



TOWARDS SOCIAL TRANSFORMATION: A REVIEW OF THE ROLE OF ARTIFICIAL INTELLIGENCE

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ABSTRACT

Artificial Intelligence (AI) is changing all aspects of society, including decision-making, interactions, and procedures. AI, a subfield of computer science that makes it possible for machines to mimic human thought and learning, is now essential for promoting innovation and sustainable development. AI offers possibilities for societal change, especially in developing countries like Nigeria, from improving healthcare diagnostics and agricultural output to transforming education and government. The role of AI as a catalyst for social change is examined in this study, with a focus on its applications in important areas like education, healthcare, agriculture, governance, and economic inclusion. Additionally, it addresses the ethical ramifications of AI, including worker displacement, privacy, and bias, and suggests legislative steps for its responsible adoption. The report emphasizes how academic institutions and polytechnics can act as centers of innovation for AI-driven solutions that tackle societal issues. In order to promote equitable technology advancement and national growth, the paper's conclusion suggests more digital capacity building, ethical policy frameworks, and regional AI research projects.

Keywords: Artificial Intelligence, Social Transformation, Nigeria, Education, Innovation, Ethics

INTRODUCTION

Artificial Intelligence (AI) has become one of the most groundbreaking technologies of the 21st century. It includes systems and algorithms that can execute tasks that ordinarily necessitate human intelligence such as learning, reasoning, problem-solving, and making decisions (Russell & Norvig, 2021). Around the world, AI has transitioned from theoretical study to practical application, impacting industries, governance, and societal structures.

In the realm of social change, AI acts as a significant catalyst for innovation, inclusivity, and sustainable growth. It has transformed the ways individuals engage with information, access services, and take part in the digital economy. For developing countries such as Nigeria, AI presents an extraordinary chance to tackle ongoing issues in healthcare, education, agriculture, and governance (Adeleke & Olayemi, 2023). The capacity of AI systems to analyze extensive data and provide insights positions them as a key resource for improving efficiency, transparency, and fairness.

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This paper examines the ways in which Artificial Intelligence can be employed to facilitate social change in Nigeria and comparable developing environments. It also highlights the importance of educational institutions—particularly polytechnics—as hubs for AI skill development, innovation, and responsible implementation.

Literature Review

The idea of Artificial Intelligence originated in the 1950s, but its practical significance has increased due to advancements in data science, computational capabilities, and cloud technology (Goodfellow, Bengio, & Courville, 2016). AI technologies range from natural language understanding and image recognition to robotics and specialized systems. The World Economic Forum (2023) estimates that AI will add more than \$15 trillion to the global economy by 2030, reshaping various industries and job markets across the world.

In Africa, there is a growing focus on research and the implementation of AI, especially in sectors like agriculture, health, and education (UNESCO, 2022). Nonetheless, the continent encounters obstacles such as inadequate infrastructure, a lack of technical skills, and disparities in digital access. Researchers from Nigeria (Okoye & Eze, 2022) have pointed out that effective integration of AI depends on ensuring that technology aligns with the socio-economic requirements of local communities.

Recent studies highlight that the transformation driven by AI is not solely technological; it encompasses social and ethical dimensions as well. For example, Crawford (2021) contends that AI systems reflect societal values and have the potential to exacerbate inequalities if not appropriately regulated. Therefore, it is crucial for policymakers and educators to ensure that AI promotes human well-being instead of undermining it. The literature supports the notion that developing nations can bypass traditional stages of development by fostering localized AI ecosystems that encourage innovation, inclusivity, and accountability.

Artificial Intelligence for Social Transformation

AI in Education and Skill Development

Artificial intelligence has transformed the educational landscape by implementing personalized learning systems, automated assessment tools, and smart tutoring applications (Holmes et al., 2022). By facilitating individualized learning experiences, AI allows learners to advance according to their own speed while offering educators valuable data on each student's performance. In Nigeria, services such as uLesson and EduTech utilize AI technology to provide tailored, digital education to numerous students. Polytechnics can leverage AI by utilizing virtual labs, employing predictive analytics to improve student retention, and

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optimizing their curricula. AI-driven tools can also support instructors in evaluating student requirements, streamline administrative processes, and boost research efficiency.

AI in Healthcare and Public Health

The impact of AI on healthcare is significant, encompassing everything from early disease detection diagnostic tools to predictive models for managing epidemics (WHO, 2023). In the identification of tuberculosis and malaria, AI algorithms that have been trained on medical imaging and patient information have demonstrated high levels of accuracy (Saheed, 2024). AI-driven chatbots and mobile health platforms provide care in rural regions where medical professionals are limited. For instance, in Nigeria, initiatives like Ubenwa leverage AI to identify neonatal asphyxia through the analysis of infant cries, showcasing the potential for local innovation.

AI in Agriculture and Food Systems

Agriculture is a fundamental component of economies across Africa. Applications of AI such as precision farming, climate forecasting, and pest management enhance productivity and minimize waste (FAO, 2023). AI-powered drones and sensors enable farmers to optimize fertilizer application and identify crop stress at an early stage. In Nigeria, companies like Hello Tractor and Zenvus utilize AI and IoT technologies to support smallholder farmers through smart equipment monitoring and soil analysis. This empowers rural areas and strengthens food security.

AI in Governance and Public Service Delivery

Governments are progressively integrating AI into their operations for purposes such as decision-making, identifying fraud, and facilitating e-governance. By identifying irregularities in financial activities and streamlining public record processes, AI can boost transparency. In Nigeria, AI presents opportunities for combating corruption, refining tax systems, and strengthening national planning (NITDA, 2023). Automated service systems and chatbots also enhance citizen engagement, enabling government agencies to manage a high volume of public inquiries effectively.

AI in Economic Inclusion and Job Creation

AI promotes economic inclusion by facilitating digital entrepreneurship and innovative business models. Industries like fintech, logistics, and the creative sector are utilizing AI to widen their market reach. Although there are worries regarding job automation, new career opportunities in AI ethics, data annotation, and software development are on the rise (ILO, 2023). Investing in AI education and innovation centers in

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polytechnic institutions can prepare young people with valuable digital skills—turning unemployment issues into prospects for innovation.

Ethical Concerns and Policy Implications

Although AI offers various advantages, it also brings about significant ethical dilemmas. These dilemmas encompass issues such as violations of data privacy, bias in algorithms, and digital exclusion (Floridi et al., 2020). For instance, AI systems that learn from biased datasets can perpetuate stereotypes or unjustly discriminate against underrepresented communities. Hence, ethical governance frameworks are essential. The Nigerian Data Protection Act (2023) establishes a baseline, but there is a need for more tailored guidelines regarding the use of AI in specific sectors. Educational institutions, particularly polytechnics, should include AI ethics in their teaching and embed responsible AI design within their programs. Another major issue is the displacement of jobs within the workforce. The automation of tasks by AI could lead to the replacement of routine employment, highlighting the need for reskilling and ongoing education initiatives. Tackling these challenges calls for cooperation among government entities, academic institutions, and the private sector.

Policy Recommendations and Role of Polytechnics

The study recommended that the government should develop a comprehensive AI policy that prioritizes ethics, inclusivity, and innovation as a national strategy on artificial intelligence, AI. It was further recommended that Polytechnics and other technical and vocational institutions should incorporate AI and data science into their educational programs, emphasizing hands-on training with tools like Google Colab and Python, thereby treating it as a strategic skill development programme. Innovation and Research Centers are encouraged to also adopt and domesticate artificial intelligence. This can be done by creating artificial intelligence (AI) innovation hubs within polytechnics to facilitate local solutions to community challenges.

The study further recommended collaboration with industries. This involves partnering with businesses to establish internship programs, hackathons, and incubators for AI solutions. Institutions are required to provide access to technology by ensuring that digital infrastructure and internet connectivity extend to rural regions to prevent deepening existing inequalities. Lastly, it was recommended that effective ethical guidelines should be put in place to ensure compliance with standards. This can be done by implementing courses and other awareness programmes on AI ethics and encourage responsible data management among students and researchers. Through these approaches, polytechnics can serve as vital contributors to social change—linking technology with community development.

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In conclusion, artificial intelligence poses both challenges and opportunities for societal change. Its ability to analyze data, forecast results, and automate intricate tasks makes it a fundamental aspect of contemporary society. In Nigeria, AI has the potential to enhance education, healthcare, agriculture, and governance if ethical considerations and inclusive strategies guide its implementation. Polytechnics play a crucial role in this transformation by developing digital skills, promoting innovation, and incorporating AI research into practical education. To achieve fair and enduring advantages, the adoption of AI must be centered on human needs, transparent, and aligned with the nation's development objectives.

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