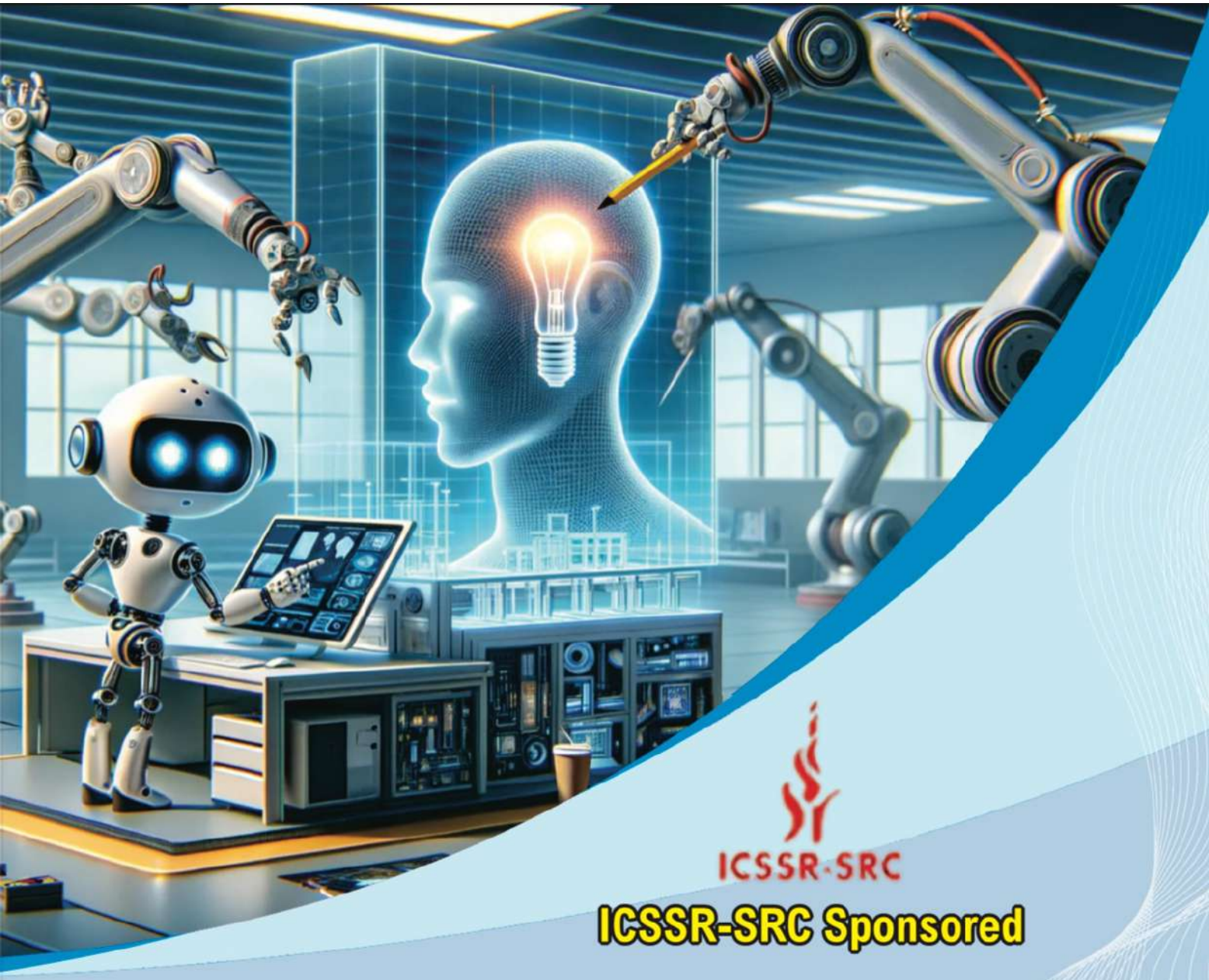

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HARNESSING ARTIFICIAL INTELLIGENCE, INNOVATION AND TECHNOLOGY: A PATHWAY TO ECONOMIC TRANSFORMATION AND SUSTAINABLE DEVELOPMENT IN INDIA

Chief Editor

Dr. R. Gayathri

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ARTIFICIAL INTELLIGENCE AND INFORMAL SECTOR RESILIENCE: A POST-PANDEMIC PERSPECTIVE

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Abstract

The informal sector, which employs nearly two billion workers worldwide, faced severe disruptions during the COVID-19 pandemic. With limited social protection and unstable incomes, informal workers were among the most vulnerable. This study explores the role of Artificial Intelligence (AI) in supporting the resilience of informal economies in the post-pandemic era. Drawing on bibliometric sources and global case studies, the paper reviews how AI technologies intersect with digital inclusion, financial empowerment, and adaptive social protection. The analysis highlights examples such as Ghana's digital literacy initiatives for older workers, Togo's AI-driven cash aid distribution, and financial inclusion programs supported by AI. Findings suggest that AI can improve resilience by offering visibility to informal workers, enabling financial access, predicting risks, and creating adaptive safety nets. However, barriers such as limited infrastructure, low digital literacy, and ethical challenges continue to slow progress. The paper argues for inclusive AI policies, capacity-building, and equitable governance to ensure that informal economies are not left behind in digital transformation.

Keywords: *Artificial Intelligence, Informal Sector, Post-Pandemic Resilience, Digital Inclusion, Social Protection, Financial Inclusion, Informal Economy, AI for Development*

Introduction

The informal sector plays a central role in global economic activity, especially in developing regions where formal employment opportunities remain limited. According to the International Labour Organization (ILO), about 61 percent of the world's employed population works in the informal sector, with higher proportions in Africa and South Asia (ILO, 2020). The COVID-19 pandemic severely disrupted this sector by cutting off daily earnings, shutting down small businesses, and leaving workers without access to social protection or healthcare (Chen, 2020). In this context, the concept of resilience—defined as the ability to adapt and recover from shocks—became central to discussions about the survival and sustainability of informal economies.

Artificial Intelligence (AI) is increasingly seen as a transformative tool that can assist in building this resilience. AI applications, including machine learning, natural language processing, and predictive analytics, are being used in diverse ways to address problems in economic inclusion, health, logistics, and social protection (Brynjolfsson & McAfee, 2017). However, their role in strengthening informal sector resilience remains underexplored.

This paper seeks to examine how AI can contribute to informal sector recovery and adaptation in the post-pandemic world. It reviews the existing literature on AI and informal economies, explores global case studies where AI was applied for digital inclusion and welfare distribution, and develops a conceptual framework linking AI adoption to informal sector resilience.

Literature Review

The intersection between AI and the informal sector is still emerging as a research field. Much of the existing literature focuses on digital inclusion, financial technology (FinTech), and the role of ICT in supporting vulnerable workers.

Scholars have pointed out that digital tools can bridge gaps in visibility for informal workers, allowing them to access markets, credit, and welfare benefits (Katz & Koutroumpis, 2013). During the pandemic, AI was particularly useful in identifying vulnerable populations and distributing aid more effectively. In Togo, for example, an AI-enabled platform called Novissi was used to identify low-income workers and deliver cash transfers (Aiken et al., 2022). Similarly, in India, mobile-based platforms supported by machine learning allowed street vendors to register for relief packages despite lacking formal identification documents (Gupta & Agarwal, 2021).

Another area of growing importance is AI in financial inclusion. Informal workers, who often lack credit histories, can benefit from AI-driven alternative credit scoring systems that use mobile phone usage, transaction histories, and social media behavior to assess creditworthiness (Fuster et al., 2019). This opens new possibilities for small entrepreneurs, women workers, and migrant laborers to access financial products.

AI also contributes to capacity-building and education. For example, Ghana launched digital literacy initiatives that used AI-enabled voice interfaces to support older workers with low literacy levels, enabling them to access information in their local languages (Boateng, 2021).

Despite these opportunities, barriers remain. Low levels of digital literacy, limited infrastructure, and ethical concerns such as algorithmic bias and privacy risks pose significant challenges (Crawford, 2021). Scholars warn that without inclusive policies, AI could further deepen inequalities by benefiting digitally connected workers while excluding those in remote or marginalized communities (Eubanks, 2018).

Methodology

Bibliometric analysis was used to identify academic works published in journals indexed in Scopus and Web of Science related to AI, informal economy, resilience, and digital inclusion between 2015 and 2023. Case studies from global experiences during and after COVID-19 were reviewed to illustrate practical applications of AI in supporting informal workers.

Results and Discussions

- ***AI for Financial Inclusion***

The results show that AI has significant potential to expand financial inclusion for informal workers. By analyzing alternative data sources, such as mobile transactions and airtime top-ups, AI-based credit scoring systems can assess creditworthiness where traditional methods fail (Fuster et al., 2019). For women entrepreneurs and migrant workers who often lack formal banking access, this innovation can unlock opportunities for microloans and business expansion.

For instance, AI-based platforms in Kenya's mobile money ecosystem (M-Pesa) allowed many informal traders to access credit facilities during the pandemic (Jack & Suri, 2016). These tools reduced dependency on informal lenders and helped businesses survive economic shocks. However, discussions highlight that financial literacy must accompany AI-driven tools to ensure workers use them effectively and avoid risks of over-indebtedness.

- ***AI in Adaptive Social Protection***

AI is also reshaping social protection systems. The Novissi program in Togo demonstrated how AI can help governments identify vulnerable populations and deliver aid quickly (Aiken et al., 2022). Instead of relying on outdated census data, the system used satellite imagery, mobile phone data, and AI algorithms to determine eligibility, ensuring faster and more accurate delivery.

This adaptive model shows that AI can strengthen resilience by making welfare systems more responsive to real-time needs. For informal workers, who are often excluded from traditional welfare programs, such innovations could be life-changing. However, discussions also point to risks, such as surveillance and exclusion errors, that may arise if algorithms are not transparent and accountable (Crawford, 2021).

- ***AI for Digital Literacy and Capacity-Building***

The Ghanaian initiative highlights how AI can be used for capacity-building among older informal workers (Boateng, 2021). By leveraging AI-enabled voice systems, illiterate workers could access information on markets, healthcare, and financial opportunities in their local languages. This breaks the barrier of literacy and demonstrates how AI can adapt to the cultural and social realities of informal economies.

The discussion here emphasizes that capacity-building must go hand in hand with technology adoption. Without digital skills and awareness, AI interventions risk reinforcing existing inequalities. Training, awareness campaigns, and community-based digital hubs can ensure that informal workers are active participants in AI-driven solutions.

- ***Ethical, Social, and Policy Considerations***

While AI presents immense opportunities, it also introduces new risks. Algorithmic bias can exclude certain groups, such as women or rural workers, if datasets are not representative (Eubanks, 2018). Privacy concerns are equally significant, especially as AI systems often rely on sensitive personal and financial data (Crawford, 2021). Policymakers must therefore create strong governance frameworks that ensure fairness, accountability, and transparency in AI applications.

In discussions, it becomes clear that AI should not be seen as a substitute for traditional welfare policies but as a complement. Investments in infrastructure, digital education, and inclusive governance are necessary to make AI truly beneficial for the informal sector. Otherwise, the digital divide may grow wider.

Conclusion

The research shows that AI can play a transformative role in strengthening informal sector resilience in the post-pandemic era. By enabling financial inclusion, adaptive social protection, and capacity-building, AI tools can empower informal workers to cope with shocks and uncertainties. The case studies from Togo, Ghana, and Kenya illustrate practical pathways for implementation. However, barriers such as digital illiteracy, limited infrastructure, and ethical concerns remain.

To ensure that the informal sector benefits equitably, policymakers must promote inclusive AI governance, invest in digital infrastructure, and develop community-based training programs. Without these safeguards, AI risks leaving behind the very workers who need

support the most. Thus, AI's promise for resilience must be balanced with inclusive and ethical practices to create sustainable pathways for informal economies in the post-pandemic world.

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