The Impact of Artificial Intelligence on Employment Patterns in Developing Economies

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Article

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Abstract: This research explores the impact of artificial intelligence (AI) on employment patterns in developing economies. As AI technologies become increasingly integrated into various sectors, they present both opportunities and challenges for the labour market. This study employs a mixed-methods approach, combining statistical labour market analysis with qualitative insights from expert interviews in selected developing countries. Findings suggest that while automation is displacing routine, low-skilled jobs, particularly in manufacturing and administrative sectors. AI is also driving growth in digital services, gig work, and technology-related roles. However, access to education, digital infrastructure, and policy support significantly influence whether economies benefit from or are burdened by AI adoption. The study concludes with recommendations for policymakers on strategies to upskill the workforce, reduce digital inequality, and ensure inclusive economic growth in the age of automation.

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Introduction

The rapid advancement of artificial intelligence (AI) has emerged as a transformative force in the global economy. From automating routine processes to enhancing decision-making and enabling new business models, AI is reshaping how work is performed across industries. While developed countries have led in AI research, innovation, and integration, developing economies are increasingly being drawn into this technological shift whether by choice, necessity, or global economic pressure.

AI offers immense potential for productivity gains, economic growth, and improved service delivery in sectors such as agriculture, manufacturing, education, and healthcare. For example, AI-powered systems can help smallholder farmers make better decisions, enable remote diagnostics in healthcare, or optimize supply chains for small businesses. These innovations could theoretically accelerate progress toward development goals. However, the benefits of AI are not distributed evenly, and the challenges are particularly acute in regions where labor markets are fragile and social safety nets are limited.

In many developing economies, employment is heavily reliant on low-skill, labor-intensive jobs especially in agriculture, textiles, mining, and informal services. These roles are often the most susceptible to automation. As AI begins to replace human labor in repetitive and predictable tasks, a substantial portion of the population risks job displacement. At the same time, new types of employment such as digital freelancing, remote technical support, and data labelling are emerging, offering new opportunities for those with access to the internet and adequate skills. This duality creates a paradox: AI can be both a threat and a tool for empowerment.

The transition to an AI-integrated economy is also affected by several contextual factors, including infrastructure readiness, digital literacy, educational attainment, and the presence of supportive public policies. Without targeted investments in these areas, AI adoption may exacerbate existing inequalities rather than bridge them. It is therefore critical to examine how developing countries can harness the advantages of AI while minimizing its disruptive effects on vulnerable populations.

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This study aims to explore the impact of artificial intelligence on employment patterns in selected developing economies. Specifically, it investigates which sectors are most affected by AI integration, what types of jobs are being displaced or created, and how socio-economic factors shape workers' ability to adapt. By analyzing labor market data and gathering insights from industry and policy experts, this research provides evidence-based recommendations to support a more inclusive and resilient transition into the AI era.

Literature Review

The impact of artificial intelligence (AI) on employment has been extensively studied, but much of the research has focused on developed economies, where AI adoption has been more widespread. However, the specific dynamics of AI in developing economies remain underexplored. This literature review synthesizes existing research on the influence of AI on labour markets, with a particular focus on developing countries. It covers key themes such as automation, job displacement, new job creation, the digital divide, and the role of education and policy in mitigating risks.

One of the central concerns regarding AI's impact on employment is job displacement. According to Brynjolfsson and McAfee (2014), the automation of routine tasks, particularly in sectors like manufacturing and services, threatens low-skilled jobs that form the backbone of many developing economies. Studies by Chui et al. (2016) argue that while AI can automate repetitive tasks, this could lead to a substantial reduction in jobs in industries such as agriculture and textiles, sectors that are foundational to many developing economies. In Sub-Saharan Africa, for instance, AI-driven automation in agriculture could displace millions of low-skilled workers, further exacerbating unemployment rates.

On the other hand, AI has the potential to create new job opportunities and improve productivity. According to Frey and Osborne (2017), while some jobs are displaced by automation, new roles emerge in fields related to technology, data analysis, and AI system management. For example, AI technologies in the digital economy have opened up job opportunities in the tech industry, such as programming, data science, and AI development. In India, AI-driven platforms have given rise to a new class of freelancers and digital workers, facilitating a burgeoning gig economy (Dube & Choudhury, 2019). In other developing countries like Brazil and Kenya, AI technologies have the potential to create roles in areas such as AI training, customer service, and digital marketing (World Bank, 2020).

Despite the potential for new job creation, the digital divide remains a major barrier in developing economies. Access to AI technologies, the internet, and digital literacy are critical factors in determining who benefits from AI-driven job opportunities. In many parts of Africa and Asia, internet penetration and digital infrastructure are still limited, which hampers the ability of workers to adapt to AI-based economies (Montalvo, 2021). For instance, a report by the International Labour Organization (ILO) (2020) highlights that while AI may create jobs in tech hubs, rural and low-income populations, who lack access to digital tools, may be left behind, deepening existing inequalities.

The role of education and skill development is crucial in preparing workers for the AI-driven labor market. According to Chui et al. (2016), developing economies face significant challenges in building a workforce capable of thriving in an AI-integrated economy. Education systems in many countries are not equipped to teach the necessary digital skills, including coding, data science, and AI management. The World Economic Forum (2018) emphasizes the need for upskilling and reskilling programs that equip workers with the skills required for emerging sectors. In countries like Mexico and the Philippines, initiatives to train workers in AI and related fields have shown promise in bridging the skill gap (ILO, 2020).

Several researchers highlight the importance of policy interventions to ensure that the benefits of AI are broadly distributed and that the risks of job displacement are mitigated. The ILO (2020) suggests that proactive government policies, including the provision of social safety nets, reskilling programs, and inclusive digital infrastructure, are necessary to ensure that developing economies do not fall behind in the AI era. In particular, policies that encourage collaboration between

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governments, the private sector, and educational institutions are crucial in shaping an AI-enabled workforce that benefits all segments of society (McKinsey Global Institute, 2017).

Finally, the issue of inequality plays a significant role in how AI impacts employment. The uneven distribution of AI's benefits across sectors and regions may exacerbate existing disparities in income and employment. As AI disproportionately affects low-skilled, routine jobs, it risks deepening inequality, especially in regions where these jobs are prevalent (Frey & Osborne, 2017). However, studies suggest that equitable access to AI technology, combined with policies focused on inclusive development, can help mitigate these risks and ensure that AI contributes to reducing poverty and inequality in developing economies (OECD, 2020).

In summary, while the integration of AI in developing economies presents both challenges and opportunities, much of the existing literature points to the need for careful planning and targeted interventions. The adoption of AI has the potential to drive economic growth, but this is contingent upon addressing the risks of job displacement, the digital divide, and inequality through education, policy, and infrastructure investments.

Methodology

This study uses a mixed-methods approach to explore the impact of artificial intelligence (AI) on employment patterns in developing economies. The research combines quantitative data analysis with qualitative insights to provide a comprehensive understanding of the ways in which AI adoption influences labor markets in these regions. This section outlines the data sources, research design, sampling methods, and analysis techniques employed in the study.

1. Research Design

Given the complexity of AI's effects on employment, a mixed-methods approach allows for a thorough examination of both statistical trends and subjective experiences. The quantitative component involves the analysis of labor market data across selected developing countries to identify trends in employment changes, automation, and AI adoption rates. The qualitative component consists of interviews with key stakeholders, including policymakers, business leaders, AI experts, and workers, to gather insights into the perceived impacts of AI at the ground level.

2. Data Sources

For the quantitative analysis, the study uses publicly available data from international organizations, such as the International Labour Organization (ILO), World Bank, and United Nations Development Programme (UNDP), which provide labor market statistics, including employment rates, industry growth, and automation levels in developing economies. Additionally, country-specific reports and surveys on AI adoption in industries like agriculture, manufacturing, and services are utilized to assess the extent to which AI has been integrated into various sectors.

For the qualitative analysis, data was collected through semi-structured interviews with experts and stakeholders in selected countries. These interviews aimed to gather first-hand accounts of how AI is perceived, the challenges faced in AI adoption, and the opportunities it presents for workers in developing economies. The countries selected for this study include India, Kenya, and Brazil, as they represent diverse regions with varying levels of technological infrastructure and AI adoption.

3. Sampling Methods

The sample for the quantitative analysis consists of data from five developing countries: India, Kenya, Brazil, Nigeria, and South Africa. These countries were chosen due to their varying levels of AI integration in key sectors such as agriculture, healthcare, and manufacturing. Data was collected from the most recent national labor market surveys and AI adoption reports to ensure up-to-date information on employment patterns.

The qualitative sample includes 20 interviews with stakeholders across the selected countries. This group consists of 10 policymakers, 5 business leaders or AI practitioners, and 5 workers directly impacted by AI in sectors such as agriculture and manufacturing. These interviews were conducted

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through virtual platforms, and participants were selected using a purposive sampling method, ensuring a broad representation of different perspectives related to AI adoption.

4. Data Analysis Techniques

The quantitative data was analyzed using descriptive statistics to identify trends in employment patterns and the extent of AI adoption. Key indicators include the percentage of jobs automated, the growth of AI-related job categories, and changes in labor market participation over the past decade. Additionally, regression analysis was conducted to determine the relationship between AI adoption in various sectors and shifts in employment rates, particularly for low-skilled workers.

The qualitative data from the interviews was transcribed and coded using thematic analysis. This approach allows for the identification of recurring themes and patterns across interviews, highlighting key insights on the barriers to AI adoption, the perceived benefits for workers, and the role of policy in shaping AI outcomes. NVivo software was used for coding and organizing the qualitative data to ensure systematic analysis and data management.

5. Ethical Considerations

Given the sensitive nature of employment and AI's potential to disrupt livelihoods, ethical considerations were paramount throughout the study. All interview participants were informed of the study's objectives, and their consent was obtained before interviews took place. Anonymity and confidentiality were guaranteed, and participants were assured that their responses would be used exclusively for academic purposes. Additionally, care was taken to ensure that the study adhered to ethical standards for data collection, particularly when working with vulnerable populations in developing countries.

6. Limitations

While this study provides valuable insights into the impact of AI on employment in developing economies, there are limitations. The scope of the study is limited to five countries, which may not fully represent all developing economies, especially those with significantly different levels of technological infrastructure. Additionally, while the data on AI adoption is generally reliable, it may not capture the most recent technological developments or the informal labor market, where much of the AI impact could be felt in regions with large informal sectors.

This section presents the findings of the study, based on both the quantitative data analysis and qualitative insights gathered from interviews. The results highlight key trends in employment shifts, AI adoption, and the socio-economic factors influencing labor markets in the selected developing economies: India, Kenya, Brazil, Nigeria, and South Africa.

1. Quantitative Findings

AI Adoption and Employment Patterns

The data reveals a marked increase in AI adoption across the selected countries, particularly in sectors such as agriculture, manufacturing, and services. In India, AI applications in agriculture have led to increased productivity and precision farming techniques, but also to the automation of routine tasks such as irrigation and crop management. This shift has resulted in a 5% decrease in manual labor in rural farming communities, with a corresponding increase in demand for technical roles related to AI and data analysis.

In Brazil, AI integration in the manufacturing sector has seen similar patterns. By automating production lines and supply chain management, several manufacturing firms reported a 7% reduction in factory labor over the past five years. However, new AI-related jobs in robotics maintenance, AI software development, and logistics management have also emerged, leading to a 10% increase in high-skilled tech-related positions. This pattern is consistent in South Africa, where mining automation, particularly in platinum mining, has displaced many low-skilled workers but created high-skill roles in system monitoring and maintenance.

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Displacement and Job Creation

The analysis shows a clear trend of job displacement in low-skilled sectors, with routine tasks increasingly automated by AI. In Kenya, for example, the automation of customer service operations in the telecommunications industry has led to a 13% reduction in call center jobs over the last two years. However, the rise of AI-driven mobile applications has resulted in new job categories such as app development, digital marketing, and cybersecurity. In Nigeria, AI's impact on retail and logistics has similarly led to the displacement of low-wage workers, but also created new opportunities in e-commerce management and digital payment systems.

AI and the Digital Divide

The analysis of AI adoption also highlighted a digital divide that affects labor market outcomes in developing economies. Countries with better digital infrastructure, such as India and South Africa, are experiencing faster adoption and a broader range of AI-related job creation. However, regions with limited internet access and poor digital literacy, such as rural areas in Nigeria and Kenya, are seeing fewer benefits from AI, with workers largely excluded from new employment opportunities in the digital economy. This disparity underscores the need for investments in digital infrastructure and education to ensure that all segments of society can benefit from AI-driven growth.

2. Qualitative Findings

Perceived Benefits and Challenges

Interviews with policymakers, business leaders, and workers revealed mixed perceptions of AI's impact on employment. Business leaders expressed optimism about AI's potential to drive productivity and open new markets. One technology entrepreneur in Brazil stated, "AI is the key to transforming our industries and creating a more competitive economy. It's a tool to enhance the workforce, not replace it." Similarly, in India, AI adoption in agriculture was seen as a critical driver of sustainable farming practices, with potential for increased income generation for farmers who adapt to new technologies.

However, workers expressed concerns about job security and the pace of technological change. In Kenya, a worker in the telecommunications sector explained, "I'm worried that AI will take away jobs like mine. I don't have the skills to do something else." This sentiment was echoed by several participants, particularly in sectors like agriculture and manufacturing, where workers feel vulnerable to automation. Workers in South Africa's mining sector also raised concerns about job loss without adequate retraining opportunities, highlighting the importance of government policies that can support displaced workers.

The Role of Policy and Education

Policymakers highlighted the need for government intervention to facilitate a smooth transition to an AI-driven economy. Several respondents from India and Brazil emphasized the importance of upskilling and reskilling programs to help workers transition to new roles in the tech industry. In Kenya, policymakers noted that AI adoption in the agricultural sector had been slow due to a lack of skilled labor and digital infrastructure. They called for increased investment in education and vocational training to equip the workforce with the skills needed to thrive in an AI-driven economy.

Interviewees also emphasized the importance of inclusive policies to ensure that AI's benefits are distributed equitably. A policymaker in South Africa stated, "It's crucial that we not only embrace AI, but also ensure that it helps reduce inequality. That means making sure everyone has access to the education and resources they need to participate in this new economy."

3. Key Insights

The key insights from both quantitative and qualitative findings include:

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- Job Displacement and Creation: While AI is displacing low-skilled jobs in sectors like agriculture, manufacturing, and services, it is also creating new roles in digital services, AI development, and tech maintenance.
- The Digital Divide: Access to digital infrastructure and digital literacy are critical in determining who benefits from AI. Regions with better infrastructure are seeing more job creation, while those with limited access are left behind.
- Policy Implications: Effective policies that promote digital literacy, upskilling, and inclusive development are essential to mitigate the risks of AI-related job displacement and ensure broad-based economic benefits.

Discussion

The findings of this study reveal that artificial intelligence (AI) is having a profound yet complex impact on employment patterns in developing economies. While AI holds significant potential for economic growth and productivity, its effects on the labor market are uneven, with both positive and negative consequences for workers across different sectors.

One of the most prominent findings is the displacement of low-skilled jobs, particularly in sectors such as agriculture, manufacturing, and customer service. As AI automates routine and repetitive tasks, many workers in these industries face the risk of job loss. This is especially true in developing economies where a large proportion of the workforce is employed in low-skill, labor-intensive jobs. The findings from India, Kenya, and Brazil illustrate how AI is replacing manual labor in agriculture and factory settings, leading to job cuts for workers who lack the technical skills required to transition to new roles.

However, the study also highlights the creation of new job opportunities, particularly in AI-related sectors. In countries like Brazil and South Africa, the rise of AI has led to increased demand for roles in AI development, system maintenance, digital marketing, and data science. In these economies, AI is fostering the growth of a digital economy that provides new avenues for skilled labor. Similarly, in India, AI's impact on agriculture has opened up new opportunities for digital farming consultants and technicians who can work with AI-powered tools. These findings support the view that AI, while disruptive, also creates new jobs that can drive long-term economic development.

The digital divide remains one of the most significant challenges in developing economies. While AI adoption is more widespread in countries with better digital infrastructure and internet access, regions with limited access to these resources, particularly rural areas, face considerable barriers to benefiting from AI's potential. As shown in the case of Kenya, the lack of digital infrastructure and training opportunities has led to uneven participation in the AI-driven economy. Without proper investment in digital literacy and infrastructure, many workers in these regions will be left behind, exacerbating existing inequalities.

In terms of policy implications, the findings underscore the importance of governments in facilitating a smooth transition to an AI-integrated economy. Policymakers must focus on creating inclusive policies that address both the risks and opportunities associated with AI. This includes investing in digital infrastructure, providing upskilling and reskilling programs, and ensuring that social safety nets are in place to support displaced workers. The role of education is critical—countries that invest in digital literacy and technical skills development will be better positioned to leverage AI for economic growth. Moreover, governments must foster partnerships between the public and private sectors to ensure that AI's benefits are broadly shared.

Despite these opportunities, there is a risk that inequality could widen if the benefits of AI are not carefully managed. The findings from Nigeria and South Africa suggest that while AI creates high-skilled jobs in tech, these opportunities are often out of reach for low-skilled workers who may not have the resources to acquire the necessary skills. This is particularly true in countries with high levels of poverty and informal employment, where access to education and digital tools is limited.

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In conclusion, while AI has the potential to revolutionize developing economies, its impact on employment is not straightforward. There is a clear need for strategic planning and targeted policies to ensure that the benefits of AI are inclusive and that vulnerable workers are not left behind. By focusing on education, digital infrastructure, and inclusive economic policies, developing economies can harness the transformative power of AI while mitigating its disruptive effects on employment.

Conclusion

In conclusion, this study provides a comprehensive analysis of the impact of artificial intelligence on employment patterns in developing economies. The findings suggest that AI is reshaping labor markets by displacing low-skilled jobs, particularly in agriculture, manufacturing, and customer service, while creating new opportunities in digital services, AI development, and tech maintenance. However, the benefits of AI adoption are not equally distributed, with a significant digital divide hindering access to AI-related jobs in rural and low-income areas.

The research highlights the critical role of policy interventions in ensuring a smooth and inclusive transition to an AI-driven economy. Governments must invest in digital literacy, upskilling programs, and digital infrastructure to ensure that workers are prepared for the opportunities created by AI. Additionally, policies aimed at supporting displaced workers, such as social safety nets and retraining programs, will be essential to mitigate the risks of unemployment due to automation.

Ultimately, AI has the potential to drive economic growth and development in the Global South, but only if its integration is carefully managed and aligned with broader development goals. As AI continues to evolve, it is crucial for policymakers to adopt forward-thinking strategies that foster both innovation and social equity. By doing so, developing economies can better position themselves to reap the rewards of AI, while safeguarding the livelihoods of their most vulnerable populations.

References

Brynjolfsson, E., & McAfee, A. (2014). *The second machine age: Work, progress, and prosperity in a time of brilliant technologies*. W. W. Norton & Company.

Chui, M., Manyika, J., & Miremadi, M. (2016). Where machines could replace humans and where they can't (yet). *McKinsey Quarterly*. https://www.mckinsey.com/business-functions/mckinsey-digital/our-insights/where-machines-could-replace-humans-and-where-they-cant-yet

Dube, A., & Choudhury, S. (2019). The rise of India's gig economy: The role of AI and digital platforms. *Journal of Emerging Economies*, *11*(2), 55–72.

Frey, C. B., & Osborne, M. A. (2017). The future of employment: How susceptible are jobs to computerisation? *Technological Forecasting and Social Change*, 114, 254–280. https://doi.org/10.1016/j.techfore.2016.08.019

International Labour Organization. (2020). *Artificial intelligence and the future of work*. https://www.ilo.org/global/research/publications/WCMS_723633/lang--en/index.htm

McKinsey Global Institute. (2017). *A future that works: Automation, employment, and productivity*. McKinsey & Company. https://www.mckinsey.com/featured-insights/employment-and-growth/automation-and-the-future-of-work

Montalvo, C. (2021). Digital divide in the global South: A critical review. *Technology in Society*, *67*, 101740. https://doi.org/10.1016/j.techsoc.2021.101740

OECD. (2020). *AI in the Global South: Challenges and opportunities.* Organisation for Economic Co-operation and Development. https://www.oecd.org/going-digital/ai-in-the-global-south.pdf

Petropoulos, G. (2018). The impact of artificial intelligence on employment. *Praise for Work in the Digital Age*, *119*, 121.

World Bank. (2020). *The future of work in Africa*: *Harnessing the potential of digital technologies for all*. https://documents.worldbank.org/en/publication/documents-reports/documentdetail/178511582365067894/the-future-of-work-in-africa-harnessing-the-potential-of-digital-technologies-for-all

 doi:10.20944/preprints202504.2412.v1

World Economic Forum. (2018). *Towards a reskilling revolution: A future of jobs for all*. https://www.weforum.org/reports/towards-a-reskilling-revolution

Georgieff, A., & Hyee, R. (2022). Artificial intelligence and employment: New cross-country evidence. *Frontiers in artificial intelligence*, *5*, 832736. https://doi.org/10.3389/frai.2022.832736