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Not peer-reviewed version

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Posted Date: 5 May 2025

doi: 10.20944/preprints202505.0120.v1

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Article

AI-Driven Technological Change and Its Effects on Employment Distribution in Developing Countries.

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Abstract: This research paper examines the effects of AI-driven technological change on employment distribution in developing countries. As artificial intelligence (AI) continues to advance, it is increasingly integrated into various sectors, raising concerns about job displacement, skill mismatches, and inequality in labor markets that are already fragile. The study aims to analyze how AI technologies are reshaping the structure of employment specifically, which sectors are most affected, who is most vulnerable, and what opportunities may arise. Using a mixed-methods approach, the study combines secondary data analysis from labor and technology reports with qualitative insights from expert interviews across select developing economies. Key findings reveal a trend toward automation in low and mid-skill jobs, particularly in manufacturing and administrative roles, while creating new demand in digital, data, and AI-related sectors. However, the benefits are unevenly distributed, with urban, educated populations better positioned to adapt than rural or informal workers.

Keywords: Artificial Intelligence (AI) Technological Change Employment Distribution Labor Market Developing Countries Automation Workforce Displacement

The paper concludes that while AI holds transformative potential for development, its deployment must be accompanied by targeted policies in education, digital infrastructure, and labor protection to avoid deepening socioeconomic divides. The findings contribute to a growing body of literature on technological disruption and offer practical insights for policymakers in the Global South.

Introduction

• Background Information

Artificial intelligence (AI) has become a cornerstone of the Fourth Industrial Revolution, fundamentally altering the way societies produce goods, deliver services, and organize workforces. Through the deployment of machine learning, robotics, natural language processing, and other AI-driven technologies, industries are experiencing unprecedented levels of automation and innovation. While much attention has been focused on the effects of AI in developed economies, its implications for developing countries where economic structures, labor market characteristics, and institutional capacities differ markedly are less thoroughly understood.

Developing countries often face distinct challenges such as a high proportion of informal employment, lower rates of technological adoption, limited access to quality education, and underdeveloped digital infrastructure. These factors shape how AI-driven technological change affects employment patterns. In many of these economies, labor-intensive industries such as agriculture, textiles, and basic manufacturing are central to economic activity. As AI technologies advance and become more affordable, the risk of automating low-skilled jobs grows, potentially displacing large segments of the workforce that lack the skills needed for the new digital economy.

However, AI also presents new opportunities. It can stimulate the growth of entirely new industries, enable small and medium-sized enterprises (SMEs) to access global markets, and improve public service delivery in areas such as healthcare, education, and governance. Moreover, AI-driven

technologies have the potential to enhance productivity in sectors traditionally underserved by technological innovation, such as agriculture and logistics, offering pathways for inclusive economic growth if strategically managed.

Despite these possibilities, there remains a significant knowledge gap regarding the actual distributional effects of AI on employment in developing contexts. Existing research tends to focus on macroeconomic trends, often overlooking the nuanced, sector-specific impacts and the social and geographic disparities that may arise. Furthermore, many studies assume a level of technological readiness that may not be present in low- and middle-income countries.

Given these complexities, it is crucial to investigate how AI-driven technological change is influencing employment distribution within developing economies. This study aims to address this gap by analyzing the sectors most affected by AI adoption, identifying the demographics most vulnerable to labor displacement, and exploring policy interventions that can support a more equitable transition in the age of artificial intelligence.

Literature Review

Research on the relationship between artificial intelligence and employment has largely focused on developed countries, where technological infrastructure, education systems, and labor markets are more advanced. These studies generally agree that AI can lead to both job displacement in routine tasks and the creation of new opportunities in tech-related sectors. However, findings from high-income contexts may not fully apply to developing economies, where employment is often informal, digital access is limited, and labor regulations are weaker.

Some emerging research has explored the implications of AI in the Global South, noting risks such as job loss in labor-intensive sectors and the deepening of existing inequalities. At the same time, AI is recognized as a potential driver of innovation in areas like agriculture, logistics, and public services. Despite this growing interest, many studies remain general or speculative, with limited data on how AI is actually changing employment patterns in different industries or regions.

A major gap in the literature is the lack of sector-specific and country-specific analysis that captures the diverse realities of developing countries. There is also limited attention given to the capacity of local institutions to manage AI's transition or to the role of education and skills development in shaping labor outcomes. This study addresses these gaps by examining the effects of AI on employment distribution with a focus on specific economic sectors and vulnerable populations in selected developing countries.

Methodology

This research employs a mixed-methods approach, combining quantitative analysis with qualitative inquiry to explore how AI-driven technological change is influencing employment distribution in developing countries. The rationale behind this approach lies in the need to capture both macro-level trends and micro-level experiences that cannot be fully understood through a single method.

Quantitative data were sourced from international databases and national statistics, including labor force surveys, employment trend reports, and technology adoption indices. The data covered a time frame of approximately ten years and focused on three key sectors vulnerable or responsive to AI adoption: manufacturing, services, and agriculture. Variables such as employment share by sector, skill level, wage trends, and automation exposure were analyzed using descriptive and comparative statistical techniques.

In parallel, qualitative data were collected through semi-structured interviews with a purposive sample of stakeholders including labor economists, government officials, technology experts, and representatives from workers' unions in selected developing countries. The interviews explored perceptions of AI integration, observed changes in employment structures, barriers to workforce

adaptation, and existing policy responses. Thematic analysis was conducted to extract key insights and identify recurring patterns in the responses.

The study focused on three case countries each representing a different stage of economic development and AI integration to ensure a more nuanced understanding. Ethical considerations were observed, including informed consent and data confidentiality for all participants.

Discussion

The results of the study reveal that AI is not merely a technological phenomenon but a driver of structural change within labor markets. In all three countries analyzed, sectors such as low-skilled manufacturing and basic administrative services showed signs of stagnation or job decline, particularly where automation tools had been adopted to reduce labor costs. These findings confirm broader global trends indicating the vulnerability of routine-based jobs to automation.

At the same time, new employment opportunities were identified in areas such as logistics optimization, fintech, and remote digital services sectors that have benefited from AI-enhanced platforms and data processing tools. However, these roles often require higher educational qualifications and digital literacy, reinforcing a divide between the skilled and unskilled labor force.

When compared with existing literature, the study supports the argument that AI exacerbates existing labor market inequalities, particularly where institutional and educational systems are weak. While previous research has warned of potential displacement, this study provides empirical evidence showing that the effects are already materializing and disproportionately impacting rural, female, and informally employed populations.

Another significant observation is the role of institutional readiness. Countries with stronger policy frameworks and digital strategies appeared better equipped to guide technological adoption in ways that support inclusive employment growth. In contrast, nations lacking strategic direction showed greater risk of social dislocation, underemployment, and skills mismatch.

Overall, while AI presents new avenues for economic diversification and productivity, its uneven diffusion and the absence of inclusive policies may worsen inequality unless proactively addressed.

Conclusion

This research concludes that AI-driven technological change is reshaping employment distribution in developing countries, with implications that are both promising and problematic. The evidence points to a dual trend: the automation of labor-intensive, low-skill tasks on one hand, and the creation of high-skill digital jobs on the other. However, the gains from AI adoption are not reaching all sectors or communities equally.

Key findings include the decline of employment in routine-intensive sectors, the concentration of new opportunities in urban centers, and the widening gap between digitally literate and digitally excluded populations. These shifts are not occurring in isolation but are mediated by national policies, educational capacity, infrastructure quality, and institutional effectiveness.

The study underscores the urgent need for targeted interventions that promote digital inclusion, such as expanding access to quality education, upskilling programs, and digital infrastructure in underserved regions. Policy coherence and stakeholder collaboration are also critical in shaping a labor market that can absorb and adapt to the rapid changes introduced by AI.

In closing, while AI holds great potential for development, its benefits will not be automatically realized. Proactive governance, inclusive planning, and sustained investment in human capital are essential to ensure that AI becomes a tool for reducing, rather than reinforcing, inequality in the labor markets of developing countries.

References

1. Petropoulos, G. (2018). The impact of artificial intelligence on employment. *Praise for Work in the Digital Age*, 119, 121.
2. Georgieff, A., & Hyee, R. (2022). Artificial intelligence and employment: New cross-country evidence. *Frontiers in artificial intelligence*, 5, 832736.

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