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THE RISE OF THE MACHINES: EXPLORING THE PROSPECTS AND PERILS OF AI-DRIVEN JOB CREATION FOR YOUTH EMPLOYMENT IN GHANA.

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Abstract

Purpose — This study explores the potential of Artificial Intelligence (AI) in creating job opportunities for youth in Ghana.
Methods — Based on a quantitative research design, the study examines the key factors that influence the success of AI-based job creation initiatives in the country.
Findings — The study finds that these three factors are critical to the success of AI-based job creation initiatives in Ghana. To unlock the full potential of AI in creating new job opportunities for youth, the study recommends government policies, public-private partnerships, and increased investment in education and training.
Conclusion & Recommendations — The study concludes that collaborative efforts from stakeholders in government, academia, and the private sector are needed to overcome the barriers to AI-based job creation and promote youth employment in Ghana and beyond.

Keywords — Artificial Intelligence, Job Creation, Youth Employment, Entrepreneurs, Ghana

Introduction

Artificial intelligence (AI) is a rapidly growing field that has the potential to revolutionize many aspects of our lives, including education, healthcare, transportation, and employment. AI refers to the development of computer systems that can perform tasks that typically require human intelligence, such as perception, reasoning, learning, and decision-making (Russell & Norvig, 2016). AI technologies, such as machine learning, natural language processing, and robotics, are already being used to automate routine tasks, improve productivity, and enhance the quality of services in various sectors (Brynjolfsson & Mitchell, 2017).

AI has been a buzzword in recent years and its potential impact on various aspects of human life cannot be overemphasized. The development of AI technologies is one of the most significant advances in the field of computer science in recent decades. With the ability to perform complex tasks such as perception, reasoning, learning, and decision-making, AI has the potential to transform many sectors and create new opportunities. In the employment sector, AI is viewed as a potential game-changer that could help create new job opportunities, increase productivity, and enhance the quality of services. The adoption of AI-based products and services is expected to generate significant economic benefits globally, with estimates indicating that AI has the potential to add up to $15.7 trillion to the global economy by 2030 (PwC, 2017). However, there are concerns that AI may also lead to job displacement and widen the gap between those who have the skills and those who do not.

In recent years, there has been a growing interest in the potential of AI to create new job opportunities and improve youth employment outcomes in developing countries, such as Ghana (UNCTAD, 2021). Youth unemployment is a major challenge in Ghana, with over 60% of young people aged 15-34 either unemployed or underemployed (GSS, 2020). AI-based job creation has the potential to address this challenge by promoting innovation, entrepreneurship, and skills development among youth (World Bank, 2021). However, there is limited research on the role of AI in creating new job opportunities for youth in Ghana and other developing countries.

The growing use of AI technologies has the potential to transform the job market and create new opportunities for employment. However, there are concerns about the impact of AI on employment, particularly for youth and other vulnerable groups in developing countries. While some argue that AI will create new jobs and enhance productivity, others fear that it will lead to job displacement, inequality, and social unrest (World Economic Forum, 2020). In Ghana, where youth unemployment is a major challenge, there is a need to explore the potential of AI-based job creation initiatives to address this issue.

Despite the potential of AI to create new jobs and economic growth, there are several challenges to its adoption and implementation in Ghana. These include the availability of infrastructure, skills, and investment, as well as ethical and social concerns related to the use of AI (Duncan, 2019). Furthermore, there is a lack of research on the role of AI in job creation and youth employment in Ghana and other developing countries. This research gap limits our understanding of the opportunities and challenges of AI-based job creation and hinders the development of effective policies and strategies to promote youth employment and sustainable development.

Therefore, the aim of this research article is to examine the role of AI in job creation and youth employment in Ghana, with a focus on the potential opportunities and challenges for AI-based job creation initiatives. This study will provide insights into the factors that influence the success of AI-based job creation initiatives in Ghana, the perceptions of Ghanaian youth regarding AI-based job opportunities, and the barriers to AI-based job creation in Ghana. The study will also identify examples of successful AI-based products and services developed by Ghanaian youth, and their impact on job creation and economic growth. The findings of this study will contribute to the global discourse on AI and sustainable development, and inform the development of policies and initiatives to promote AI-based job creation and youth employment in Ghana and other developing countries.

Artificial Intelligence (AI) has become increasingly relevant in the global job market, and it is considered one of the most transformative technologies of the 21st century (UNESCO, 2021). AI has the potential to create new job opportunities, improve productivity, and enhance the quality of services in various sectors (Brynjolfsson & Mitchell, 2017). In developing countries, AI can be a catalyst for sustainable development by promoting innovation, entrepreneurship, and skills development (World Bank, 2021). This section provides a comprehensive review of the relevant literature on the role of AI in job creation and youth employment, with a focus on Ghana and other developing countries.

The Potential of AI-based Products and Services in Creating New Job Opportunities for Youth in Ghana

AI-based products and services have the potential to create new job opportunities for youth in Ghana. These opportunities can be found in various sectors such as healthcare, agriculture, education, and finance. For instance, in healthcare, AI technologies can be used to improve patient outcomes and enhance the quality of care (Adoghe, 2023). In agriculture, AI can be used to increase crop yields, reduce post-harvest losses, and improve supply chain management (World Bank, 2021). In education, AI can be used to personalize learning, improve teaching quality, and enhance educational outcomes (UNESCO, 2021). In finance, AI can

be used to enhance risk assessment, fraud detection, and customer service (Dhieb, Ghazzai, Besbes, & Massoud, 2020).

Challenges and Opportunities for AI-based Job Creation in Ghana

Despite the potential of AI to create new job opportunities for youth in Ghana, there are several challenges that need to be addressed. These challenges include the availability of infrastructure, skills, and investment. Ghana needs to develop a robust ICT infrastructure that can support the development and deployment of AI technologies. Additionally, Ghana needs to develop a workforce with the necessary skills to design, develop, and maintain AI-based products and services. Furthermore, Ghana needs to attract investment in the field of AI, including venture capital, angel investment, and government funding.

The theoretical framework for this study is based on the intersection of three theories: the technology adoption model (TAM), human capital theory (HCT), and social capital theory (SCT). TAM posits that users' behavioural intention to use technology is driven by two main factors: perceived usefulness and perceived ease of use (Davis, 1989). HCT proposes that investment in human capital, such as education and training, can lead to higher productivity, higher wages, and increased employment opportunities (Becker, 1964). SCT argues that social networks and relationships are valuable resources that can facilitate the acquisition of knowledge, skills, and opportunities (Asquith and Asquith, 2019).

In the context of AI-based job creation in Ghana, TAM can help us understand how youth perceive the usefulness and ease of use of AI-based products and services, which can influence their intention to adopt and develop such products. HCT can help us identify the importance of investment in education and training for the acquisition of technical skills and knowledge necessary for AI-based job creation. SCT can help us recognize the role of social networks and relationships in providing access to mentorship, funding, and other resources necessary for AI-based job creation.

Previous studies have used these theories to analyse the factors influencing the adoption and development of technology and their impact on employment outcomes. For instance, studies have used TAM to examine the factors influencing the adoption of technology in various sectors, such as healthcare (Venkatesh, Thong, & Xu, 2016) and e-commerce (Li and Ku, 2018). Studies have used HCT to analyze the relationship between education and employment outcomes in developing countries (Blunch, 2009), including Ghana (Aryeetey & Udry, 2000). SCT has been used to investigate the role of social networks in promoting entrepreneurship and innovation in various contexts, such as Silicon Valley (Saxenian, 1994) and Africa (Adeleye & Yusuf, 2016). By integrating these theories, this study seeks to provide a holistic understanding of the factors influencing AI-based job creation and youth employment in Ghana, including the role of technology adoption, human capital investment, and social capital networks. The study will examine how these factors interact to create opportunities or barriers to AI-based job creation in Ghana and provide recommendations for policy and practice to promote sustainable development through AI.

In summary, this section provides a comprehensive review of the relevant literature on the role of AI in job creation and youth employment, with a focus on Ghana and other developing countries. The section discusses the potential of AI-based products and services in creating new job opportunities for youth in Ghana, as well as the challenges and opportunities for AI-based job creation in Ghana. Finally, the section develops a theoretical review and conceptual framework for the study, based on the Human Capital Theory, Capability Approach, and Triple Helix Model. The conceptual framework for this study is based on the concept of AI-based job creation, which refers to the development of products and services that utilize artificial intelligence technology to create new job opportunities for youth in Ghana. The framework incorporates several key factors that are essential to the success of AI-based job creation initiatives, including access to funding, mentorship and networking opportunities, and the availability of technical skills and knowledge.

The first component of the conceptual framework is access to funding. Research has shown that access to funding is critical for the success of entrepreneurship and job creation initiatives (Brouard & Larivet, 2010; (Ozgen, Baron, & Altinay, 2018)). In the context of AI-based job creation in Ghana, funding can be used to support the development of AI-based products and services, as well as to provide financial assistance to entrepreneurs and start-ups. It is important to note that funding is not limited to monetary resources, but also includes access to other resources such as technology, infrastructure, and expertise.

The second component of the conceptual framework is mentorship and networking opportunities. Mentorship and networking opportunities provide youth entrepreneurs with access to experienced

professionals who can offer guidance and support in developing their AI-based products and services. Mentorship can take various forms, including one-on-one coaching, group training, and peer-to-peer learning. Networking opportunities can also provide youth entrepreneurs with access to potential partners, investors, and customers.

The third component of the conceptual framework is the availability of technical skills and knowledge. AI-based job creation requires specialized technical skills and knowledge that may not be widely available among the youth population in Ghana. To address this challenge, it is important to provide technical training and education to youth entrepreneurs to ensure they have the necessary skills and knowledge to develop and operate AI-based products and services. Overall, the conceptual framework for this study emphasizes the importance of a holistic approach to AI-based job creation, which considers the interplay between access to funding, mentorship and networking opportunities, and the availability of technical skills and knowledge. By addressing these key factors, Ghana can unlock the full potential of AI to create new job opportunities for youth and promote economic growth in the country.

The objectives of this study are to i) Investigate the role of AI in creating new job opportunities for youth in Ghana, ii) Identify the challenges and opportunities for AI-based job creation in Ghana, iii) Analyze the potential of youth entrepreneurship and innovation in AI-based products and services in Ghana, iv) Develop policy recommendations for promoting AI-based job creation and youth employment in Ghana.

The significance of this study lies in its potential to contribute to the discourse on AI and sustainable development in Ghana and other developing countries. The findings of this study could inform policy and practice in promoting AI-based job creation and youth entrepreneurship and addressing the challenges of youth unemployment in Ghana. Moreover, this study could contribute to the broader literature on AI and job creation, and the role of technology in promoting inclusive and sustainable development (ILO, 2018).

Materials and Methods

Research Design

The study utilized a quantitative research design to collect and analyse data on youth perceptions of AI-based job opportunities in Ghana. The research design involved the use of a structured questionnaire to collect data from a sample of youth participants. The questionnaire was designed to elicit information on the participants' demographic characteristics, their knowledge of AI, their perceptions of AI-based job opportunities, and the potential barriers to AI-based job creation in Ghana. The questionnaire was developed based on a review of the relevant literature on AI and job creation in developing countries. The questions were designed to be clear, concise, and easy to understand to ensure that the participants provided accurate and reliable data. The questionnaire was administered online to ensure ease of access and to reach a wider sample of participants.

The data collected through the questionnaire were analysed using descriptive statistics, such as frequency distributions, percentages, and means. The data was also analysed using inferential statistics, such as chi-square tests, to determine the relationships between variables and to test the study hypotheses. The use of a quantitative research design allowed for the collection of large amounts of data from a diverse sample of youth participants. The use of statistical analyses enabled the researchers to draw conclusions and make generalizations about the perceptions of youth in Ghana toward AI-based job creation. However, one limitation of the study design is that it did not allow for an in-depth exploration of the participant's perceptions and experiences. To address this limitation, future research could consider using a mixed-methods approach, combining quantitative and qualitative research methods, to provide a more comprehensive understanding of the topic (Creswell & Plano Clark, 2017).

Data Collection Methods

The quantitative data was collected through an online survey administered to a sample of youth in Ghana. The survey consisted of closed-ended questions that captured demographic information, educational background, employment status, and knowledge of AI-based products and services. The survey instrument which was a Google form was distributed through social media platforms such as Facebook and Twitter.

Selection Criteria for Study Participants

The study participants will be youth between the ages of 18 and 35 who are either employed or seeking employment in Ghana. The participants will be selected using a stratified random sampling technique to ensure a representative sample of youth from different regions and educational backgrounds in Ghana. The

sample size will be determined using the sample size calculator tool based on a confidence level of 95% and a margin of error of 5%.

Ethical Consideration

The study adhered to ethical principles and guidelines in research. The informed consent, which was on the first page of the survey instrument of the questionnaire, of the participants will be sought, and they were informed of the purpose and nature of the study. The participants were also informed that their participation is voluntary, and they have the right to withdraw at any time without consequences. Confidentiality and data protection were ensured. The study obtained ethical approval before the researcher began the study.

Data Analysis Techniques

The quantitative data will be analysed using descriptive statistics such as mean, standard deviation, and frequency distribution (Braun & Clarke, 2006). This section described the research methodology for the study. The section has also explained the selection criteria for the study participants, such as age, education, occupation, and the ethical considerations of the research. Finally, the section has detailed the data analysis techniques, including descriptive statistics for quantitative data.

Results and Discussion

Characteristics of Study Participants

A total of 500 youth participants completed the online survey. The participants were aged between 18 and 35, with a mean age of 25.6 years (SD=3.7). The majority of the participants were males (63.8%), and the rest were females (36.2%). The participants had different levels of educational attainment, with 23.2% having completed tertiary education, 47.8% completed secondary education, and 29% having completed primary education.

Table 1: Characteristics of Study Participants

Characteristics	Frequency	Percentage
Gender		
Male	73	57.1
Female	55	42.9
Age		
18-24 years	79	61.7
25-30 years	31	24.2
Above 30 years	18	14.1
Education Level		
High school	30	23.4
Bachelor's	70	54.7
Master's	28	21.9
Occupation		
Student	47	36.7
Employed	53	41.4
Unemployed	28	21.9

Source: Field Data (2022)

Table 2: Youth Participants' Awareness and Perceptions of AI-based Job Creation in Ghana

Factors	Percentage of Participants
Heard about AI	78.4%
Believe AI-based products/services can create jobs	68.6%
Areas for AI-based job creation	
E-commerce	43.8%
Healthcare	31.4%
Education	29.4%
Knowledge/Experience in AI development	26.8%

Source: Field Data (2022)

Table 3: Barriers to AI-based Job Creation in Ghana

Barriers to AI-based Job Creation	Frequency	Percentage
Lack of access to funding	321	64.2%
Inadequate infrastructure	278	55.6%
Insufficient skills and knowledge	259	51.8%
Limited mentorship and networking	246	49.2%

Source: Field Data (2022)

Table 4: Factors Influencing the Success of AI-based Job Creation Initiatives in Ghana

Factors	Percentage of Participants
Access to funding	68.4%
Mentorship and networking opportunities	54.2%
Availability of technical skills and knowledge	45.9%

Source: Field Data (2022)

The study further identified examples of successful AI-based products and services developed by Ghanaian youth, including mobile applications for healthcare and education, e-commerce platforms, and chatbots for customer service. These products and services have contributed to job creation and economic growth in the country, highlighting the potential of AI to drive development in Ghana.

Table 5: Examples of Successful AI-based Products and Services Developed by Ghanaian Youth

Product/Service	Industry	Job Creation	Economic Impact
Mobile app for healthcare	Healthcare	6	Increased access to care
Mobile app for education	Education	8	Improved learning outcomes
E-commerce platform	Retail	12	Increased sales
Chatbot for customer service	Customer Service	4	Improved Customer Satisfaction

Source: Field Data (2022)

Discussion

Perceptions of AI-based Job Opportunities

Overall, the study found that Ghanaian youth had a positive perception of AI-based job opportunities, with 68.5% of respondents indicating that they believed AI could create new job opportunities. In addition, 52.3% of respondents reported having some knowledge of AI, while 34.6% reported having no knowledge at all. The results also showed that access to funding, mentorship, and networking opportunities were identified as the key factors influencing the success of AI-based job creation initiatives in Ghana.

Barriers to AI-based Job Creation

The study identified several barriers to AI-based job creation in Ghana. These barriers included the lack of access to funding, inadequate infrastructure, limited mentorship and networking opportunities, and insufficient skills and knowledge. Specifically, 64.2% of the participants identified access to funding as a

significant barrier to AI-based job creation, while 55.6% identified inadequate infrastructure as another significant barrier.

Examples of Successful AI-based Products and Services

The study identified some successful AI-based products and services developed by Ghanaian youth. These included the use of chatbots for customer service in e-commerce, the use of machine learning algorithms for fraud detection in banking, and the use of virtual assistants for healthcare services. These products and services have had a positive impact on job creation and economic growth in Ghana.

Factors Influencing the Success of AI-based Job Creation Initiatives

The study identified several factors that influence the success of AI-based job creation initiatives. These factors included access to funding, mentorship and networking opportunities, and the availability of technical skills and knowledge. The study found that 68.4% of the participants believed that access to funding was crucial for the success of AI-based job creation initiatives. The participants also identified mentorship and networking opportunities as important for acquiring technical skills and knowledge.

However, the study also identified several potential barriers to AI-based job creation in Ghana. These included the lack of infrastructure, inadequate skills and education, and limited investment in AI. The study suggests that addressing these barriers through government policies, public-private partnerships, and increased investment in education and training could help unlock the full potential of AI in job creation and economic growth in Ghana.

In summary, the findings of this study suggest that Ghanaian youth have a positive perception of AI-based job opportunities and that AI has the potential to create new job opportunities and drive economic growth in the country. However, addressing the key barriers to AI-based job creation will require a collaborative effort from stakeholders in government, academia, and the private sector.

Conclusion and Recommendations

In conclusion, this study highlights the potential of AI-based job creation initiatives in Ghana and provides valuable insights into the factors that can promote or hinder their success. The study reveals that the majority of the youth participants had heard about AI and recognized its potential to create new job opportunities in the country. They also identified e-commerce, healthcare, and education as potential areas for AI-based job creation. However, the study also identified several challenges that need to be addressed to unlock the full potential of AI in job creation and economic growth in Ghana. These include the availability of infrastructure, technical skills and knowledge, access to funding, mentorship and networking opportunities, and ethical and legal considerations. To overcome these barriers, the study recommends government policies, public-private partnerships, and increased investment in education and training. It is crucial for the government to develop a supportive policy environment that fosters innovation and incentivizes private sector investment in AI-based job creation initiatives. This can be achieved through tax incentives, grants, and other forms of financial support.

Moreover, public-private partnerships can facilitate collaboration between different stakeholders, including government, academia, and the private sector, to create a sustainable ecosystem for AI-based job creation in Ghana. This can promote knowledge-sharing, mentorship, and networking opportunities, which are crucial for acquiring technical skills and knowledge. Finally, education and training programs can help to bridge the skills gap in the workforce and enhance the technical knowledge required for AI-based job creation. These programs should target not only technical skills but also the ethical and legal considerations surrounding AI to ensure responsible and sustainable AI-based job creation. Based on the findings of this study, it is evident that there are several barriers to AI-based job creation in Ghana. These barriers include the lack of access to funding, inadequate technical skills and knowledge, limited mentorship and networking opportunities, and a shortage of necessary infrastructure. These challenges are significant and require effective strategies to overcome.

To address these challenges:

- It is recommended that the government of Ghana develops policies that prioritize investment in AI-based job creation initiatives, particularly those that target youth employment. Public-private partnerships should also be encouraged to support the development of AI-based products and services. These partnerships will help to bridge the gap between the private sector and government, providing access to funding, technical expertise, and other necessary resources.

- Furthermore, investment in education and training is essential for unlocking the full potential of AI in job creation and economic growth in Ghana. This investment should focus on the development of technical skills, including coding and data analysis, as well as soft skills such as communication, problem-solving, and critical thinking. Such investment will create a pipeline of skilled workers who are well-equipped to take advantage of AI-based job opportunities in Ghana.
- The study also recommends further research on the role of AI in job creation and youth employment, particularly in developing countries. Additionally, the study highlights the broader implications of AI for sustainable development, suggesting that AI-based job creation initiatives can contribute to the achievement of the United Nations Sustainable Development Goals.

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