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# Impact of AI in Labor Market of Pakistan and Developing Countries

**Dr. Raja Amir Hanif (Corresponding Author)**
HoD and Professor, Department of History, Government Graduate College Asghar mall, Rawalpindi
Email: aamirhanif71@gmail.com

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## Abstract

In the 21st century, Artificial Intelligence (AI) has rapidly evolved as a transformative technology reshaping labor markets globally, with developing economies like Pakistan experiencing both promising opportunities and complex challenges. This paper examines the potential of AI-driven innovation to stimulate economic growth, ensure job creation and enhance productivity in developing countries, while also addressing concerns about job displacement, skill shortages and inequitable access to technology. Using human capital theory (Becker, 1964) and the technology acceptance model (Davis, 1989) as foundational frameworks, this study considers how AI integration in sectors such as manufacturing, agriculture and services could alter workforce dynamics. Drawing on structural change theory (Lewis, 1954), which suggests that technology can transform economies from agrarian to industrial, this research explores how AI could play a pivotal role in labor reallocation and sectoral shifts within developing economies.

While analyzing existed literature, when this study assesses; Acemoglu and Restrepo (2018) have shown that automation could displace routine jobs, others, like Bessen (2019), argue that new technology often creates complementary roles requiring human skills. In Pakistan and similar economies, however, the widespread adoption of AI is limited by barriers like inadequate digital infrastructure, education gaps and uneven access to resources (Ahmed & Ali, 2021; Malik, 2023). This comparative analysis, focusing on sectors most affected by AI, reveals that while opportunities for growth and efficiency exist, targeted policies must be implemented to address skill gaps and support workers in transitioning to AI-augmented roles. Hence, this paper proposes policy recommendations aimed at facilitating workforce adaptation to AI-driven economies, including investment in digital literacy, promotion of public-private partnerships and support for AI-related research.

## Introduction

Artificial Intelligence (AI) is possibly the most promising technology currently in development which has potential applications across a wide range of industries and functions. It is a rapidly changing labor market worldwide, offering potential to enhance productivity and foster innovation. However, in developing countries like Pakistan, the integration of AI presents unique challenges. Industries traditionally reliant on human labor, such as agriculture and manufacturing, face disruption due to automation. This paper investigates how AI is reshaping the labor market in Pakistan and other developing countries, assessing both opportunities for job creation and the risk of large-scale job displacement.

In the 21st century AI has swiftly emerged as the most transformative technologies, greatly affecting different sectors, including the labor market (Jagannathan et al., 2019a). Ai-powered systems and robotics technologies are altering the way people work and live by improving productivity and encouraging economic and social development. Though, technological advancements also show momentous challenges, comprising of displacement of traditional jobs and aggravation of inequality in income.

Its potential to generate new jobs and increase productivity is significant, though concerns continue concerning its movement of human employees, worsening inequality and dropping share of labors in economic gains. As firms progressively accept AI, its effect on labor markets has drawn consideration from both policymakers and economists, mainly in economies facing declining growth of productivity and decreasing working-age populations (Su et al., 2022).

In recent years the demand for AI skills has surged, mainly in sectors such as Information Technology, Finance, Professional Services and Administrative Support. Mathematical and Computer occupations have seen more demand, trailed by Engineering, Architecture and Science fields (Magnani, 2022). This tendency is not limited to tech-associated industries but extends to a varied range of sectors, showing an extensive impact of AI across the economy. Big firms, mainly those with R&D investments and more cash reserves are leading the charge in employing AI-skilled labor

The labor market is continuously reshaped by AI, emerging of new job opportunities are emerging while others are facing obsolescence. In different industries introduction of AI has started to shift the skill requirements, employing more focus on the managerial and cognitive skills while automating the tasks of routine which are traditionally performed by the human workers. Moreover, the firms which demand expertise of AI tend to recommend more wages across non-AI jobs, signing a balancing relationship between high skill roles and other AI skills mainly in management (Skrypnyk, 2024).

AI economic implications are also profound. Past evidence demonstrates that advancement in technology like electrification and information technology have powered growth of productivity (Jason & Robert, 2019). Though the rapid development of AI may lead to disruption in the labor market, possibly broadening the gap between low-skill workers and high-skill workers. This emphasis on the critical requirement for policies which facilitate the adoption of AI while confirming passable worker upskilling and retraining to alleviate the negative effects of labor market.

The impact of AI on the labor market is a focus of academic research. Studies present that automation of technologies can substitute an important division of the workforce. For example, (Frey & Osborne, 2015)

assessed In U.S. 47% are vulnerable to automation, as related studies in Australia and Japan expect that 9 % and 55 of jobs, respectively, are at threat of being automated. In the European Union, research directs that for every further robot per thousand laborers, the employment rate reduces by 0.16% to 0.2%, emphasizing disruptive potential of AI (Bordot, 2022).

## Problem Statement

The quick integration of AI across industries is reforming the global labor market. Though AI has potential to create job opportunities and improve productivity, it poses substantial challenges like displacement of job, rising demand for new skills and increased inequality in wages. Most of the workers, particularly those in manual and routine jobs, are at risk of misplacing their livelihoods because of automation. While AI generates opportunities in particular fields like AI development and data science, there is a shortage of understanding regarding how AI-made changes affect the workforce and broader sectors, mainly in developing countries. The lack of suitable initiatives of reskilling and policies could worsen disparities and leave most of the unprepared workers for AI-driven labor market

## Research Gap

Current literature on Artificial Intelligence (AI) and labor markets highlights significant advances in understanding the technology's effects on job creation and displacement, but most studies focus on high-skilled labor within advanced economies. There is limited research addressing the impact of AI on low-skill labor sectors, particularly in developing countries where routine jobs predominate. Low-skill workers face heightened vulnerability to job displacement, as automation and AI-driven solutions increasingly replace tasks that require minimal specialized training (Brynjolfsson & McAfee, 2014). Furthermore, existing research primarily centers on specialized, high-tech sectors and their capacity for job creation, overlooking broader, more systemic effects on sectors traditionally untouched by high-tech solutions, such as agriculture, retail and basic manufacturing. This gap signifies a need for comprehensive, sector-specific studies in developing nations, where the labor market is more susceptible to rapid technological shifts due to economic structures and limited resources for large-scale reskilling initiatives (World Bank, 2020).

## Research Questions

In light of these challenges, this study seeks to answer the following research questions. First, it examines the key challenges posed by AI adoption within the labor markets of Pakistan and other developing economies, with a particular focus on low-skill and routine jobs. This inquiry will shed light on the types of roles most vulnerable to displacement and explore the unique challenges faced by low-skill workers in adapting to AI-induced changes. Second, it investigates the opportunities that AI presents for job creation, productivity enhancement and economic growth within developing countries. Identifying the potential areas for leveraging AI will allow policymakers and organizations to formulate strategic interventions that maximize benefits while minimizing disruption. Lastly, the study questions what strategies and policies governments and organizations can implement to overcome AI-related challenges while harnessing its potential for transforming labor markets. This line of inquiry is vital, as the development of robust, locally

tailored policies is essential for facilitating a smooth transition into AI-integrated economies (Acemoglu & Restrepo, 2018; Bessen, 2019).

## Research Objectives

Based on the identified gaps and questions, this study aims to achieve several key objectives. The first objective is to analyze the challenges that AI presents for labor markets in Pakistan and similar developing economies, with a focus on job displacement, skill gaps and growing inequalities. By understanding these challenges, this research will provide a nuanced view of how AI impacts vulnerable labor sectors, particularly those with limited access to advanced technological training. The second objective is to identify the opportunities AI offers for labor market efficiency, job creation and economic growth. This includes exploring how AI can create jobs within both specialized and non-tech sectors, promoting a diverse and balanced economic landscape that aligns with local market needs (Schwab, 2016). Finally, the study will offer policy recommendations and strategic frameworks that can help developing nations mitigate the adverse effects of AI. These frameworks will emphasize the importance of inclusive, sustainable growth and highlight the need for investment in skill development and digital infrastructure to ensure a more equitable distribution of AI's benefits across the labor market (Ahmed & Ali, 2021; Malik, 2023).

## Literature Review

The integration of Artificial Intelligence (AI) into global labor markets has garnered extensive research interest, with studies increasingly investigating its multifaceted impacts across occupations, industries and countries. Current literature extensively examines the rising demand for AI skills, the risks and benefits of job displacement and the creation of new roles driven by technological advancements in AI. Researchers have been particularly interested in understanding how AI shapes human potential within the labor force, affects economies that rely heavily on manual labor and influences emerging trends that are expected to shape the future workforce.

One prominent theme in the literature is the increasing demand for AI-related skills and the corresponding wage premium for roles requiring these skills. Analyzing data from online job vacancies, studies have shown a sharp rise in the need for AI skills across industries, particularly in IT, management and engineering fields. Large firms with greater market capitalization and significant investments in research and development tend to have a higher demand for AI expertise, which is reflected in the wage premium offered for these roles. AI-related managerial positions, in particular, are often associated with substantial wage premiums, highlighting the growing importance of AI proficiency for shaping the labor markets of tomorrow.

Another critical focus of AI research is its dual effect on job displacement and job creation. As AI increasingly automates routine tasks, jobs dependent on repetitive or manual work are vulnerable to disruption. This displacement risk is particularly pronounced in labor-intensive sectors where AI-driven efficiencies can replace traditional human roles. However, the literature also highlights the job-creation potential of AI, especially in areas such as AI development, data science and related technical fields. Scholars argue that AI may enhance, rather than replace, human productivity when AI systems are

deployed in a collaborative manner, complementing human efforts and driving new opportunities for skill development. This shift underscores the need for continuous adaptation in skills, with workers increasingly expected to embrace lifelong learning and collaborative capabilities to stay relevant in the AI-enhanced labor landscape.

The role of AI in reshaping skill requirements is another significant topic within the literature. Researchers emphasize the necessity of skills development and reimagined training approaches to prepare the workforce for AI-driven changes. This shift is particularly relevant in emerging economies, where foundational digital skills, along with reskilling and upskilling initiatives, are essential. AI's influence is broadening the scope of job roles, necessitating new competencies such as teamwork, design thinking and problem-solving. As the need for these skills grows, workers in AI-affected sectors face the challenge of adapting to rapidly evolving job requirements, underscoring the dynamic and active nature of labor markets shaped by AI advancements.

Beyond technical and economic factors, the literature also explores the ethical considerations associated with AI adoption. Scholars have examined how the rapid integration of AI raises issues related to fairness, bias and transparency, especially in the wake of disruptions brought on by the COVID-19 pandemic. The pandemic has heightened the need for digital skills, yet it has also intensified concerns about skill mismatches and job insecurity. Consequently, researchers advocate for responsible AI practices that prioritize human well-being while fostering a collaborative relationship between human workers and AI systems. These ethical concerns emphasize the need for policies that support AI-driven transformation without compromising the fundamental rights and welfare of workers.

Lastly, studies have begun to focus on the implications of AI in developing economies. Research shows that AI adoption is not limited to advanced economies and that developing nations are also impacted as they engage with the Fourth Industrial Revolution. For instance, in regions such as South Asia, AI adoption has both positive and negative consequences, with job losses occurring in some sectors and new job opportunities arising in others. While digital transformation led by AI has the potential to stimulate economic growth, it requires carefully crafted national policies to mitigate associated risks and ensure inclusive, sustainable growth. Overall, the literature indicates that while AI presents transformative opportunities, it also introduces significant challenges, particularly in labor markets where workers may face barriers to adapting to AI-driven changes. These insights highlight the importance of targeted interventions and strategies that can promote balanced, inclusive economic progress.

## Research Methodology

The study used qualitative methods while integrating systematic literature review to attain the objective of the study. Methodology is planned to certify an inclusive and rigorous analysis of the subject matter, leveraging secondary sources to give valuable visions. Secondary data is gathered from peer-reviewed journals, relevant government publications and industry reports. A thematic content analysis is used to identify the recurring trends and patterns in literature. The analysis focused on AI-related job displacement related to AI, skill development, policy responses and wage premiums. The study analyzes existing policies related to AI, like reskilling programs and estimate their efficiency in planning workforces for AI integration.

## Impact of AI on Job Markets

The ongoing integration of Artificial Intelligence (AI) is actively restructuring job markets across various industries, with a particularly pronounced impact on routine and low-skill positions. One of the notable shifts is toward higher-skill roles, where routine tasks are automated by AI systems, increasing the demand for jobs requiring critical thinking, creativity and emotional intelligence. For instance, industries like education, healthcare and technology increasingly seek workers with advanced problem-solving skills, as well as competencies in human-centric tasks such as counseling, caregiving and AI management (Koski et al., 2018). The shift reflects a fundamental change in the skills required in these fields, as companies aim to integrate AI capabilities with the nuanced, empathetic understanding that human workers bring to customer and patient interactions, as well as the strategic oversight needed for AI management.

Alongside this shift in skill demand, AI is also fostering the creation of entirely new job roles. These emerging positions include AI development, robot maintenance and data management, each requiring educational pathways and skill sets that were not necessary before AI's rapid adoption. For example, AI developers and data scientists are increasingly needed to design and manage complex AI systems, while robot maintenance roles ensure the smooth operation of automated machines in manufacturing and logistics. Such roles highlight the evolving nature of the labor market as it adapts to AI integration, encouraging a new focus on specialized training programs to equip workers with relevant competencies (Johnson et al., 2021). Moreover, as AI technology handles more routine and repetitive tasks, there is an increased emphasis on cognitive, emotional and creative intelligence skills. Sectors such as healthcare, technology and education, which require nuanced decision-making, benefit from workers capable of adapting to AI-enhanced environments, thereby fostering opportunities for growth in fields where cognitive and emotional skills complement AI applications (Singh & Chouhan, 2023).

The efficiency gains from AI integration are another core aspect of its impact on job markets. AI-driven systems streamline productivity by performing repetitive tasks accurately and efficiently, enabling human workers to focus on higher-value activities. This transformation is evident in industries like manufacturing, logistics and retail, where AI applications, such as automated assembly lines and inventory management systems, have improved operational processes. By handling routine tasks, AI enables human workers to engage in activities that drive innovation and growth, ultimately contributing to sectoral advancements and economic expansion. For example, the implementation of self-checkout systems in retail and automated warehousing in logistics reduces the need for human labor in routine roles, illustrating the tangible effects of AI adoption on workforce structures (Sheffi, 2024).

However, AI's impact on job markets is not uniform across all industries, leading to significant sectoral variations. In sectors heavily reliant on routine and manual work, such as retail and manufacturing, the potential for automation is higher, resulting in substantial job displacement. By contrast, industries like healthcare, where human interaction and empathy remain essential, experience less displacement of low-skill jobs, though AI is increasingly used for diagnostic and data analysis tasks, which may reduce administrative roles over time. This disparity in impact across sectors indicates that while automation brings efficiency, it also necessitates targeted workforce strategies and reskilling programs to address the specific challenges each sector faces (Petropoulos, 2021). Additionally, the rise of AI-related job roles has

led to job polarization, creating a stark divide between high-paying, high-skill AI jobs (such as those in machine learning and data science) and lower-paying, low-skill jobs, with routine roles most susceptible to automation (Davis, 2024).

Certain industries, including education and healthcare, have witnessed gradual automation in routine administrative roles while experiencing less disruption in low-skill caregiving or teaching functions. As AI continues to be incorporated into these fields, roles involving repetitive tasks, such as record management or appointment scheduling, are becoming increasingly automated (Kraft, 2021). This selective impact necessitates a careful balance to avoid excessive dependency on technology. The over-reliance on AI systems without proper human oversight poses significant risks, as technical failures, algorithmic biases, or unforeseen AI behavior can have serious consequences if not effectively monitored. Studies emphasize that a balanced approach combining human oversight with AI automation is essential to ensure both efficiency and safety in the workplace (Chen, 2018).

AI's integration has also led to notable labor market challenges, such as wage suppression and labor substitution. Historically, technological advances often resulted in wage suppression due to the substitution of human labor with automated systems and AI is no exception. Research reveals a negative correlation between wages and exposure to AI technology, indicating that the automation of easily replicable tasks tends to replace human roles and reduce wage growth in certain sectors (Tyson & Zysman, 2022). As AI continues to evolve, it is likely that this trend will persist, driving greater automation over human employment in specific industries and limiting demand for low-skilled workers, which in turn may exert downward pressure on wages.

Another significant outcome of AI adoption is the increased income inequality it creates, primarily benefiting capital owners who are positioned to profit from the efficiency and automation gains enabled by AI. As AI systems enhance productivity and contribute to revenue growth, the wealth generated tends to concentrate among those who own and control AI technologies. This wealth concentration widens the income gap between labor and capital, with financial gains from AI advancements largely accruing to those at the top economic tiers rather than being distributed equitably across various social and economic classes. This trend has sparked discussions on the need for policies aimed at ensuring a fair distribution of the benefits of AI, as its transformative power may otherwise reinforce existing inequalities and limit opportunities for upward mobility among workers (Ernst et al., 2019).

Hence, this study examines that the integration of AI into job markets brings both opportunities and challenges, reshaping skills demand, creating new roles and driving efficiency, yet also displacing routine jobs, suppressing wages and amplifying income inequality. While AI's impact varies across industries, the broader trend emphasizes the need for strategic workforce adaptation, continuous skill development and policies to address the inequalities that AI may intensify.

## Strategies and Policies for Mitigating AI's Impact on Labor Markets

To address the labor market disruptions posed by AI while promoting inclusive growth, a multi-faceted approach combining education, economic policy, ethical governance and innovation support is essential. Such strategies aim to protect workers, enhance skill development and encourage responsible AI adoption across industries.

- Organizations and governments need to prioritize education and workforce reskilling to prepare workers for AI-driven changes in the job market. This approach includes initiatives such as continuous learning programs, industry-education partnerships and public training programs that focus on developing skills relevant to emerging AI-related fields. Reskilling and upskilling are especially critical for workers in low-skill, routine jobs that are at higher risk of automation. By preparing workers for roles requiring advanced problem-solving, AI management and human-centric tasks, educational efforts can help workers transition smoothly into more secure, higher-skill positions within AI-augmented industries.
- Inclusive economic policies that support workers during transitions are crucial in maintaining workforce stability. Governments can implement policies such as wage subsidies, unemployment benefits and job transition programs to provide financial security for workers displaced by automation. These safety nets reduce the economic burden on workers and allow them to seek new opportunities or retrain for high-demand roles. Furthermore, structured transition programs facilitate career changes by connecting displaced workers with relevant job openings and retraining resources, ultimately helping mitigate AI's impact on vulnerable segments of the labor market.
- Establishing AI governance frameworks that prioritize human control, transparency and fairness is fundamental to ensuring that AI adoption benefits society as a whole. Policies emphasizing ethical AI usage discourage excessive automation in sectors where human interaction is essential, thereby protecting jobs that leverage uniquely human capabilities. By mandating guidelines for responsible AI deployment, organizations and governments can ensure that AI technologies are implemented in ways that align with public welfare goals, minimizing the risk of workforce displacement in critical sectors like healthcare and education.
- Collaboration among educational institutions, government agencies and businesses can stimulate job creation in emerging industries while fostering innovation networks. Public-private partnerships (PPPs) facilitate access to funding and resources that support job creation in new fields, as well as in areas indirectly affected by AI. For example, government-backed programs supporting small businesses in adopting AI responsibly can lead to innovation while preserving employment levels. Such collaborations also create pathways for workers to acquire specialized skills needed in evolving industries, ultimately bolstering job security and economic resilience.
- Promoting social entrepreneurship that leverages AI for societal good can open up new job opportunities, particularly in underserved areas. Governments and organizations can focus on encouraging firms that use AI to address social challenges, such as healthcare access in underserved communities. This strategy not only enhances the social value of AI but also creates jobs in developing sectors that serve the public interest. By aligning AI innovations with social impact goals, these organizations can foster job growth in fields where AI applications benefit both economic and societal needs.

- Ethical AI frameworks and regulations are essential for ensuring that AI adoption aligns with societal values and prevents excessive automation in sectors where human roles are irreplaceable. Such frameworks promote fair use of AI technologies and emphasize the importance of transparency, accountability and data security. By setting ethical boundaries around AI use, these policies protect jobs in human-centric sectors and ensure that automation supplements rather than replaces workers in industries that rely on human interaction and judgment.
- Support for small and medium-sized enterprises (SMEs) is key to fostering a balanced AI adoption that promotes innovation without reducing employment. Public-private partnerships and government initiatives can support SMEs in adopting AI through training grants, tax incentives and access to AI technology. These measures enable SMEs to increase productivity and competitiveness while creating job opportunities in innovative sectors. By promoting innovation ecosystems through these partnerships, governments can stimulate job creation in fields like AI development, data management and robotics maintenance, helping to offset potential job losses due to automation.

By implementing these strategies, organizations and governments can manage AI's impact on labor markets, ensuring a future where both technological advancement and inclusive workforce development coexist harmoniously.

## Conclusion

"Technology is best when it brings people together", as Matt Mullenweg once said and this sentiment rings true for the transformative impact of Artificial Intelligence on labor markets in Pakistan and other developing countries. While AI promises unprecedented opportunities for productivity gains and new job creation in emerging fields, it also brings complex challenges, such as the risk of job displacement in traditional roles, skill mismatches and potential wage inequality. To navigate these shifts, inclusive policies are essential. By prioritizing upskilling, reskilling and ethical AI governance, organizations and governments can help workers adapt and thrive in an AI-augmented future. Supporting innovation and fostering strong public-private partnerships can lead to AI advancements that drive equitable economic growth, ensuring that technology remains a tool for collective progress. Ultimately, as societies adapt to AI, they should remember that progress should empower all, leaving no one behind.

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