are captured by the owners of capital and superstar firms, rather than workers.

Much of the Impact of AI will be Seen through the Reorganization of Task

AI adoption may result in a worker being displaced from a certain task. Rather than their entire job being eliminated entirely, there may then be a reorganization of tasks within the job profile (with some tasks added and others removed) so that AI is ultimately complementary to the worker. These dynamics reflect the interplay between the displacement, productivity and reinstatement effects, which will determine the overall impact on AI on demand for labour (and the related impact on employment and Wages

AI can produce both substitution and complementary effects, and results in a reorganization of tasks. Firstly, AI produces a substitution effect as it is able to outperform high-skilled sell-side equity analysts in prediction tasks where sufficient data are available (in part because analysts' predictions can be subject to bias, due to conflicts of interest). The researchers find that analysts who cover stocks with the most data available (and therefore most suited to AI-based prediction) are more likely to leave the profession,

representing the substitution effect. At the same time, the analysts who stay in the profession tend to shift their attention towards the types of stocks that are less suited to AI-based prediction, indicating a further substitution effect at the task level. The researchers find evidence that these analysts book more meetings with management teams, suggesting that the use of AI frees up time for them to use their interpersonal skills to gather soft information on the stocks. This represents a reorganization of tasks and, in the researchers' view, the new focus of analysts on tasks that AI cannot perform reflects the complementary of AI to high-skilled labour.

The Impact of AI will also Result in the Creation of New Tasks

. As established in previous chapter, AI's potential to create labor-intensive tasks (i.e., tasks that only humans can perform) is a critical mechanism for adjustment, counteracting the displacement effect and ensuring that the productivity benefits of AI are shared with workers. Most directly, AI will create jobs in entirely new occupations and fields related to its own development and deployment. However, this is not sufficient to ensure positive labour market outcomes. AI must also create new high-productivity tasks for human labour as noted in section 3.2.2. New jobs may also be created due to innovations enabled by AI and to spillovers from the AI industry. 25 Brynjolfsson et al. (2017[6]) point out that firms implementing large enterprise planning system

Workers May Need to Re-Skill or Up-Skill in Order to Adapt to AI-Induced Changes in the Labour Market

Workers may need to re-skill or up-skill in order to adapt to the reorganizations of tasks and the emergence of new tasks, and to weather potential job loss and navigate transitions to new jobs. Some may choose to acquire AI-related skills so that they can take advantage of opportunities in AI development and deployment. However, not all jobs where AI is complementary to human labour will require specialised AI skills. Some of these jobs will require skills in areas that AI cannot do so well, such as creative and social intelligence, reasoning skills, and critical thinking

Certain Workers will be more Capable of Adapting to Change

. Explaining why workers in high-skilled occupations might be more capable of adapting to such changes, Fossen and Sorgner (2019[32]) point to their greater ability to learn new information and adapt to new technologies, as well as their tendency to possess skills which cannot be easily automated, such as creative and social intelligence, reasoning skills, and critical thinking. They suggest that the potential for AI to substitute labour depends on the extent to which an occupation consists of non-routine cognitive tasks, which is more likely in high-skilled occupations in their view.30 84. It has also been suggested that adjustments to white-collar jobs due to AI might be slower than adjustments to blue-collar jobs due to automation (Wright, 2019[74]), because of the greater need to adjust processes around reporting or controls, the value attached to relationships and to expert judgment in complex decision-making, and the unlikeliness of a situation in which an entire department (e.g. accounting) is dismissed all at once. The article provides the example of Zurich Insurance piloting the use of machine learning in the assessment of insurance claims for car crashes or burglaries. Zurich Insurance ultimately decided not to roll the pilot out in full due to the frequency with which humans had to step in to override the computer's decision.

AI and the Work Environment

The jury is out on whether the reorganizations of tasks as a result of AI adoption improves the work environment

One of the most direct ways AI can affect the quality of the work environment is through the automation of tasks and the resulting reorganisation of tasks within an occupation. To the extent that AI can facilitate the automation of hazardous, repetitive or demeaning tasks and steer workers toward safer and more fulfilling ones, it can enhance the work environment. On the other hand, if the reorganisation has the effect of removing safe and fulfilling tasks from workers, the work environment will deteriorate.

One survey of workers in Japan (Yamamoto, 2019[80]) suggests that the reorganisation of tasks in the wake of AI adoption contributes both to greater job satisfaction and increased stress. The authors suggest that AI allows workers to concentrate on more complex tasks that can only be performed by humans. These more complex tasks may intensify work-related stress but may also provide a greater sense of satisfaction once accomplished.

AI can Promote Close Human-Robot Collaboration

One factor that has traditionally limited human-robot collaboration in manufacturing or warehousing environments is the physical danger associated with humans and robots sharing the same space. Some point to AI-enabled technologies as a way to allow humans and robots to work in close collaboration while safeguarding the health and well-being of workers (Daugherty and Wilson, 2018[84]; [85]). One example36 is AI-enabled cobots. 100. Cobots allow firms to combine a robot's strength and endurance with a human's tacit knowledge and agile decision-making, thereby complementing and augmenting human capabilities (rather than replacing them) , and enhancing performance compared to purely robotic processes. Collaborative robotics has been described as one of the fastest-growing sectors of the robotics market (Goldberg, 2019[87]). Villani et al. (2018[88]) identify the industrial applications where cobots are most advantageous, according to the literature: handling; welding; assembly; and applications in the automotive industry (where demand is currently the greatest). In these applications, cobots generally assist the operator by performing mundane and or physical tasks such as moving materials, holding heavy objects or performing sample test

AI Can Support Human Resource Management and Career Development

AI has a few features that make it particularly attractive to firms that wish to employ more modern, participative and engaging human resource management models and to workers wishing to advance their careers. However, potential benefits for workers are very much dependent on how employers will use these new technologies, which have the potential to collect and produce vast amount of data on work performance, and therefore, may increase work pressure (see section 5.4). With these caveats in mind, Table 5.1 presents some applications that demonstrate how AI can enable personalised coaching for individuals, help managers to manage, match skills to jobs, and improve training tools and programmes.

AI May also Entail Risks for the Work Environment

Some of the same features that make AI algorithms so powerful may also entail risks for the quality of the work environment. Excessive monitoring may generate psychosocial risks, increasingly recognised as an important component of occupational safety and health Concerns about data privacy, transparency and explainability may exacerbate these risks, in addition to raising questions about the ethics39 of introducing AI to the workplace. AI can also amplify some of the psychosocial risks associated with digitalization re-existing tools or new tools for workplace management and design. However, Moore notes a general lack of discussion in high-level governmental and organisational reports about the implications for OSH of introducing AI into the workplace.

Enable Excessive Monitoring on Behalf of the Firm

Excessive monitoring of employees, in the form of data collection and processing, may cause stress and undermine well-being. Surveillance at work is not necessarily new41, but AI tools can only exacerbate the situation, not least because it is the very way those tools perform – every bit of data is potentially valuable (Van den Broek, 2017[108]).

Many of the HRM-related applications mentioned in Table 5.1 require additional data to be collected in the workplace. Even cobots – which are not intended to monitor employees' behaviours but rather are geared towards helping them execute work tasks – produce a myriad of granular data on work performance (e.g. workers' and machines' idle times). In addition, some innovative approaches to put human psychosocial risks at the heart of human-robot collaboration involve the operator wearing a smart-watch that monitors stress levels (Landi et al., 2018[109])

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