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IMPACT OF AI ON LABOR MARKETS: INTENSIFYING OR MITIGATING UNEMPLOYMENT

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ABSTRACT:

Technology has transitioned societies from Agri-based to mechanized-productions; emphasis of technology from being just a tool to an intelligent partner, collaboration, personalization along human capabilities. This transformative potential has led to augmentation, transformation and potential replacement of various manual tasks where humans had reached saturation of physical capacity. As technology advances further, traditional jobs are exposed to risk of being automated, causing unemployment for certain segments of the workforce. This transformation raises the concern for obsolescence of traditional workforce due to AI-driven efficient productivity. This study aims to examine the studies on AI's evolution and its potential effects on the labour market. Contributing to the existing literature, this study provides a balanced perspective on AI-driven job creation and job displacement by synthesising findings from multiple sources. This study will provide valuable insights for business executives, governments, policy makers, and researchers for future directions to design strategic and adaptive mechanisms. This study is based on systematic review of scholarly articles, official reports from global institutions such as the OECD, IMF, and World Bank. To comprehend the literature, content analysis methodology was employed, requiring a detailed study of all selected articles. The conclusion between whether AI usage is human-augmenting or human-substituting is still uncertain, where AI is putting even knowledge-intensive occupations at risk of automation. Research work is still divided into groups proposing contradicting impacts.

Keywords: AI, Labor market, unemployment, structural transformation, skills gap.

1. INTRODUCTION

Humankind is continuous adaptation and innovation story. From earliest stone tools to present day revolutionary technologies; innovation has sought to make human life easier. Today we are experiencing the emergence of 5th industrial revolution referred to as "cognitive" or "Symbiotic" revolution. This has transitioned societies from Agri-based to mechanized-productions; emphasis of technology from being just a tool to an intelligent partner, collaboration, personalization along human capabilities. This transformative potential has led to augmentation, transformation and potential replacement of various manual tasks where humans had reached saturation of physical capacity (Dwivedi et al., 2019).

Most prevalent output of 5th industrial revolution being developed and deployed is AI. In broad terms AI is referred to systems which are capable of performing tasks requiring human-cognition like decision making under uncertain circumstances, language processing in natural way. Artificial intelligence (AI) is the study and creation of "intelligible (machine) agents", which are devices, programs, or algorithms that operate intelligently by detect and respond to their surroundings (Acemoglu & Restrepo, 2019).

India ranks sixth globally for patents registration with 64,480 applications, where resident filings account for more than half of all submissions (55.2%).

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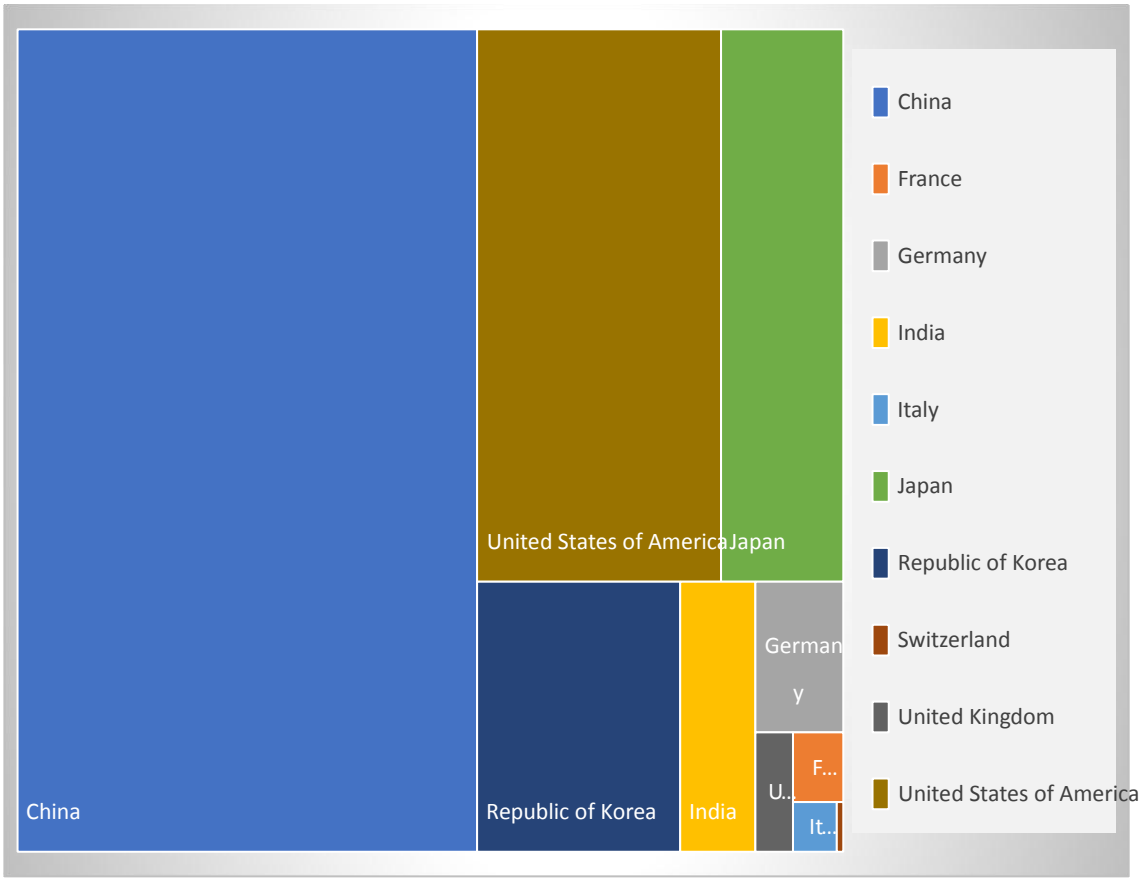

Figure 1: Top-10 countries for patents registration

Source: (World Intellectual Property Organization (WIPO) et al., 2024)

When understanding AI's labor impact, the concept of "creative destruction," introduced by economist Joseph Schumpeter (Schumpeter, 2010), argues that technological disruption can balance the overall scenario by demolishing old business models and fostering new ones. AI actively introduces novel opportunities and fosters the creation of new job roles into the job market like machine learning engineers and data scientists. As technology advances further, traditional jobs are exposed to risk of being automated, causing unemployment for certain segments of the workforce. This transformation raises the concern for obsolescence of traditional workforce due to AI-driven efficient productivity. The impact of AI on labor market is a dual-edged phenomena with two distinct perspectives:

1. Optimistic: AI augments the labor productivity and creates many novel occupations. When AI is used for performing critical tasks, human skills are still required to perform various tasks like decode, coordinate, interpret AI's performance and act accordingly. e.g. Human intellect will be superseded by AI potential by 2030. (Popkova & Sergi, 2020).
2. Pessimistic: Many labor tasks currently performed by professionals are susceptible to be substituted by AI leading to higher efficiency and enhanced productivity. Technology obsolescence leads to higher degree of job destruction over job creation. e.g. AI will create 12 million new jobs than it replaces (Wood, 2023).

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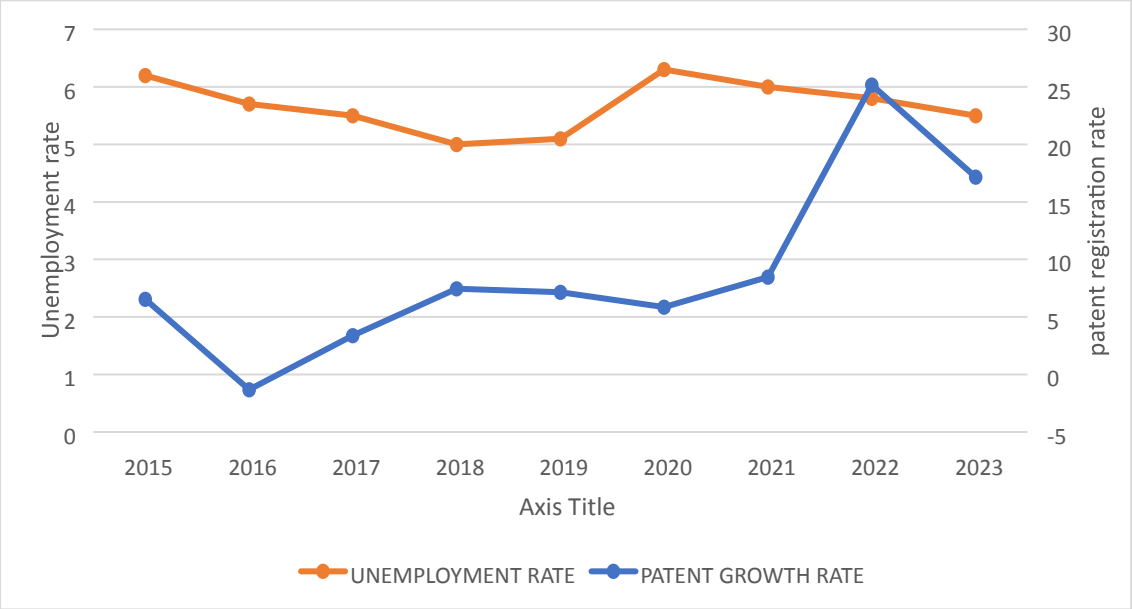

Figure 2: AI development and unemployment scenario in India (2015-2023)

Source: Prepared from data collected from Directorate General of Employment and WIPO IP statistics data centre

Majorly AI 's impact on labor market can be studied from perspective of three general themes:

1. Job displacement
2. Job creation
3. Workforce transformation

1.2 Need of the study: few decades back, nobody imagined jobs like social media mangers, GPT developers, AI ethics officers; yet they exist today. This controversial phenomenon has emerged as major area of study for a concrete understanding of AI's impact on employment, to establish a balance between harvesting AI's potential for development and mitigating its potential harsh effects on job security. Therefore, a plenty of literature has emphasized the AI exposure of labour market from multiple perspectives like patterns of unemployment, labour demand, productivity, working hours, wages inequality etc. (Ghosh et al., 2024)

A thorough review of the literature can prove beneficial in developing insights to better explain the uncertainties that emerged among economic entities, regarding potential shrinkage of labour demand, generic-job replacement etc. This study aims to examine the studies on AI's evolution and its potential effects on the labour market. This study will provide valuable insights for business executives, governments, policy makers, and researchers for future directions to design strategic and adaptive mechanisms. Contributing to the existing literature, this study provides a balanced perspective on AI-driven job creation and job displacement by synthesising findings from multiple sources. This present study highlights the importance of skill adaption and lifelong deployment of skills to stay relevant in labor market.

1.3 Research objectives: The objectives of this research are as follows:

1. To Examine the literature on Dual Impact of AI on Employment i.e. positive as well as negative.

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2. To analyse the role of AI in creating or destroying labor demand.
3. To study AI-induced structural changes in labor markets.

2. RESEARCH METHODOLOGY

This study is based on systematic review of scholarly articles, official reports from global institutions such as the OECD, IMF, and World Bank. AI's potential to substitute human labourers has become a major area of study for academics. Researchers have looked at the interaction between AI and labor market from a range of perspectives, such as industry-specific, skill-based, and labour market-wide.

2.1 Identification of articles: the period of study is limited to cover the studies since 2019 because patent registration (unanimously used as proxy for AI growth) has gained velocity after pandemic time period as shown in figure2. Scopus database has been used for conducting literature search as it provides an extensive range of articles related to artificial intelligence. To identify relevant studies, terms "AI", "Artificial Intelligence", "Employment", "labor market" were used, which lead to 235 results.

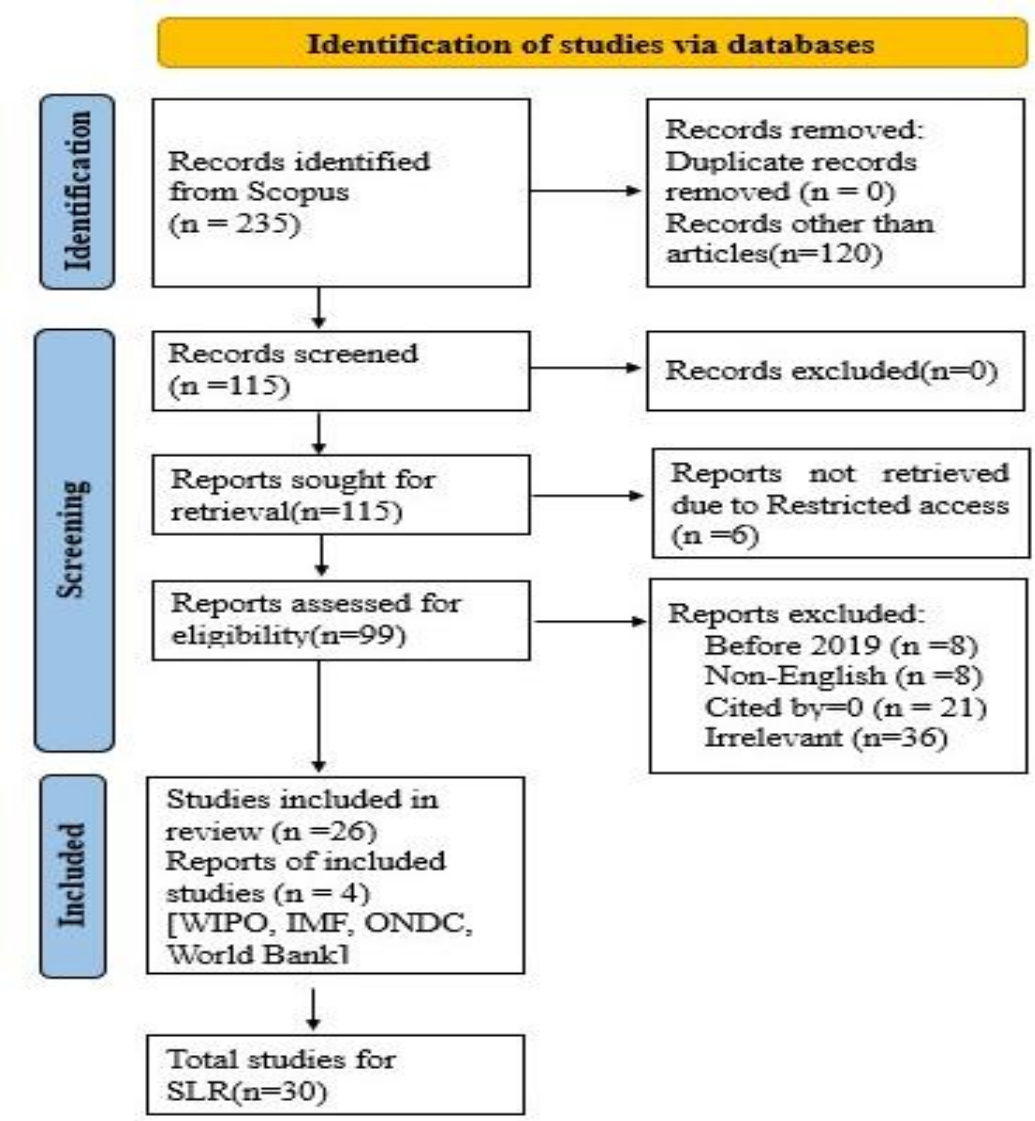

Figure 3: PRISMA flowchart

Source: (Page et al., 2021)

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2.2 Screening criteria: various inclusion and exclusion criteria were applied to arrive at a manageable size of literature which corresponds to the objective of the study. Initial results were evaluated for eligibility based on their type of source i.e. book chapters, conference proceedings, articles in press were removed. Further articles written in languages other than English were dropped due to language barriers. Irrelevant articles from fields other than social sciences, business and management, economics, decision science, multidimensional and the articles which do not corroborate the impact of AI (in any variation) on the labour market were excluded.

2.3 Method of review: To comprehend the literature, content analysis methodology was employed, requiring a detailed study of all selected articles. Further scrutinising each article and categorising its objectives, research approach, findings, and research contributions. Main focus of review is to amalgamate the outcomes to furnish a comprehensive descriptive portrayal and arriving at a consensus of understanding of the investigated domain.

3. SYNTHESIS OF LITERATURE

AI's influence on the labor market is a complex interplay of positive and negative forces. Along the lines of assessing the positive or negative impact casted by AI on labor market, the literature has been thoroughly analysed. Based on the findings or conclusions drawn by researchers, studies have been grouped into groups of contrary assertions:

3.1 Mitigating unemployment: The impact of artificial intelligence (AI) on employment has been a subject of extensive debate, with researchers analysing its effects across different time horizons. (Qin et al., 2024) explored how AI adoption influences the labor market in the short, medium, and long term. In the short term, the most pronounced fluctuations occur due to the sudden automation of routine, low-skill jobs, such as those held by assembly line workers and entry-level customer service representatives. Displaced workers often struggle to find new employment immediately, creating short-term job losses. However, in the medium term, AI's effects become more balanced, as job displacement and job creation offset each other, leading to a relatively stable employment market. While some workers remain unemployed, others acquire new skills, adapt to AI-driven roles, and contribute to job market stabilization.

Research further highlights the rising demand for AI expertise. (Liu et al., 2024) found a significant surge in AI-related job opportunities over the past 13 years, not only in the creation of new job roles but also in the transformation of existing jobs. In Europe, (Albanesi et al., 2024) identified a positive association between AI adoption and employment growth, particularly benefiting occupations with a higher proportion of skilled workers. The introduction of new AI-driven products, services, and occupations suggests that employment projections may even underestimate AI's long-term impact on job creation. Job losses remain limited when compared to the substantial potential for job creation, both in direct AI-related sectors and spillover industries.

Despite AI's job creation potential, its benefits are not evenly distributed across different labor segments. (Vermeulen et al., 2018) found that while AI leads to a decline in unemployment rates, the positive effects are significantly stronger in skilled labor markets than in unskilled ones. Similarly, (Lu, 2020) described AI's role in employment growth as an "icing on the cake"—it enhances job opportunities but with varied impacts based on gender and industry. Automation, for example, has brought greater digital welfare to female workers and benefited labour-intensive industries, yet it has also reduced the proportion of male workers in manufacturing (Shen & Zhang, 2024).

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AI-related jobs are increasingly offering higher wage premiums. (Alekseeva et al., 2021) conducted a cross-sectional analysis and found that job postings requiring AI skills increased tenfold from 2010 to 2019 and saw a fourfold rise in their overall job share. Similarly, (Aly, 2020) demonstrated a positive link between AI-driven digital transformation, employment growth, and economic development. One of the key drivers of AI-driven employment growth is its impact on remote work and female workforce participation. The ability to work from home has significantly benefited women, creating more job opportunities for them than for men.

While AI is expected to reshape workforce structures, its effects on labor market polarization remain a concern. (Zhang, 2023) empirically demonstrated AI's dual role in "upgrading" and "polarizing" labor markets, particularly widening the income gap between high-skilled and low-skilled workers. Despite these shifts, AI still lacks managerial, cognitive, and social skills, which are essential for creative, complex decision-making roles. AI's limitations in these areas suggest that certain human jobs will not be fully replaced.

Finally, AI's continued penetration into industries fuels demand for professionals in robotization, ethical AI governance, and creative problem-solving. (Su et al., 2020) noted that while assembly-line workers and machine operators face potential job displacement due to AI's cost-efficiency, new career paths emerge that require technical expertise, creativity, and critical thinking. These evolving roles help compensate for routine job losses and contribute to a dynamic, AI-enhanced labor market (Serrano, 2025).

3.2 Intensifying unemployment: (Aghion et al., 2019) used robotization as a measure of AI development and found that it reduces aggregate employment at the zone level. They observed that non-educated workers are more adversely affected than educated workers. To counterbalance these effects, the authors recommended education policies that could help maximize AI's positive influence on employment.

AI would lead to significant labor displacement in the coming decades, estimating a 90% or greater likelihood of automation replacing jobs. They suggested a 1-in-10 chance that AI technology capable of outperforming humans in 90% of tasks could emerge within a decade, raising concerns about large-scale job losses (Gruetzemacher et al., 2020). (Qin et al., 2024) similarly argued that AI would intensify long-term job losses, reinforcing the concerns surrounding automation's disruptive potential. (Zhou et al., 2019) further estimated that by 2049, China could see between 201 and 333 million workers—equivalent to 35.8% of the country's current employment—replaced by AI. The study identified that female workers, older employees, and individuals with lower education levels would face the highest risks of displacement.

AI-driven unemployment disproportionately affects workers with a medium level of education, supporting the "technological change-induced labor market polarization" hypothesis. This suggests that AI does not only displace low-skill jobs but also diminishes mid-level employment, creating a labor market that increasingly Favors high-skill jobs (Bordot, 2022). (Wang et al., 2023) examined the degree of AI's substitution effect across different job categories, concluding that more than 50% of jobs in China are highly vulnerable to replacement in the coming years. However, they noted that the probability of AI substitution varies depending on the level of perception, manipulation, and social intelligence required for each occupation.

(Acemoglu & Restrepo, 2019) introduced the concept of the "wrong kind of AI," referring to AI designed specifically for automation rather than augmentation. They argued that such AI marginalizes workers by concentrating benefits among the already wealthy, leading to job

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losses, wage stagnation, and increased inequality. (Choi & Leigh, 2024) highlighted the dual nature of AI's impact on employment, acknowledging that while technological innovation can generate new job opportunities, it can also displace workers and reduce labor share. They found that the adoption of AI skills is associated with a decline in non-AI labor demand, with the displacement effect particularly affecting nonroutine cognitive and interpersonal analytical tasks—roles previously considered difficult to automate but now increasingly at risk.

3.3 Structural impact : AI's impact on the labor market is complex and varies across regions, industries, and worker demographics. It is not desirable to generalize its effects across different spaces, as its influence depends on regional factors such as industrial composition and workforce adaptability. For example, (Leigh et al., 2019) found that robots and robotics-competent workers have a greater impact on regional manufacturing employment, emphasizing the importance of location-specific factors.

A major reason behind the heterogeneous effects of AI across countries is the diversity in occupational structures. (Carbonero et al., 2023) noted that occupations differ across nations in terms of their breakdown and task composition, leading to varied labor market responses to AI and automation. Moreover, AI and machine learning are not only altering the labor market but also providing new tools for analysing it. Certain job roles may remain resilient to automation based on the balance between soft and hard skills, where one set of skills is less prone to automation if the other is dominant (Colombo et al., 2019). An OECD study provided additional insights into AI's effects, revealing that in countries where firms adopted AI at scale, labor productivity increased measurably, though with sectoral variations. The manufacturing sector often experiences greater benefits than services. However, the gap between early adopters and lagging firms is widening, leading to winner-takes-all dynamics in certain markets.

The demand for AI-related skills has surged rapidly since 2015, particularly in data and management roles, with the highest concentration in large firms and major technology hubs like Bengaluru (Copestake et al., 2023). AI roles require higher education levels and command significantly higher wages compared to other white-collar service jobs. However, AI adoption has also reduced growth in non-AI job postings and average wage offers, particularly for skilled managerial, professional, and analytical occupations. This shift contrasts with previous findings on computerization and robotics, which primarily affected routine tasks.

The long-term accumulation of automation is expected to drive up the AI skill premium, widening wage inequality between AI-skilled and non-AI workers (Grant & Üngör, 2024). However, (Wang & Jiao, 2024) challenged the prevailing narrative of technology-driven labor displacement, arguing that AI adoption has enhanced labor income share. Their findings suggest a positive relationship between AI implementation and labor compensation, as firms increasingly recognize the complementary role of human capital and AI, leading to more opportunities for workforce development.

In India, (Hammer & Karmakar, 2021) highlighted that the overall impact of AI on employment is likely to be limited and skewed due to the dominance of agriculture and the informal economy. While AI may create some opportunities, it is more likely to reinforce informal and precarious work rather than transform existing trends. Self-employment is expected to rise, as the low cost of labor in the informal sector reduces the incentive for automation. Additionally, women and marginalized groups, who often lack digital fluency,

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are more likely to hold low- to medium-skill jobs that are most susceptible to automation, further exacerbating the urban–rural divide.

At a global level, (Guarascio & Reljic, 2025) found a positive association between AI exposure and employment growth, but with stark differences across countries. Innovation Leaders and Strong Innovators benefit significantly, while Moderate and Emerging Innovators see little to no AI-related employment gains. (Masoud, 2024) further explored AI's impact, showing that it positively influences unemployment reduction up to a certain inflation threshold, after which the effect stabilizes, indicating a nonlinear relationship. Similarly, (Teutloff et al., 2025) pointed out that AI leads to job losses in tasks that are easily substitutable but also creates new opportunities in complementary skill clusters. However, much of the job destruction is concentrated in short-term gig work rather than long-term employment.

3.4 Summary: This study examined how artificial intelligence has impacted labor market. The debate over the impact of AI on labor market whether positive or negative has not reached any consensus. The conclusion between whether AI usage is human-augmenting or human-substituting is still uncertain, where AI is putting even knowledge-intensive occupations at risk of automation. Research work is still divided into groups proposing contradicting impacts. While a whole different set of studies declare that AI is not going to create or destruct jobs because it is just a structural change. They say that AI will change work environment, wages composition, workforce proportion as per gender, age and the way work is carried out. The simplest reason is the lack of quantification of replacement (destructive impact) and generation (creation impact) phenomena. Mere comparison of the quantities can provide a satiable conclusion of dominance of either positive or negative for the time being. But quantification of the dual effect is not feasible due to the fact that impact is not uniform among jobs. Certain sectors, regions, jobs, tasks are transformed entirely due to development of AI while others may have moderate to remote transition. Even the quantification is not sufficient alternative towards this ever-pertinent debate because impact casted by AI is interplay of various aspects which are region specific, job-specific, country-specific, sector-specific. This specificity hinders the possibility of drawing any conclusions which can be generalized irrespective of job, sector, region, nation etc.

3.5 Research gaps identified: this review highlights several gaps in the literature. First, there is no consensus on AI's net impact on employment—while some studies argue AI creates jobs, others predict significant displacement. Additionally, sector-specific AI adaptation remains underexplored, particularly in service industries. Another gap is the lack of empirical research on workforce reskilling effectiveness. Furthermore, studies on AI-driven job polarization and its impact on wage disparities are limited. Most research focuses on general employment trends, but few analyse how AI adoption varies across industries. Most AI labor market studies focus on Western economies (US, EU, China), while developing nations have limited representation. There are very limited longitudinal studies tracking AI-driven job losses vs. job creation over time. Lastly, most AI employment research is Western-centric, with little focus on developing economies.

4. CONCLUSION

Impact of AI on labor market in future can't be articulated with certainty at present. Changes in labor market and occupational dynamics and ever continued developments in AI creates difficulty in assessing the substitution or creation effect. However, this can be asserted that AI and automation will undergo vast developments. This will create a huge demand for highly skilled professionals to handle technical performers or AI-enabled machinery. Applying the

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simplest laws of economics, the excess demand for professionals over the limited supply creates an upward push in wages premium due to competition among employers to secure recruitment of professionals. Hence technical professionals are going to secure higher wages premium for sure.

Historically, every technical transformation has lead to creation of jobs over and above substitution i.e. net creation effect. But short-term displacement raises concern. This AI-driven workforce transition has certain challenges waiting ahead like skill gaps, policy & regulation of labour laws, economic disparities due to unequal access to AI-driven opportunities.

However, the lack of any uniformity over AI's impact has created psychological insecurity among workforce which threatens their livelihood. Even though AI is not sure shot a replacement technology but the ambiguity has posed a negative portrait of artificial intelligence. Focusing on AI and its implementation in augmenting human capabilities can promote the idea of security among population that they can't be replaced by AI, at least in jobs requiring human, social, decisive skills.

5. LIMITATIONS OF THE STUDY

The conclusions drawn are limited by the scope and reliability of the reviewed research. The studies were reviewed majorly for their finding, conclusion for understanding their take on AI's impact. Thus, this review does not evaluate raw data, methodologies, or statistical robustness, relying only on the authors' final interpretations The study excludes pre-2019 research, which may have provided valuable insights into the early trends of AI adoption in the labor market. The study only examined the literature related to employment changes (job creation, displacement, labor market shifts) and does not consider AI's broader economic effects (e.g., productivity, wages, inequality). The analysis may not have captured AI's indirect effects, such as wage structures, work conditions, or industry-specific transformations.

6. RECOMMENDATIONS FOR FUTURE RESEARCH

This study has unfolded the call for interdisciplinary research in the area of AI and its impact. Setting the stage for future research, this study fosters the need for political research (e.g. favouring the candidates proposing to save from the impact of AI), psychological and social studies (e.g. vulnerability and threats to livelihood of meagre workers).

Direction of research work can shape the societal reaction towards AI and its acceptance or rejection. Further research efforts can be made to explore the impact of AI on labor market from varied perspectives like wage rates, working environment, work-life balance and workforce composition. There is still very high scope for research in the area of automation and working from home phenomena due to very limited research work in this area. Research work inhibits gap in efforts towards augmenting or complementing human skills as research lens is focused on studying substitution rather than complementing. Impact of AI can also be analysed comparatively for developed and developing nations. Studies evaluating the success of AI training programs are much required. Impact analysis of government policies like AI job guarantees, universal basic income (UBI), and employment subsidies is still lacking and can be taken up for future research.

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