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Investigating the Impact of AI Usage in Ghana. A Case Study of Ghanaian Banks

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Abstract

This study investigates the impact of Artificial Intelligence (AI) usage in the Ghanaian banking sector, driven by the need to understand how AI technologies are being adopted and what implications they hold for operational efficiency, customer service, and decision-making. The aim of this project is to investigate the impact of AI on the Ghanaian banking sector, focusing on its adoption, challenges, and potential to enhance operational efficiency, cybersecurity, and financial inclusion. The problem addressed is the limited information on the extent, impact, and challenges of AI usage in Ghanaian banks. A quantitative research approach was employed, using structured questionnaires distributed among employees of selected commercial banks. The methodology focused on collecting measurable data to analyze trends in AI adoption, perceptions of its effectiveness, and the challenges associated with implementation. Findings revealed that while many banks have integrated AI tools such as chatbots, fraud detection systems, and credit scoring algorithms, the frequency of interaction and level of staff training vary significantly. AI was reported to enhance operational processes and customer experiences, but concerns regarding job displacement, financial costs, and inadequate technical expertise were noted. The study concludes that AI presents transformative potential for the banking industry in Ghana if implemented with strategic planning and capacity building. Based on the results, it is recommended that banks invest in digital skills development, improve infrastructure, and establish clear policies to support sustainable AI adoption.

Keywords: Artificial Intelligent (AI), Ghanaian Banking Sector, Cybersecurity, Credit scoring Algorithm

1.1 Introduction

Artificial Intelligence (AI) is generally defined as the simulation of human intelligence in machines that are designed to think, learn, and problem-solve. It enables systems to analyze vast amounts of data, recognize patterns, and make informed decisions with minimal human intervention. AI technologies encompass machine learning, natural language processing, computer vision, and robotic process automation, among others. AI can be broadly categorized into three main types which are Narrow AI (Weak AI), designed for specific tasks such

as fraud detection, chatbots, and risk assessment. It operates within a limited scope and cannot perform beyond its programming, General AI (Strong AI) known as Hypothetical AI that possesses human-like cognitive abilities, allowing it to understand, learn, and apply knowledge across various domains. This form of AI is still under development, and Super AI which is a futuristic concept where AI surpasses human intelligence, capable of independent decision-making and innovation. This type does not currently exist in the banking sector, most AI applications fall under Narrow AI, assisting with automation, risk management, and customer service.

The banking sector in Ghana plays a crucial role in the country's economic development. It is regulated by the Bank of Ghana (BoG) and consists of commercial banks, rural banks, savings and loans companies, and microfinance institutions with major players like The Commercial Banks made up of Ecobank Ghana, Ghana Commercial Bank, Stanbic Bank, Absa Ghana, Standard Chartered Bank, Zenith Bank, and the Development and Rural banks like the Agricultural Development Bank (ADB), Fidelity Bank, and various rural banks providing financial inclusion services.

The banking industry has been undergoing digital transformation, adopting fintech solutions, mobile banking, and AI-driven automation to improve service delivery, customer engagement, and financial security and this is changing the way businesses are run across the globe, in effect it is reshaping the way that businesses make decisions and better customer interactions are performed. The banking industry has been undergoing change and transformation for many years as current technologies such as chatbots are being used by financial institutions to provide customer service, the use of fraud detection systems has been used to enhance customer security as well as the use of predictive analytics so that financial decision-making can be made more easily. These current technologies have the capability of improving the efficiency of performing routine financial tasks as well as giving customers a more personal and smooth experience when interacting with banking organizations.

In Ghana the banking industry is undergoing a significant transformation as part of increased digitization and regulations that are reforming. With this change there is a growing interest in AI which is the use of this technology. However, this interest is not yet being fully realized in the banks of Ghana as it is in some advanced economies which is a consequence of the slow capabilities of business contractors particularly in Ghana's banking sector.

While there is a growing interest in AI having adapted and pared its mining potential, one of the slowest limiting factors in toppling the current rate of AI in Ghana's business sector capability is the lack of adequate infrastructure to support the systems. It is also limited because of problems dealing with regulations that face providers with customers' information in addition to the inadequacy of the technical know-how which slows down the current rate of widespread implementation and adoption of AI systems.

However, a vast potential is there for AI to be able to address the industry inefficiencies being seen. AI enabled solutions could be used to streamline daily routine challenging tasks to be done in banking in an all-encompassing way, reduce operational costs as well perform fraud detection tests more quickly, use chatbots and virtual service assistants to make customer service a lot more personal as well as improving the efficiency of the chatbots and virtual service assistants. The industry is also bound to have an increased potential in financial inclusion as customers from the underserved population will also have the opportunity to experience banking functionality just as much as customers from other demographic groups.

1.2 Problem Statement

Despite the promise of AI, Ghanaian banks face hurdles such as:

- Limited digital literacy among older customers.
- Infrastructure gaps and cybersecurity concerns.
- Resistance to change within traditional banking culture.

1.3 Aim and Objective

1.3.1 Aim

This study aims to investigate how Ghanaian banks are currently using AI and what impact AI usage is having on banking industry, whereby to investigate the impact of AI usage on Ghanaian banks, examining how AI is currently being utilized and what future opportunities exist for further adoption.

1.3.2 Objectives

The main objectives are to:

- assess the extent to which AI technologies are currently being used in Ghanaian banks.
- evaluate the impact of AI usage in banks
- identify the key benefits and challenges of adopting AI in the banking sector.
- recommend strategies for enhancing the adoption and effectiveness of AI in Ghana's banking industry

1.4 Research Questions

This study seeks to answer the following research questions:

- What AI technologies are currently employed in the Ghanaian banking sector?
- What is the impact of AI in banks of Ghana?
- What are the primary benefits and challenges associated with AI adoption in these banks?
- What strategies can enhance AI adoption and its effectiveness in Ghana's banking sector?

1.5 Significance of Research

This study is very significant because it will provide valuable insights into the adoption and impact of Artificial Intelligence (AI) in the Ghanaian banking sector. The findings will be beneficial to banks, policymakers, and other stakeholders in the financial industry. Overall, this project will serve as a valuable resource for Ghanaian banks seeking to leverage AI for digital transformation, efficiency, and competitiveness in the evolving financial landscape.

1.6 Scope of Research

This study focuses on the current state and future potential of AI adoption in the Ghanaian banking sector which touches on current AI applications by examining existing AI technologies used in Ghanaian banks, impact assessment for evaluating how AI influences banking operations, service delivery, and financial inclusion, opportunities and challenges when identifying the benefits and limitations associated with AI adoption in Ghana's banking industry, and future trends which explores potential advancements in AI and their implications for the banking sector.

2. Literature Review

2.1 Introduction

Artificial Intelligence (AI) has emerged as a transformative force in global banking, enhancing operational efficiency, customer experience, and decision-making. In Ghana, commercial banks are increasingly adopting AI-driven technologies such as chatbots, predictive analytics, and self-service platforms to remain competitive and meet evolving customer expectations.

2.1.1 AI-Driven Self-Service Technologies (SSTs)

Aboagyewaa and Antwi (2023) explored how AI-powered SSTs influence customer experience across generational cohorts (Gen X, Y, Z) in Ghanaian banks. Their study found that:

- SSTs improve convenience and speed of service delivery.
- Customers still value human interaction, especially for complex queries.
- Hybrid models combining AI and human support foster trust and satisfaction.

2.1.2 Chatbots and Customer Engagement

Mensah et al. (2023) examined chatbot deployment in Ghanaian banks, revealing:

- Chatbots are integrated into platforms like WhatsApp for customer service.
- Banks lack standardized metrics to evaluate chatbot effectiveness.
- Customers are indifferent to chatbot performance, suggesting a need for better personalization and usability.

2.1.3 Technology Integration and Bank Performance

A study from KNUST highlighted broader technology integration in Ghanaian banks, noting:

- AI and digital platforms enhance service delivery and operational efficiency.
- Challenges include high implementation costs and limited infrastructure.
- Internet banking and mobile apps have reshaped customer expectations and behavior.

2.2 Theoretical review

This section explores key theories that underpin AI adoption and its implications in banking, especially within the Ghanaian context.

2.2.1 Technology Acceptance Model (TAM)

Developed by Davis (1989), TAM is one of the most widely used frameworks for understanding technology adoption.

- **Core Constructs:**
 - *Perceived Usefulness (PU)*: The degree to which a user believes AI will enhance banking performance.
 - *Perceived Ease of Use (PEOU)*: How effortless users find AI tools to operate.
- **Application in Ghanaian Banks:**
 - Helps explain customer and employee willingness to engage with AI-powered services like chatbots and predictive analytics.
 - Useful for assessing digital literacy and trust in AI systems.

2.2.2 Unified Theory of Acceptance and Use of Technology (UTAUT)

Proposed by Venkatesh et al. (2003), UTAUT expands TAM by incorporating social and organizational factors.

- **Key Constructs:**
 - *Performance Expectancy*
 - *Effort Expectancy*
 - *Social Influence*
 - *Facilitating Conditions*
- **Relevance to Ghana:**
 - Captures cultural and infrastructural influences on AI adoption.
 - Useful for analyzing generational differences in tech acceptance among banking customers.

2.2.3 Diffusion of Innovation Theory (DOI)

Developed by Everett Rogers (1962), DOI explains how innovations spread through societies.

- **Stages:**
 - *Knowledge → Persuasion → Decision → Implementation → Confirmation*

- **Banking Context:**

- Highlights how early adopters (e.g., tech-savvy customers) influence broader AI uptake.
- Useful for understanding how AI innovations like biometric verification or robo-advisors gain traction in Ghana.

2.2.4 Resource-Based View (RBV)

This strategic management theory posits that competitive advantage stems from unique resources and capabilities.

- **AI as a Strategic Asset:**

- Banks that effectively deploy AI gain operational efficiency, customer insight, and fraud detection capabilities.
- RBV helps assess how AI contributes to long-term sustainability in Ghana's banking sector.

2.2.5 Institutional Theory

This theory explores how organizational behavior is shaped by external pressures—normative, coercive, and mimetic.

- **Implications for Ghanaian Banks:**

- Regulatory frameworks and global banking standards push institutions toward AI adoption.
- Peer influence and competitive pressure also drive innovation.

2.3 Theoretical Frameworks

Several studies recommend using models like **Unified Theory of Acceptance and Use of Technology (UTAUT)** to assess adoption drivers, and **Technology Acceptance Model (TAM)** to evaluate user perceptions and behavioral intentions.

2.4 Future Research Directions

- Comparative studies across different banks and regions.
- Longitudinal analysis of AI's impact on financial inclusion.
- Evaluation of AI ethics and data privacy in Ghana's banking sector.

3. Methodology

3.1 Research Design

This study employed a descriptive survey design to investigate the use and impact of Artificial Intelligence in Ghanaian banks. A descriptive design is appropriate for gathering quantifiable data that reflects current practices, patterns, and perceptions without manipulating variables [2]. It allows for objective observation of

how AI technologies are adopted and their effects on operational efficiency, customer satisfaction, and decision-making. Using standardized questionnaires, data were collected from a diverse group of respondents across multiple banks, ensuring broad representation and enhancing the generalizability of findings. The cross-sectional nature of the design enabled the collection of data at a single point in time, offering a snapshot of the current state of AI integration.

This approach was selected due to its cost-effectiveness, time efficiency, and suitability for statistical analysis. Overall, the descriptive survey design provided a structured yet flexible framework for drawing meaningful, data-driven conclusions about AI adoption in Ghana's banking sector.

3.2 Research Approach

A quantitative research approach was adopted to objectively examine the relationship between AI implementation and key banking performance indicators, including customer service, operational efficiency, and strategic decision-making. This deductive method enabled the formulation and statistical testing of hypotheses, allowing for the generalization of results across the selected banks.

Quantitative research is particularly suitable for studies that involve hypothesis testing and the identification of patterns and correlations among variables, especially within organizational and technological contexts [5].

3.3 Population of the Study

The target population comprised employees of selected commercial banks in Ghana, particularly those in departments such as information technology (IT), operations, customer service, and management. These individuals were selected based on their likelihood of having direct experience or knowledge of AI tools and systems being used within their institutions.

3.4 Sampling Technique and Sample Size

A stratified random sampling technique was employed to ensure that various departments within the selected banks were adequately represented. Stratification was based on the functional roles of employees, ensuring a balanced inclusion of technical, managerial, and frontline staff.

Five major banks operating in Ghana were purposively selected based on their level of digital transformation and known engagement with AI-based services. From each bank, between 5 and 10 employees were randomly sampled, resulting in a total sample size of 50 respondents. This sampling technique helped enhance the representativeness and reliability of the study outcomes.

3.5 Data Collection Methods

Primary data for this study were collected using a structured, self-administered questionnaire. This method was chosen because it is cost-effective, ensures consistency in the responses, and is suitable for reaching a larger number of respondents within a short period [1]. Additionally, questionnaires allow respondents to provide honest and unbiased responses, particularly on sensitive topics like organizational technology use, without pressure or external influence.

The questionnaire consisted of seven sections, covering:

- Demographics and department
- Awareness and usage of AI
- Types of AI technologies used

Impact of AI on operations and customer service

- i. Negative effects and challenges
- ii. Perceptions about AI in banking
- iii. General views on AI adoption

The questionnaires were distributed in both physical and electronic formats (via email), depending on the availability and preference of respondents. The structure of the questionnaire was influenced by similar studies on AI adoption in banking sectors across developing economies.

3.6 Data Analysis Techniques

The collected data were coded and analyzed using Statistical Package for the Social Sciences (SPSS Version 25). Descriptive statistics such as frequencies, means, and percentages were used to summarize responses. To explore relationships between variables, inferential statistical methods such as correlation and regression analysis were applied.

This combination of descriptive and inferential analysis was essential for identifying trends and testing hypotheses related to the effect of AI on various performance indicators in the banking sector.

3.7 Ethical Considerations

The study adhered strictly to established ethical research standards. Key ethical procedures included:

- i. Obtaining informed consent from all participants prior to data collection
- ii. Ensuring anonymity and confidentiality of respondents throughout the research process
- iii. Using the data strictly for academic purposes
- iv. Acquiring ethical clearance from the university's research ethics committee before fieldwork commenced

All participants were assured that their participation was voluntary and that they could withdraw at any time without consequences.

4. Results and findings

4.1 Demographic Information of Respondents

To gain insight into the diversity of perspectives within the banking sector, respondents were asked to indicate the departments they belonged to. The purpose of this was to ensure representation across various functional

areas where AI tools may have different levels of implementation or impact.

Figure 4.1 below shows the distribution of respondents across departments:

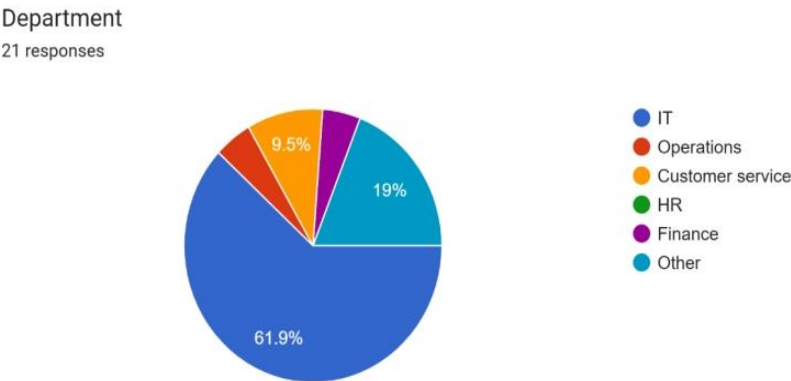


Figure 4.1: Departmental Distribution of Respondents

This distribution indicates that the largest group of respondents were from the Operations and Customer Service departments, which are typically the frontline beneficiaries of AI implementations such as automation and chatbots. The inclusion of IT and Finance personnel further enriches the dataset with perspectives from technical and analytical domains. Overall, the demographic spread provides a balanced foundation for analyzing the awareness, usage, and perceived impact of AI across various functional areas of banking operations.

4.2 Analysis

This section presents respondents' levels of awareness of AI use in their banks, the types of AI applications they identify, and how frequently they interact with these tools.

4.2.1 Awareness of AI in the Bank

Respondents were asked whether they were aware of any AI applications in their institution. Out of the 22 participants:

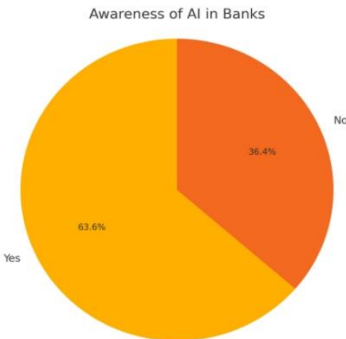


Figure 4.2 Awareness of AI in the Bank

4.2.1.1 Types of AI Applications in Use

Respondents identified several types of AI applications currently being employed within their banks. Among the most commonly used were:

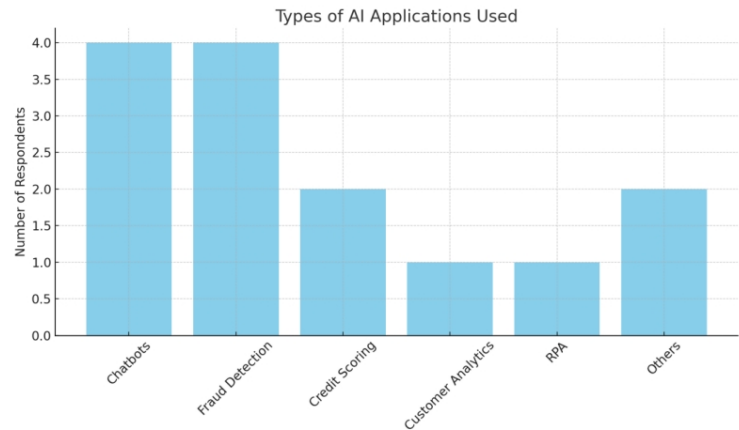


Figure 4.3 Types of AI Applications in Use

These results indicate a relatively modest level of AI integration, with a focus on customer engagement and security-related tools. The low usage numbers across the board may reflect either the early stages of implementation or limited access to these tools among employees.

4.2.1.2 Interaction with AI Tools

Out of the respondents, 10 indicated that they interact directly with AI tools in their line of duty, representing 71.4% of those who answered this question. Four respondents (28.6%) reported no direct interaction. This suggests that while AI tools are present, they may only be accessible or relevant to certain job functions.

Table 4.1 Interaction with AI Tools

Response	Frequency	Percentage (%)
Yes	10	45.5%
No	12	54.5%
Total	22	100%

4.2.1.3 Frequency of AI Tool Interaction

Table 4.2 Frequency of AI Tool Interaction

Frequency	Frequency Count	Percentage (%)
Daily	9	40.9%
Weekly	2	9.1%
Occasionally	3	13.6%

Never	0	0.0%
Total	14 (who said Yes)	100%

When asked about how often they engage with AI tools, the majority (n=9) stated they interact with these tools daily, followed by occasionally (n=3), and weekly (n=2). No respondent selected “never,” indicating that all who reported using AI tools do so with at least some frequency. This demonstrates a promising trend in active AI usage where implemented.

4.2.2 Impact of Artificial Intelligence on Bank Operations

This section presents an analysis of respondents' perceptions of how Artificial Intelligence (AI) has affected operational efficiency, customer service delivery, fraud reduction, employee roles, and productivity within Ghanaian banks. The responses provide insight into the practical outcomes of AI integration in daily banking functions.

4.2.2.1 Efficiency of Banking Operations

From the data, 54.5% of respondents (12 out of 22) either agreed or strongly agreed that AI has significantly improved operational efficiency in their banks. These respondents cited that automation had simplified tasks such as transaction processing and record keeping. This reflects the positive role AI is playing in reducing manual workload and speeding up core processes.

4.2.2.2 Enhancement of Customer Service Delivery

A strong 63.6% (14 out of 22) of respondents indicated that AI had enhanced customer service delivery. Respondents noted faster query resolution and improved client satisfaction, particularly through chatbots and AI-enabled customer interfaces. This illustrates how AI is being used to complement human service efforts, especially in high-volume environments.

4.2.2.3 Reduction of Fraud and Improvement in Security

Approximately 54.5% of respondents agreed that AI tools, especially fraud detection systems, have contributed to enhancing security and minimizing fraudulent activity. While 5 respondents were neutral, only a few strongly agreed, indicating that while AI's presence in fraud detection is growing, some staff may not be fully aware of or directly involved with its outcomes.

4.2.2.4 Influence on Employee Roles and Responsibilities

When asked whether AI had impacted their roles, 41% of respondents (9 out of 22) either agreed or strongly agreed. However, 5 respondents remained neutral, suggesting mixed opinions. Some respondents recognized that AI had changed their workflows positively, while others expressed concern about job displacement.

4.2.2.5 Productivity and Ease of Work

Respondents generally saw AI as a productivity enhancer, with **63.6% (14 respondents)** reporting that AI tools have made their work easier. Tools like data extraction, automated report generation, and CRM suggestions were seen as valuable. This supports the view that AI serves as a supportive tool that boosts

individual efficiency.

4.2.2.6 Training and Preparedness

Only 8 out of 22 respondents (36.4%) felt adequately trained to use AI tools, while the remaining either disagreed or were neutral. This highlights a significant training gap, with respondents calling for more structured support to fully adapt to the technological shift. This sentiment indicates a critical need for banks to invest in continuous digital literacy and skill-building programs to accompany AI deployment.

4.2.2.7 Potential Negative Impacts of Artificial Intelligence

While AI offers numerous benefits to banking operations, it is also accompanied by potential drawbacks that can affect employees, financial planning, and organizational preparedness. This section highlights respondents' perspectives on the negative implications of AI implementation in their respective banks.

4.2.2.8 Job Displacement and Insecurity

When asked if AI had reduced job opportunities or created job insecurity, 6 out of 22 respondents (27.3%) agreed, while 2 (9.1%) strongly agreed. A smaller group, 2 respondents (9.1%), disagreed, and only 1 respondent (4.5%) strongly disagreed. The remaining 3 respondents (13.6%) chose a neutral stance.

Table 4.3 Job Displacement and Insecurity

Response	Frequency	Percentage (%)
Strongly Agree	2	9.1%
Agree	6	27.3%
Neutral	3	13.6%
Disagree	2	9.1%
Strongly Disagree	1	4.5%

These figures indicate a moderate but notable level of concern among staff regarding the long-term implications of AI on employment. This indicates that although banks are adopting automation, there appears to be insufficient communication and assurance regarding the future of staff roles, which may be contributing to employee uncertainty and concern.

4.3.2.9 Financial Challenges

Respondents were also asked about the financial burden of implementing AI. 8 out of 22 (36.4%) described the process as "somewhat challenging," while 2 (9.1%) considered it "very challenging." An equal number of respondents (2 each) found it either "not challenging" or were "not sure."

Table 4.4 Financial Challenges

Response	Frequency	Percentage (%)
Somewhat Challenging	8	36.4%
Very Challenging	2	9.1%
Not Challenging	2	9.1%
Not Sure	2	9.1%

The spread of responses implies that while AI is perceived as valuable, its cost of adoption remains a barrier, especially for banks still developing their digital infrastructure. This underscores the need for careful budgeting and phased investment strategies when implementing AI technologies.

4.3.2.10 Availability of Skilled Personnel

When evaluating the availability of in-house expertise to manage AI systems, 5 respondents (22.7%) said yes, 7 (31.8%) answered maybe, and 2 (9.1%) said no.

These responses reveal a lack of confidence in internal technical capacity, which could hinder banks from maximizing the value of AI tools.

Table 4.5 Availability of Skilled Personnel

Response	Frequency	Percentage (%)
Yes	5	22.7%
Maybe	7	31.8%
No	2	9.1%

This points to a critical need for banks to invest in upskilling their staff and developing in-house expertise to manage and maintain AI systems effectively.

4.3.2.11 Perception and Challenges of Using Artificial Intelligence

This section presents an overview of respondents' general attitudes toward AI in the banking sector and the key challenges they associate with its adoption. Understanding these perceptions is vital for shaping future AI strategies in Ghanaian banks.

4.3.3 Major Challenges in AI Adoption

Respondents were asked to identify the key challenges they associated with AI adoption in their banks. The results were as follows:

Table 4.6 Major Challenges in AI Adoption

Challenge	Frequency	Percentage (%)
High Cost of Implementation	7	31.8%
Lack of Technical Expertise	4	18.2%
Cybersecurity and Privacy Concerns	3	13.6%

These concerns suggest that beyond acquiring AI, banks face challenges in sustaining and scaling their usage due to cost, expertise gaps, and potential risks associated with data privacy.

4.3.4 Views on AI Replacing Human Jobs

When asked whether AI is likely to replace human jobs in the near future, responses were fairly evenly distributed:

Table 4.7 Views on AI Replacing Human Jobs

Response	Frequency	Percentage (%)
Yes	5	22.7%
Maybe	4	18.2%
No	4	18.2%

This diversity of opinion highlights the need for open communication and proactive workforce planning as banks deepen their AI integration.

4.3.5 Overall Perception of AI in Banking

Despite the concerns mentioned, the overall sentiment toward AI was largely optimistic:

Table 4.8 Overall Perception of AI in Banking

Perception	Frequency	Percentage (%)
Positive	9	40.9%
Very Positive	2	9.1%
Neutral	3	13.6%

This indicates that while challenges persist, the majority of staff view AI as a valuable innovation that can drive long-term improvement in banking operations.

4.4 Summary of Findings

This chapter presented a detailed analysis of the data collected from 22 respondents across selected Ghanaian banks, focusing on the awareness, usage, and impact of Artificial Intelligence (AI) in banking operations. The findings highlight both the growing integration of AI technologies and the challenges faced in their adoption.

The findings are that a majority of respondents were aware of AI usage in their banks, with tools such as chatbots, fraud detection systems, and credit scoring algorithms being the most commonly cited applications.

However, actual interaction with these tools varied, with only a portion of staff using them regularly in their roles.

Most respondents agreed that AI has positively impacted operational efficiency, customer service delivery, and fraud prevention. AI tools were also viewed as enablers of productivity, although some employees expressed a lack of sufficient training.

Concerns were raised about potential job losses and financial challenges associated with AI implementation. While AI enhances certain functions, it also poses threats to traditional roles and requires significant investment and technical capacity.

High costs, limited technical expertise, and cybersecurity concerns were the main barriers to adoption. Despite these challenges, the overall perception of AI in the banking sector remains positive, with many respondents recognizing its long-term potential.

These findings offer valuable insights into how AI is currently transforming the Ghanaian banking system. It also emphasizes on the importance of balancing technological advancement with human resource development and strategic planning to ensure sustainable adoption.

5 Conclusion and Recommendations

5.1 Conclusion

This study set out to investigate the impact of Artificial Intelligence (AI) usage in Ghanaian banks, with the aim of assessing current adoption levels, operational outcomes, and associated challenges. Based on the research findings, the aim of the study was clearly achieved. Through data collected from 22 respondents across multiple banks, the study successfully identified the types of AI technologies in use, such as chatbots, fraud detection systems, and credit scoring tools, and evaluated their perceived benefits and limitations.

The data showed that 63.6% of respondents were aware of AI usage in their banks, with fraud detection systems, chatbots, and credit scoring algorithms being the most cited applications. In terms of operational impact, 54.5% agreed that AI had improved banking efficiency, and 63.6% agreed that customer service had been enhanced through faster and more automated responses. Additionally, 54.5% of respondents acknowledged AI's role in improving fraud prevention and security.

Despite these benefits, significant challenges were reported. For instance, 31.8% of respondents identified the high cost of implementation as a barrier, while 18.2% cited a lack of technical expertise, and 13.6% raised cybersecurity and privacy concerns. Furthermore, only 36.4% felt adequately trained to use AI tools, highlighting a gap in staff preparedness. Regarding job security, 27.3% agreed and 9.1% strongly agreed that AI has created job insecurity in their banks. The significance of the results lies in their ability to inform strategic planning within the banking sector. The insights gained provide a foundation for decision-makers to implement targeted interventions, such as staff training, infrastructure development, and clearer communication strategies, to facilitate the sustainable integration of AI technologies.

In conclusion, while Ghanaian banks have been progressing well with AI adoption, there remains a pressing

need to align technological advancement with human resource development and institutional readiness. By addressing these gaps, the full transformative potential of AI in the banking sector can be realized. These outcomes affirm the validity of the hypothesis and reinforce the conclusion that AI adoption, when strategically managed, can yield substantial benefits for the banking sector in Ghana.

5.3 Limitations

This research was limited by several factors:

- i. **Sample Size:** The study surveyed only 22 respondents from a select number of banks. This limited scope may not capture the full spectrum of AI usage across Ghana's banking sector.
- ii. **Access to Data:** Some banks were not fully transparent regarding their AI strategies or challenges, limiting the depth of analysis.
- iii. **Rapid Technological Change:** The fast-evolving nature of AI means that findings may become outdated quickly as new technologies are introduced.
- iv. **Subjectivity in Responses:** Since the data was based on perceptions and self-reported experiences, responses may be subject to bias or limited technical understanding of AI by some staff.

Despite these limitations, the findings remain valuable for understanding current trends and challenges.

5.4 Recommendations

Based on the findings, the following recommendations are proposed:

- i. **Strengthen Training and Capacity Building:**
Banks should invest in continuous AI-related training programs to bridge the knowledge gap among employees and promote confidence in AI usage.
- ii. **Enhance Communication on Role Changes:**
To reduce anxiety about job displacement, banks should openly communicate how AI will reshape, not necessarily replace, roles emphasizing reskilling rather than redundancy.
- iii. **Adopt a Phased Implementation Strategy:**
Considering the high cost of AI adoption, banks should implement AI tools in stages, beginning with high-impact, low-cost solutions to build internal support and experience.
- iv. **Develop In-house AI Expertise:**
Hiring and developing internal AI experts will reduce dependency on third parties and improve responsiveness to AI-related issues.
- v. **Address Cybersecurity and Privacy Risks:**
Banks must establish strong data protection and cybersecurity protocols as part of AI deployment to safeguard customer data and maintain public trust.
- vi. **Encourage Cross-Departmental Collaboration:**
Since AI affects multiple functions (e.g., operations, IT, customer service), cross-functional collaboration can ensure more effective integration and utility of AI tools.

5.4 Suggestions for Future Research

This study focused on a small sample size (22 respondents) from selected commercial banks in Ghana. Future research could explore:

- i. A larger, more diverse sample across multiple regions.
- ii. Comparative studies between private and public sector banks.
- iii. The long-term financial return on AI investments in the banking sector.
- iv. Customer perceptions of AI-driven services in banks.

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