IJNRD.ORG ISSN : 2456-4184
INTERNATIONAL JOURNAL OF NOVEL RESEARCH AND DEVELOPMENT (IJNRD) | IJNRD.ORG
An International Open Access, Peer-reviewed, Refereed Journal

What Are The Short-Term And Long-Term Economic Impacts Of Ai-Driven Automation On Income Inequality?

VEDIKA PAL
Canadian International School, Bengaluru, India

Abstract

AI driven automation, which is the use of artificial intelligence technology to perform tasks, conventionally done by humans, is revolutionizing the labour market and industries across various sectors. This is having and will continue to have profound impact on the income inequality in both short term and long term which this study explores. Short-term causes contributing to growing income inequality include the swift replacing of low-skilled workers and wage reduction in regular employment. On the other hand, because of unequal access to higher education and training, artificial intelligence may eventually worsen income polarization even while it has the potential to offer new, highly skilled work possibilities. This research paper explores these structural changes in the labour market in near future and their impacts on the income distribution in an economy and potential strategies to gear the economy for such imbalances. These include labour market reforms like skills development and workforce adaptations. Additionally, the study also highlights the need for urgent policies and educational reforms that workers would need to thrive in the increasingly omnipresent AI dominated economy assuring a more equitable distribution of income and minimizing the risks associated with technological advancement

1. Introduction

1.1 Background of the Study:

AI-driven automation refers to the use of artificial intelligence technologies across various business lines and sectors to perform tasks that were previously completed by humans. It includes machine algorithms, robotics process automation and other computational methods that increases efficiency and productivity (Adeyeri, 2024). There are particularly three ways through which income disparity can be affected by the use of AI in automation.

In the short run, there might be the elimination of whole industries whose tasks and duties are easily automated by AI technology. The skill-bias impact and hire-and-fire effect can hurt lower-skilled workers which may worsen income distribution problems since they might not find other jobs that would enable them to earn similarly again (Erdil and Tamay, 2023).

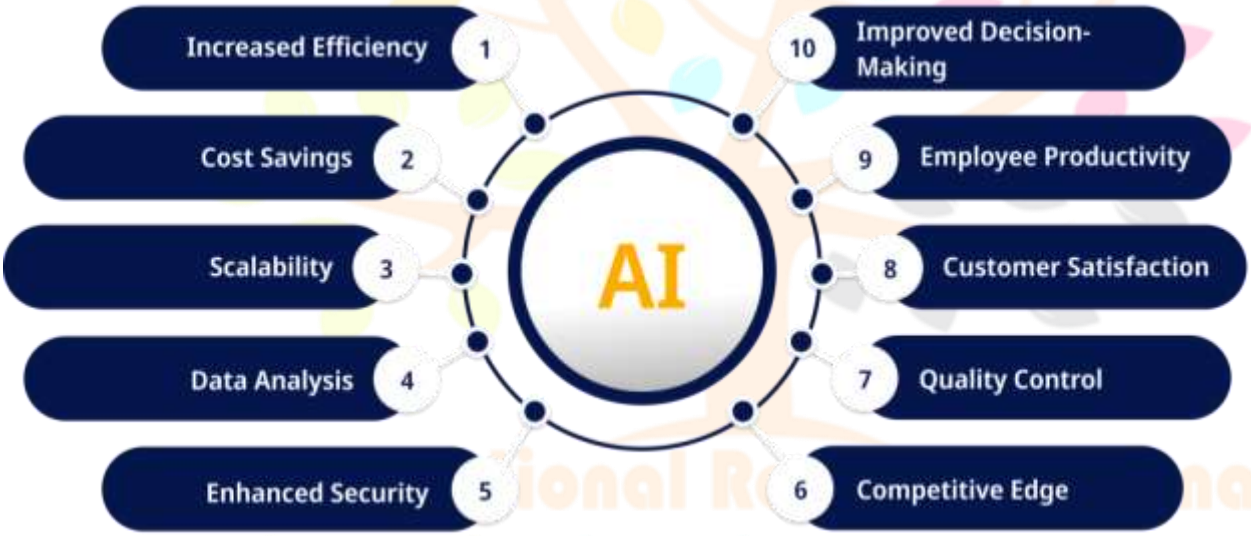

Figure 1: AI-driven automation benefits

(Source: Erdil and Tamay, 2023)

Conversely, in the long term, AI has the potential to create new employment opportunities in fields related to AI development, operation, and regulation. For instance, AI can reduce costs, enhance productivity, and improve decision-making, thereby positively impacting a company's performance. However, these roles require advanced skills in education and technology. Without proper education and retraining of workers to adapt to these evolving demands, there is a risk of widening the income gap between skilled and unskilled workers.

At the international level, the impact of utilizing AI to automate the labor market varies significantly due to differences in technological adoption rates and economic systems across nations. First-world countries, with their advanced infrastructure and capital, may incorporate AI extensively, leading to rapid employee displacement and

changes in industrial systems (Yaseen, 2021). Conversely, the adoption rate in developed economies might be slower compared to developing economies, which could bypass certain developmental phases and leverage AI to accelerate economic growth (Bastani and Daniel, 2024; Yaseen, 2021). However, disparities in technological skills and training could exacerbate income polarization both globally and within countries, leading to increased inter-country income inequality.

Overall, while automation through the use of AI thus holds the potential for expanding economies' size and improving resource productivity, it can be either a boon or curse for the distribution of workers' income depending on how societies respond to the disruption it brings through efforts to upgrade human capital for a new economy through education and training as well as efforts to cushion displaced workers through social protection policies. Appreciating these dynamics would be essential for those keen on realizing the objective of deploying AI for development while at the same time minimizing its detrimental impacts on the income distribution process.

1.2 Review Aim and Objective

The present study aims to investigate how AI-driven automation is affecting income disparity in the short and long terms. Based on this aim, the review has the following specific objectives.

- To analyze the short-term effects of AI-driven automation technologies on income distribution and wage levels, with a focus on job displacement, wage suppression, and changes in employment patterns.
- To examine the long-term impact of AI-driven automation on income inequality, including structural changes in labor markets and shifts in income distribution.
- To explore mitigation strategies for income disparity resulting from AI-driven automation, such as skills acquisition and workforce adaptation.

2. Body of Literature

This section discusses the overall variables and their implications using existing ones. Books, review papers and online journals are used for the discussion on the body of literature regarding AI-automation and its implication on financial aspects.

2.1 Short-term Economic Impacts of AI-driven Automation on Income Disparity

AI-driven automation can have uneven effects on economic development, which are discussed in this section.

2.1.1 Job Displacement and Unemployment Rates

The short-term consequences of AI-driven automation include increased unemployment rates and the replacement of human employees by machines, particularly in routine and repetitive tasks. Yaseen (2021) argues that various sectors, including production, transport, trading, and communication, are undergoing radical changes as AI takes over many tasks traditionally performed by people. The most susceptible occupations are frontline roles such as production line workers, packagers, clerks, and telemarketers (Acemoglu and Restrepo, 2020). These jobs typically involve routine activities that can be executed by AI systems at a lower cost.

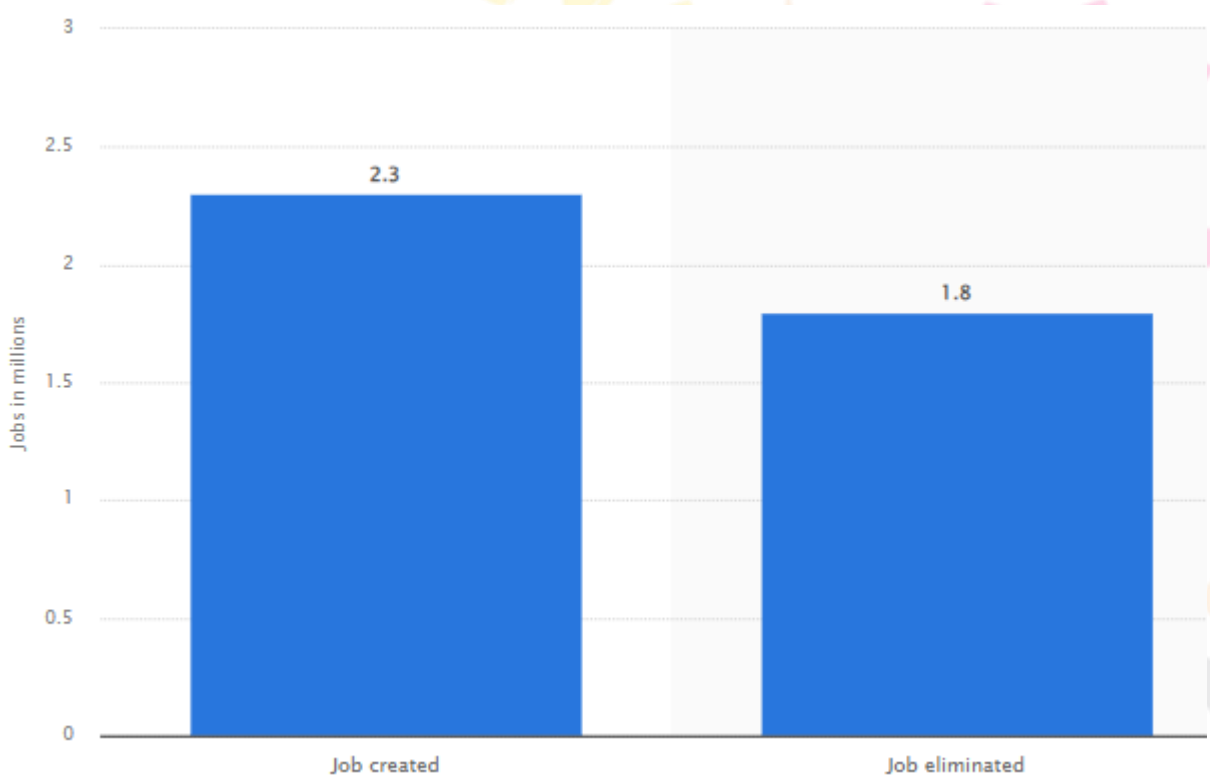

Figure 2: Job creation and elimination

(Source: Thormundsson, 2022)

Jaures (2021) opined these tasks are susceptible to automation, which results in job losses and minimized employment prospects in sectors where such positions are offered, thus possibly causing short-term rise in unemployment particularly among employees with low skill levels. As figure indicates, in 2022, 1.8 million job eliminations were done whereas, 2.3 million jobs were created. In addition, implied general job insecurity and economic volatility during the 'transformation time' the AI technologies starts to be implemented in organizations.

On the other hand, jobs that entail idea generation, analytical skills, personal emotional skills, and social skills are less prone to be replaced soon by AI (David, 2024; Jaures, 2021). It's more possible for them to be supported by technologies like AI than it is for them to be replaced by them; some include healthcare personnel, teachers, artists and designers, and anyone involved in management decisions. These jobs, typically, imply activities that cannot be easily outsourced to a computer because they require the element of judgment, understanding, and flexibility which is inherent in human behavior only.

2.1.2 Wage Suppression and Alterations in Wage Structures.

Use of AI-Driven automation affects wages profoundly, and consequently, its effects are reflected in general wage dispersion and also wage disparity as per various industries and as per levels of employee skills (Ege and Besiroglu, 2023). Some of these works have as their main focus different aspects of this impact.

Firstly, AI-Driven automation impacts most of all wage depression in some categories of employees (David, 2024; Ege and Besiroglu, 2023). As the tasks get mechanized, then the need for workers to be employed in those positions will reduce thus exerting a pressure on the wages especially those in the affected occupations who are low skilled. For instance, wages in the manufacturing industries or routine service sectors may either stagnate or decline in the future due to an AI capability to execute most of the repetitive tasks (Ferrara, 2023). Secondly, there is a recorded increase in wage inequality at the same time that there is the adoption of AI. The high-skilled people, who have the technical knowledge to design, set up, and supervise the AI platforms, get paid more because there is demand for these kinds of people (Williamson et al., 2023). On the same note, lower-skilled employees in occupations that are prone to automation experience greater wage volatility and risk of reduced earnings.

In addition, Ikwuegbu (2021) mentioned the distribution of wages in industries might be altered by AI-Driven automation in the future. There might be wage premiums in careers that again entail cognition that is non-routine and may take longer to automate; things like analytical abilities, being creative or having interpersonal skills are likely to be more valuable in a future society wrought with technology. While, the jobs that require repetitive activities and low skill levels may have or be prone to wage compression or even depreciation.

2.2 Long-term economic Impact of AI-Driven Automation on Income Disparity

Long-term consequences of AI-driven automation on income Disparity include:

2.2.1 Structural Changes in the Labour Market

Artificial intelligence is not just transforming the labor market in bits and pieces, but changing the fundamental structure in the long term where the changes are most likely to be long-lasting. Such transformations include changes in occupation types, the creation of new occupations, and the disappearance of some traditional ones (Hisham and Mekid, 2023).

Some of these changes include the following; The first one is the restructuring of the job types. Mainstream jobs, such as a sequence of repetitive tasks in diverse sectors, are gradually being liberalized; thus, there are fewer work opportunities in fields involving clear-cut challenges (Rawashdeh, 2023). On the other hand, more and more jobs are emerging that involve the need to solve important issues, be creative, to learn new things and foster interpersonal skills, which cannot be easily imitated by an AI system (Pegah and Levy, 2020). This comprises capacities in the creation and administration of AI, data science, protection, and postures concerning human associations and judgment. Investment in new technologies has revealed new positions, which are related to the application of AI technologies. For instance, artificial intelligence specialists, big data scientists, machine learning developers, and robotics technologists are examples of emerging roles that teams have begun setting up as companies commence AI initiatives.

2.2.2 Alterations in Income Distribution

Using Artificial Intelligence to automate several processes has a big impact on trends in income distribution as seen in the long-term influence, making it a sensitive topic for research. When comparing the results of investigations focusing on the dynamics of income distribution over a long period, several factors can be attributed to the use of AI-driven automation (Awni, 2023). To start with, automation is always unequal across the different categories of the workforce, thus deepening the differential between the high-skill and low-skill employees. Pegah and Levy (2020) argued AI technologies benefit high-skilled workers who can utilize the assistance of the technologies for the enhancement of their productivity, leading to a rise in their income resulting from the demand of their specialized skills in the development of AI technologies, analyzing of the large data for the companies, and the decision-making processes.

In addition, this AI-driven automation affects the income distribution pattern in a way that widens the income disparity. On this side, there is a magnitude of income and wealth among the owners or managers of AI technologies as well as the corporations that are leading in technological innovations (Mehmet, 2024). This focus can result in increased value for the AI-driven execs, shareholders, and investors to the detriment of the median worker's wages. However, the automation of routine tasks results in job loss for low-skilled workers, hence exposing this category to high risks of poverty and general instability in the economy (Mehmet, 2024, Pegah and Levy, 2020). Analysts also argue that it is likely to result in the laying-off of workers especially in industries such has manufacturing and retail industries where most of the employees are paid low wages and their working conditions are relatively precarious. This may help increase the inequality between those who are classified as the 'rich' and 'poor' population.

In addition, the shift in income attributable to technology-driven AI applied to work automation over the long term depends on policy actions and social decisions. Some of the income inequalities are because of losses incurred by workers due to loss of work to lower-skilled automation, hence nations that ensure that workers go back to school or acquire new skills and training to fit in new jobs in the economy will in some way help in

reducing the inequalities (Ben et al., 2023). Therefore, although AI-initiated automation is a possibility for generating economic growth and increasing the effectiveness of the economy in achieving planned objectives, the trends that have emerged in income redistribution in the long term indicate the relevance of equitable policies and strategies that would lead to the optimisation of the distribution of the results of technological progress and eliminate inequalities in the shares of social productivity acquired by various segments of society.

2.3 Mitigation Strategies for Income Disparity

Reviewing the literature mitigation strategies for income disparities caused by AI-based automation are as follows:

2.3.1 Continuous Skill Development

It is important to note that numerous authors, such as those in the Daron and Restrepo (2020) and Zarifhonarvar (2024) stress the significance of promoting and enhancing employees' skills, engaging in lifelong learning, and acquiring new skills throughout people's careers to reduce the adverse effects of using AI-driven automation. Since automation is becoming a norm in industries and certain tasks are effectively being solved by AI, the workers must retrain themselves to acquire new skills compatible with the AI technologies. Continuing education keeps the person ready for employment opportunities embracing innovative human skills, which AI cannot capture, innovate, or solve in aspects of creativity, problem-solving or social relations. Upskilling programs which are driven by employers and or governments are instrumental in preparing employees for the new world order beset by technology. People thus can be trained with education and training programs that create society's workforce ready to come to terms with AI to reduce disrupting effects and provide incomes for the poor.

2.3.2 Strategies for Workforce Adaptation

Workforce adaptation to AI-driven automation can be facilitated through several strategic approaches

- **Vocational Training Programs:** Setting up vocational training programs and specifically for new growth sectors means that the workers acquire certain skills that may be required in new positions. Such courses are mostly developed with help of working professionals and guarantee practical applicability (Alexandre and Hyee, 2021).
- **On-the-Job Training:** Employers can use human resource management development in giving on the job training to increase the skill level of the current employees. Thus, this approach enables the workers to learn new competencies while remaining useful to their organizations.
- **Collaborations Between Industry and Educational Institutions:** Together with industries, institutions of learning are able to design solutions that fit current employment market by designing a suitable curriculum (Farahani and Ghasemi, 2024). It helps to guarantee that educational programs contain skills and knowledge that would be needed by candidates in the growing employment sector.

2.4 Literature Gap

The literature review indicates that there are gap in the literature regarding specific implication and identification of the economic impact. Although, there are literatures like Farahani and Ghasemi (2024) and Zarifhonarvar (2024) that details on such aspects, yet the discussions are not elaborated. The research aims to address such gaps and address the research objectives prominently.

3. Discussion:

Analyzing the topic connected with automation based on artificial intelligence, one can mention the following crucial consequences for economies and labor markets around the world (Anton et al., 2021). As a conclusion of the discussion of specific findings, this paper integrates them to explain the general effects of AI-driven automation, relevant employment dynamics, income distribution, and dealing with the problems associated with AI-driven automation.

3.1 Impact on Employment and Labor Markets:

AI-driven automation changes the characteristics of employment and the skills that are sought after. Daily activities that may be done by machines, which include manufacturing and administrative-related jobs, are replaced, meaning that there is an immediate loss of jobs and low wages among workers who are bearing minimal education (Yaseen, 2021; Zarifhonarvar, 2024). On the other hand AI creates the need for more high-skilled job positions that are within the AI creators, data analysts, decision makers thus acting as a separator of the workforce. Through such strategies, societies ensure that skill deficiencies are closed and that equal opportunities in new markets are availed to all, hence eradicating disparities caused by automation.

3.2 Income Distribution Dynamics:

Specifically, the resulting utilization of artificial intelligence and automation in jobs deepens income disparity. Accumulation of wealth stabilishes in the hands of owners and managers of artificial intelligence technologies enhancing the income divide between high-paid employees and low-skilled job loses due to technological advancement (Ferrara, 2023). The long-term trends are the polarizing distribution of income based on increases in productivity and demand for specialists for highly qualified personnel on the one hand and unemployment and low wages for low-skilled personnel on the other.

3.3 Implications and Significance:

The results indicate that in the age of the fourth industrial revolution of AI automatization of the economies and labour markets. It is concerning that such dynamics must be understood by policymakers, businesses, and stakeholders operating in the context of the Fourth Industrial Revolution (Cazzaniga, 2024). It is essential to

invest in education, skills enhancement initiatives, and social protection measures so that the talents in human resources can be utilized optimally through integration with efficient and effective AI tools while the negative impacts on employment and income inequality could be reduced (Zheng et al., 2020). Overall, the case of automation using AI is both beneficial and disadvantageous for the economies of the world. If the populations' growth is inclusive and the distribution of technological progress is fair, AI becomes a tool for building a better world in its potential.

3.4 Mitigation Strategies for Income Disparity:

- **Government Policies:** Different governments of various countries are conducting research on different policies and interferences proposed in curbing the gap in income inflamed by automation. For instance, Universal Basic Income (UBI); UBI means issuing all citizens standard, unconditional cash transfers to cover the minimum cash necessary for subsistence. Skeptics of UBI claim it as a broad protection against unemployment resulting from the use of technology and artificial intelligence in production to those who propose it as the economic safety net and way to eliminate poverty (Zheng et al., 2020; Akter et al., 2021). Some attempts have been made on pilot studies in countries like Finland, Canada, and Kenya which shows the reliability of UBI and its relation to the reduction of income inequality. Concerns are also heard that would negatively affect sustainability, discourage work, and that the payments made under UBI would be insufficient. The progressive tax systems gather more tax from the high earners, to minimize income differences. Citizens are taxed progressively in an effort to pay for social expenditure, education, health, and other facilities.

- **Corporate Responsibility:** Companies are also involved in facing income inequality by carrying out fair wage policies that afford decent remunerations, undertaking redressing measures, skills development for efficiency in handling new roles that AI brings, and embracing ethical AI to reduce employment losses and increase efficiency other than leading to income inequality (Margaret and Tay, 2020). Such initiatives show corporate action in the promotion of sustainable development.

4. Conclusion and Recommendations:

Based on the review of the literature, the short-term and long-term economic impacts of AI-driven automation on income inequality are significant. In the short term, the use of AI in automation can lead to job displacement and increased unemployment rates, particularly among low-skilled workers (Zarifhonarvar, 2024). This can exacerbate income inequality as those workers might struggle to find new employment opportunities that offer similar levels of income. However, in the long term, AI-driven automation has the potential to create new employment opportunities in sectors related to AI development and regulation, but these roles often require advanced skills and education, which may widen the income gap between skilled and unskilled workers if not addressed through education and retraining.

Lastly, To mitigate the negative impacts of AI-driven automation on income inequality, it is recommended to focus on strategies such as skills acquisition and workforce adaptation. Investing in education and training programs to equip workers with the skills needed for the evolving job market is essential (Awni, 2023). Additionally, implementing social protection policies to support displaced workers during the transition and promoting inclusive economic policies can help to minimize the detrimental effects of AI-driven automation on income distribution

● **Ethical Considerations:** This automation introduces deep ethical questions that need to be asked and looked into over issues of bias, fairness, and the digital divide. If the training data set is biased, the AI systems will solidify and reinforce the existing prejudices of the society vitiating several important spheres of life such as employment, creditworthiness assessment, and criminal justice systems. AI technologies pose ethically poignant threats since they gather, process, and employ people's data; as a result, privacy protection needs robust regulations.

● **Technological Forecasting:** Technological forecasting in the case of AI involves the expectation of future technological developments and their probable effects on the economy and the development of proper ways of evolving. AI to evolve in domains including natural language processing, computer vision and reinforcement learning algorithms. This could mean the development of new and advanced uses of AI in healthcare along with finance, transportation, and other industries to raise the level of productivity. It is suggested that AI's capacity to handle large quantities of data could significantly transform decision-making activities across enterprise and political establishments. Machine learning and big data analytics could enhance supply and demand chain management as well as policy deployment.

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