ISIR Journal of Business and Management Studies (ISIRJBMS)
ISSN: 3048-7684 (Online)
Frequency: Bimonthly
Published By ISIR Publisher
Journal Homepage Link- https://isirpublisher.com/isirjbms-home/

Factors Influencing the Usage of Artificial Intelligence in Improving Customer Satisfaction in Selected Commercial Banks in Mwanza City, Tanzania

By

Mohamed Aziz[1*], Zinaida Marwa[2], David Mrisho[3]

[1]Department of Finance and Accounting, St. Augustine University of Tanzania, P. o. Box 307, Mwanza
[2]Department of Procurement and Logistic Management, Marketing and Human Resource Management, St. Augustine University of Tanzania, P. O. Box 307, Mwanza,
[3]Department of Public Relations and Advertising, St. Augustine University of Tanzania, P. O. Box 307, Mwanza

Article History

Received: 05/11/2024
Accepted: 25/11/2024
Published: 27/11/2024

Vol – 1 Issue – 3

PP: -23-37

DOI:10.5281/zenodo.14229500

Abstract

Purpose

This study investigates the influence of Artificial Intelligence (AI) on customer satisfaction within commercial banks in Mwanza, Tanzania, focusing on three primary factors: perceived usefulness, perceived benefits, and perceived ease of use of AI.

Design/methodology/approach

The research employs a cross-sectional design, gathering data from 180 respondents through questionnaires, which were analyzed quantitatively and presented in tables and charts.

Findings

The findings indicate that demographic factors, such as gender and education level, significantly affect the adoption of AI technologies in banking. The perceived usefulness of AI is shown to have a positive correlation with customer satisfaction, while the perceived benefits, including enhanced ease and efficiency in transaction processing, further bolster this relationship. Additionally, the perceived ease of use of AI is linked to its adoption, suggesting that user-friendly AI applications are more likely to be embraced by customers.

Originality

The originality of this study lies in its comprehensive examination of the factors that affect AI utilization in enhancing customer satisfaction, with implications for revenue generation, operational efficiency, strategic decision-making, risk management, and ethical considerations. The insights gained are valuable for various stakeholders, including academic researchers, policymakers, banking professionals, and regulatory bodies.

Practical Implications

Practically, the study underscores the necessity of considering demographic and socio-cultural factors when implementing AI technologies. It highlights the significant role of AI applications, particularly chatbots, in driving organizational innovation within commercial banks.

Social Implications

Socially, the research advocates for continuous monitoring of technological advancements in AI, recommending that banks benchmark against best practices, allocate appropriate budgets for technology and infrastructure, and maintain a balance between technological integration and information security to protect client privacy.

Keywords: *Artificial Intelligence, Perceived Ease of Use, Perceived Usefulness, Perceived Benefits*

1. Introduction

The financial services industry is undergoing a significant transformation due to the integration of Artificial Intelligence (AI), which enhances efficiency, profitability, and revenue generation **(Bock et al., 2020).**. AI technologies are being strategically deployed at customer interaction points, leading to improved customer experiences by providing insights into preferences and buying behaviors (Mclean & Osei-Frimpong, 2019). A notable example is Banco Bilbao Vizcaya Argentaria (BBVA) in Spain, which successfully utilized AI to personalize customer interactions and optimize operations, resulting in better financial outcomes **(Alfaro et al., 2019).**

In the United States, AI is poised to disrupt the service sector, particularly in banking, as customers increasingly favor machine interactions over human ones **(Syam & Sharma, 2018, Ivanov & Webster, 2019).**. This shift is evident in various applications, including banking automation, chatbots, and intelligent controls. In Africa, countries like Ghana, Rwanda and Tanzania are witnessing the positive impacts of AI on customer experience and operational efficiency in sectors such as hospitality and banking (Bedu et al. 2024;

*Corresponding Author: **Mohamed Aziz.**

Kagwa, 2024 and Kikwete, 2024). AI systems are enhancing financial inclusion by offering services through mobile platforms and addressing accessibility challenges in rural areas.

Despite the promising advancements, there remains a limited understanding of AI's role in value co-creation and customer satisfaction. Research indicates that customer satisfaction is influenced by perceived usefulness, benefits, and ease of use of AI technologies. The study aims to identify these determinants in the context of commercial banks, focusing on how AI can improve customer loyalty, retention, and service quality.

The banking sector is evolving from traditional methods to modern practices that incorporate advanced technologies, including AI **(Noreen *et al.*, 2023)**. This evolution has led to significant growth in the industry, driven by increased user engagement **(Garekwe *et al.*, 2024).** Different studies have shown the importance of AI in various business endeavors however, there is a notable gap in research regarding the specific factors that influence AI's effectiveness in enhancing customer satisfaction in banking industry. This study seeks to address this gap by exploring the relationship between AI adoption and customer satisfaction in commercial banks, ultimately providing evidence-based recommendations for effective implementation. The objectives include assessing the perceived usefulness of AI, examining its benefits compared to traditional systems, and evaluating its ease of use in improving service quality.

2. Theoretical Framework

Many theories such as Theory of Reasoned Action (TRA), Diffusion of Innovation (DOI) theory, Technological Acceptance Model (TAM), Theory of Planned Behavioural (TPB) and The Unified Theory of Acceptance and Use of Technology (UTAUT) have been advocated to explain technology adoption such as AI technology adoption. According to Rouibah *et al.* (2009), these are the five theories that are widely used to explain technology adoption. According to TRA, individuals will behave based on their pre-existing attitudes and behavioural intentions (Ajzen & Fishbein, 2000). The components of TRA are behavioural intention, attitude and subjective norm. The DOI on the other hand assumes that, early adopters evaluate innovation for its relative advantage, compatibility, complexity, trialability, and observability (Rogers, 1981). As for TAM theory, when a user is presented with new technology, the perceived usefulness and the perceived ease of use notably influence how and when users utilize it (Davis, 1989). The TPB states that, behavioural intention, attitude, subjective norm and perceived behavioural control are the four constructs which determine individual's behavioural intentions (Ajzen, 2005).

The paper discusses the application of the Unified Theory of Acceptance and Use of Technology (UTAUT) in understanding technology adoption within commercial banks, particularly regarding artificial intelligence (AI) and its impact on customer satisfaction. While several established theories, such as the Theory of Reasoned Action (TRA), Diffusion of Innovation (DOI), Technological Acceptance Model (TAM), and Theory of Planned Behavior (TPB), are commonly utilized in technology adoption studies, they often overlook the connection to key business areas like customer satisfaction.

UTAUT, developed by Venkatesh et al. (2003), provides a comprehensive framework that integrates various models to analyze technology acceptance. It identifies four primary constructs: performance expectancy, effort expectancy, social influence, and facilitating conditions, along with moderating variables such as gender, age, experience, and voluntariness of use. The theory emphasizes the significance of perceived usefulness, perceived ease of use, and perceived benefits in influencing user intentions and behaviors regarding technology adoption.

The study aims to leverage UTAUT to explore AI adoption in commercial banks, highlighting its potential to enhance customer satisfaction through improved service quality, efficiency, and personalization. Despite its strengths, including a structured approach and broad validation across contexts, UTAUT has limitations. It primarily focuses on individual-level factors and may not adequately address organizational or environmental influences, nor does it consider cultural differences or the evolving nature of technology.

Generally, UTAUT serves as a valuable framework for guiding research and decision-making in the banking sector's adoption of AI technologies, offering insights into customer behavior and strategies for enhancing banking experiences.

3. Empirical Literature Review

The paper examines the relationship between three independent variables—perceived usefulness, perceived benefit, and perceived ease of use—and customer satisfaction, which is further categorized into customer loyalty, quality service, and customer retention. Perceived usefulness is influenced by factors such as bank size, experience, and the number of products offered. Perceived benefit relates to favorable policies and staff technological skills, while perceived ease of use considers geographical differences and user navigation.

A study by Königstorfer et al. (2020) highlights the role of AI in enhancing core banking functions, although its small sample size and European focus limit generalizability. Fares et al. (2023) further explore AI's impact in Thailand, emphasizing strategic decision-making for banking professionals, yet also face limitations due to sample size and potential publication bias.

Chatterjee et al. (2021) focus on AI's role in B2B customer relationship management, revealing a positive link between AI implementation and customer satisfaction. However, the study's industry-specific focus may restrict broader applicability. Bhattacharya and Sinha (2020) emphasize AI's transformative potential in Indian banking, identifying key use cases and recommending improvements in customer service technologies.

*Corresponding Author: **Mohamed Aziz.**

Salameh et al. (2021) investigate AI's effectiveness in combating cybercrime in Jordanian banks, noting significant findings but also limitations in generalizability. Tang and Tien (2020) assess AI's impact on Vietnamese banks, highlighting its applications in customer interaction and risk management, though the small sample size may affect the robustness of the conclusions.

Qasaimeh et al. (2022) explored the adoption of AI in banking services, identifying AI's role in fraud detection and risk prevention. The study revealed that attitudes towards AI significantly influence adoption intentions, while challenges such as regulatory gaps and skills shortages must be addressed to facilitate successful implementation.

Gallego-Gomez (2020) focused on AI's role in developing dynamic capabilities within banks, emphasizing its potential to enhance customer relationships and service adaptability. The study identified key capabilities that contribute to efficiency and competitiveness, although its qualitative nature limits generalizability.

Bhattacharya and Sinha (2020) examined AI's impact on customer experience in India, finding positive relationships between AI Customer Relationship Management (CRM) and organizational performance. However, the study's reliance on a questionnaire may introduce response bias.

Ramaul (2021) investigated the use of chatbots in CRM, highlighting their benefits in customer engagement and operational efficiency, while also noting challenges related to technology and regulation. The study calls for further research to explore the broader implications of chatbots in enhancing customer experience.

Overall, the studies collectively underscore the importance of AI in enhancing customer satisfaction and loyalty across various business contexts. They recommend further research with larger, more diverse samples and continuous adaptation to technological advancements to ensure relevance and effectiveness in the rapidly evolving banking landscape.

4. Methodology

4.1 Research Design, Sampling and Data Collection

The research combines constructivism and positivism, using both quantitative and qualitative methods. It uses a cross-sectional research design to gather data from 350 employees from five commercial banks in Mwanza City, Tanzania, focusing on AI use to improve customer satisfaction. The sample size was 184 respondents, distributed proportionately among the five banks **(**NMB, CRDB, NBC, KCB and AZANIA). A structured questionnaire was used to gather information from a large population, ensuring representativeness and reliability. The study aimed to identify relationships between variables and generate hypotheses for future research. The research's focus is on understanding existing relationships among variables without longitudinal tracking.

4.2 Data Analysis

The data analysis procedure for the study involved a systematic approach to examine the influence between Artificial Intelligence and Customer satisfaction and the model estimation was done through Statistical Package for Social Science (SPSS) version 27.0 tool software. The Logistic model was used to determine factors that influence the use of AI in improving customer satisfaction. Using logistic regression for data analysis in this study helps identify factors influencing AI adoption in commercial banks in Mwanza city. Its suitability for binary outcomes and ability to assess multiple factors make it a robust tool for understanding AI utilization in the banking sector. The decision to participate is modeled as a random utility function. Commercial banks decide to participate if the utility derived from participation exceeds that from not participating. That is,$U^a > U^b$, where a denotes participation and b denotes non-participation. $U^a$and U^b are modeled as:

$$U^a = X'\beta_a + \varepsilon_a \text{and } U^b = X'\beta_b + \varepsilon_b \ldots\ldots\ldots\ldots (1)$$

Since $U^a$and U^b are latent, it is the probability of the observed decision (participate or do not participate) that are modeled,
Let Y' be the binary response variable, $Y_i^* \epsilon \{0,1\}, \mathrm{i} = 1, \ldots . \mathrm{n}$ commercial bank and $P$is the probability that $Y_i^* = 1$given X;

For $P(Y_i^* = 1|\mathrm{X}) = \mathrm{Prob}(\mathrm{U^a} > \mathrm{U^b})|$
$= Prob[X'\beta_a + \varepsilon_a - X'\beta_b \varphi > 0|X]$
$= Prob[X'(\beta_a - \beta_b) + \varepsilon_a - \varepsilon_b > 0]$
$= Prob[X'\beta + \varepsilon > 0]$

This binary choice model is estimated as a logistic model specified as follows:

$$Log\left(\frac{p}{1-p}\right) = \alpha + \beta_j X_j + \varepsilon \ldots\ldots\ldots\ldots\ldots (2)$$

Where $\left(\frac{p}{1-p}\right)$ is the odds of $Y^* = 1$ given that X_j and $\beta_j$are the multiplicative changes in the odds for $Y^* = 1$ when the j^{th} variable increases by one unit, holding all other variables constant (Finger and El Benni, 2013).

The empirical model for quantifying the factors that influence usage of of AI among commercial banks in Mwanza city is specified as follows:

$$Y_j^* = \beta_0 + \beta_1 BS + \beta_2 BE + \beta_3 NP + \beta_4 FP + \beta_5 AT + \beta_6 IA + \epsilon_i \ldots\ldots\ldots (3)$$

Where

Y_j^* = Customer satisfaction (being loyal and receive quality services)
β_0 = Constant
$\beta_1 BS$ = Bank size (number of customers)
$\beta_2 BE$ = Bank experience
$\beta_3 NP$ = Number of products
$\beta_4 FP$ = Favourable policies
$\beta_5 AT$ = Access to various technological skills among bank staff
$\beta_6 IA$ = Interaction with various actors of commercial banks

*Corresponding Author: **Mohamed Aziz.**

ϵ_i = is the stochastic term assumed to have a logistic distribution

5. Findings and Discussions

5.1 Demographic Characteristics

In order to assess the factors influencing the use of AI to improve the customer satisfaction of the commercial banks, survey respondents from five selected commercial banks viz CRDB, NMB, NBC, KCB and AZANIA were chosen to participate in the study. The participant profile that follows concentrates on the four demographic factors of gender, age, marital status, and education and educational because these characteristics have a direct impact on customer satisfaction.

Table I: Demographic Characteristics

Gender distribution (N=180)	Respondents	%
Female	61	33.9%
Male	118	65.6%
Age		
15-35 years old	113	62.8%
36-45 years old	47	26.1%
46-59 years old	20	11.1%
60+	0	0%
Marital Status		
Single	85	47.2%
Married	95	52.8%
Divorced	0	0%
Education level		
Primary (up to form four)	0	0%
Secondary (up to form six)	0	0%
Certificate	10	5.6%
Diploma	21	11.7%
Bachelor	118	65.6%
Masters	31	17.2%
PhD	0	0%

Source: Field data, 2024

Gender

This section provides a comprehensive summary of the gender distribution among the respondents. This study was conducted to ascertain whether there existed a balanced distribution of gender. In the research area, the male respondents constituted a majority, accounting for 65.9 percent of the total, while the female respondents comprised 33.9 percent. The disparity in gender representation, with a higher proportion of male than women, can potentially be described to the structural dynamics within job industry. This phenomenon may be influenced by cultural setting of which women are given less priority in higher learning as results making them few in job industry than their counterparts. These findings are in line with those by Ahmed (2021) who found that men were using AI in their business endeavors than female.

Age

The age of the respondents has an important role in influencing the use of AI and building customer satisfaction. Scholars (for example, Kaya *et al.*, 2019) hold that AI usage is significantly associated with the participant's age. The study required respondents to indicate their age. The results show that most contributors during the study were youth in their 15s to 35s (62.8 percent) followed by those aged between 36 and 45 years old (26.1 percent). Those aged between 46 and 60 years old contributed to 11.1 percent, and only. The results show that the maximum number of participants during the study were youth. The results of this study are also reported by Khalayleh & Al-Hawary (2022) and Belov & Abramov (2020), where the majority of respondents adopted various technologies, including the use of internet in the youth group. This implies that youth are conversant with technology then adults. This is associated with risk taking attributes which is mostly associated with youth.

Marital Status

About 52.8 percent of the respondents were married compared to 47.2 percent of their counterparts. This implies the presence of stable and settled family as the divorce rate was low 0 percent. A stable family is more productive in that they concentrate more on production to meet their ends than an unstable one and thus may influence efficiency in the use of AI to improve customer relationship.

Education Level of Respondents

Another demographic aspect of participants was their level of education. According to the data, 65.6 percent of the 118 participants had a Bachelor's Degree level of education, 17.2 percent had master's level of education, and 11.7 percent had diploma. Few respondents counting 5.6 had certificate. This signifies or implies that commercial banks employs the majority of people having a Bachelor's degree or higher. The availability of such staff personnel's have an impact on their levels of performance and hence improve customer satisfaction using AI. Staff education level influences their skills and knowledge on the use of AI on a variety of concerns relating to handling customer complaints etc. The creation of a pleasant working environment for employees would improve their motivation to use their expertise in offering excellent customer services.

5.2 The use of Artificial Intelligence in the Banking Industry

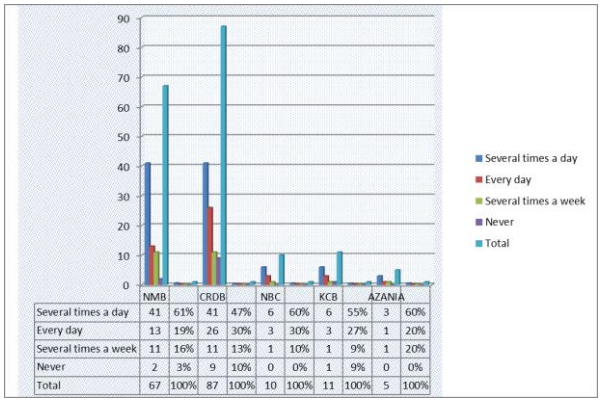
Artificial Intelligence (AI) enhances customer experience by categorizing transactions and suggesting products, improving satisfaction and sales. In fraud detection, AI tools reduce false alerts and increase detection rates, offering proactive security. Employees of the commercial banks were testified on the use

*Corresponding Author: **Mohamed Aziz.**

of AI in the banking. Results shows that majority of respondents (76.7 percent) use AI in banking services with only 13.9 percent who declared not to use the technology. This implies that banking industry has revolutionized their services by providing customers with the convenience of carrying out banking transactions anytime, anywhere. In addition, AI in banking has also improved the efficiency of banking operations and reduced the cost of service delivery.

5.3 Frequency of using AI among Commercial Banks

The intensity of using AI was obtained by considering the frequency of the use of AI by bank employees in improving customer satisfaction as presented in Figure I The results show that overall use of AI is 54 percent of respondents reported to use AI several times in a day, followed by 26 percent frequency of use as they use several times a day. This is possibly caused by the advanced technology employed in banking sector which makes it more useful in improving customer satisfaction. Although respondents who use AI several times a day are many (61% in NMB bank and 60% in NBC and AZANIA banks), the frequency of not using AI is minimum to all banks depicting the high usage of AI to improve customer satisfactions.



	NMB		CRDB		NBC		KCB		AZANIA	
Several times a day	41	61%	41	47%	6	60%	6	55%	3	60%
Every day	13	19%	26	30%	3	30%	3	27%	1	20%
Several times a week	11	16%	11	13%	1	10%	1	9%	1	20%
Never	2	3%	9	10%	0	0%	1	9%	0	0%
Total	67	100%	87	100%	10	100%	11	100%	5	100%

Figure I: Frequency of using AI among commercial banks

5.4 Services offered to customer using AI

The study intended to investigate on services offered to customers using AI. Results show that the selected five banks are revolutionizing customer service by leveraging AI solutions like chatbots (44%), virtual assistants (12%), and sentiment analysis (5%). AI enables 24/7 support (12%), personalized advice (4%), proactive assistance (8%), fraud detection (11%), and improved efficiency (3%) that leading to happier customers and higher revenue as shown in Figure II.

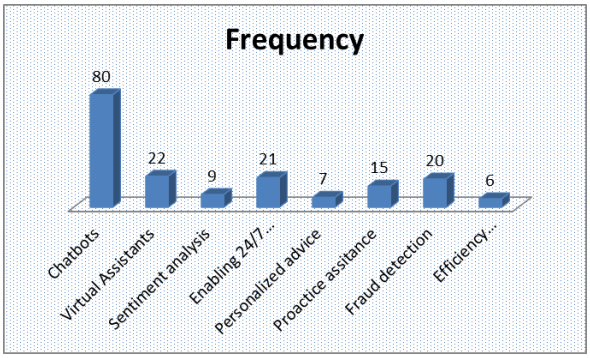


Figure II: AI Services

These study findings imply that AI has significantly impacted banking industry. The integration of AI in banking apps and services has made the sector more customer-focused and technologically relevant. These findings are in concurrence with those by Caron (2019) who found that AI-based solutions can help banks save money by enhancing efficiency and making judgments based on data that a human agent would find incomprehensible.

Some of the key applications of AI in banking include cyber security and fraud detection, loan and credit decisions, tracking market trends, data collection and analysis, customer experience, risk management, regulatory compliance, predictive analytics, process automation, and predictive analytics as was affirmed by Rahman *et al.* (2023) study. Cyber security and fraud detection are crucial for banks to ensure the safety and efficiency of their digital transactions. AI can help banks lower risks, track system problems, and improve the security of online financial transactions.

Chatbots are another example of AI applications in banking, as they can work whenever they choose and maintain a record of usage patterns of certain clients (Cîmpeanu et al., 2023). By integrating chatbots into banking apps, banks can ensure they are reachable to their customers around the clock and offer customized customer care and suitable financial services and products.

Loan and credit decisions are another area where AI can help banks make better, safer, and more profitable decisions. AI-based systems can study the patterns of conduct of customers with limited credit history to determine their creditworthiness and alert banks to certain acts that can increase the danger of default.

Tracking market trends is another area where AI can help banks analyze massive volumes of data and anticipate future changes in markets, currencies, and stocks. Modern machine learning techniques can assess market mood and provide investment recommendations as was supported by Noreen *et al.* (2023) findings. AI in banking can also alert users to potential risks and suggest when to buy stocks due to its high data processing capacity.

Data collection and analysis are another area where AI can enhance customer satisfaction and user comfort in banking and financial services. AI technology can accelerate Know Your Customer (KYC) data capture, remove errors, and expedite approval procedures for services like loan disbursement. AI banking supports accurate client data collection for error-free account creation, providing a great customer experience.

Risk management is another area where AI can help banks stay organized and make decisions on time. By estimating the possibility of a consumer failing on a loan, AI helps in spotting risky applications by looking at previous behavior patterns and smartphone data.

Regulatory compliance is another area where AI can help banks comply with stricter regulations. Deep learning and

*Corresponding Author: **Mohamed Aziz.**

Natural Language Processing (NLP) can interpret new compliance criteria for financial institutions and improve decision-making using deep learning and NLP. While AI cannot replace a compliance analyst, it can improve processes in the banking sector.

Predictive analytics and general-purpose semantic and natural language applications are two common applications for AI. Data may contain unique connections and patterns that AI can spot that were previously undetectable by conventional technology. These patterns could indicate underutilized cross-sell or sales opportunities, operational data measurements, or factors that affect revenue.

Process automation is another area where AI can be used to speed up transactions and increase efficiency. Robotic Process Automation (RPA) algorithms can automate repetitive procedures, allowing banks to focus on more difficult activities requiring human involvement.

5.5 Descriptive Statistics

To determine factors influencing the use of AI in improving customer satisfaction, the data were analyzed with descriptive statistics. This study aimed at investigating the degree to which three separate independent factors, namely perceived usefulness of AI perceived benefits of AI and perceived ease of use of AI correlates with the dependent variable customer satisfaction. The participants were tasked with evaluating the levels of perceived usefulness of AI, perceived benefits of AI and perceived ease of use of AI as well as the influence that each of these factors has on improving customer satisfaction. The evaluation was carried out using a five-point Likert scale, ranging from "1= strongly disagree, 2 = Disagree, 3 =Neutral, 4 = Agree and 5 = strongly agree."

5.5.1Perceived Usefulness of Artificial Intelligence in enhancing customer loyalty in commercial banks

The results about the influence perceived usefulness of AI in enhancing customer loyalty in commercial banks are illustrated in Table II. According to the data, the Perceived usefulness of AI scored the minimum mean of 3.72 with a standard deviation of 0.942 and maximum mean of 3.88 with a standard deviation of 0.964, the computed average score above the neutral value of 3. This finding suggests that a significant proportion of respondents indicate perceived usefulness of AI by commercial bank employees plays a role in influencing employees' performance.

Table II: Descriptive Statistics for Perceived Usefullness of AI in enhancing customer loyalty in commercial banks

	N	Mean	Std. Deviation
Size of the bank was a justification to adopt AI (number of customers)	179	3.72	.942
The bank has enough experience making it eligible to use AI	179	3.75	.969
Number of products offered by the bank prompted to use AI	179	3.88	.964
Valid N (listwise)	179		

Table 4.4 presents descriptive statistics on respondents' views on the effect of perceived usefulness of AI in enhancing customer loyalty in commercial banks.

5.5.2Perceived Benefits of AI in retaining customers in commercial banks compared to traditional information systems (IS)

The results about the influence Perceived Benefits of AI in retaining customers in commercial banks compared to traditional information systems (IS) are illustrated in Table III. According to the data, the perceived benefits of AI exhibited a minimum mean score of 3.81 with standard deviation of 0.842 and maximum mean score of 3.97 with standard deviation of 0.827 surpassing the cut threshold of 3.0 showing that respondents confirms that perceived benefits of AI depict customer satisfaction.

Table III Descriptive Statistics for Perceived Benefits of AI in retaining customers in commercial banks compared to traditional information systems (IS)

	N	Mean	Std. Deviation
Availability of favorable monetary and fiscal policies creates a conducive environment for the adoption of AI	179	3.93	.800
Our staff have Access to various technological skills making it easy to implement AI	174	3.81	.842
Our Interaction with various actors of commercial banks gives us an advantage to use AI	179	3.97	.827
Valid N (listwise)	174		

Table III presents descriptive statistics on respondents' views on the effect of perceived benefits of AI in retaining customers in commercial banks compared to traditional information systems (IS)

5.5.3Perceived Ease of Use of AI in improving customer quality service in commercial banks

The results about the influence Perceived Ease of Use of AI in improving customer quality service in commercial banks are illustrated in Table IV shows that perceived ease of use of AI has an impact on improving customer quality services in commercial banks. The use of AI among commercial bank in the study area had a minimum mean score of 3.85 with standard deviation of 0.902 and maximum mean value 4.08 with standard deviation of 0.775 above the cut point of 3.0 suggesting that perceived ease of use of AI increases the chance of customer satisfaction.

*Corresponding Author: **Mohamed Aziz.**

Table IV Descriptive Statistics for Perceived Ease of use of AI in improving customer quality service in commercial banks

	N	Mean	Std. Deviation
Our banks being located mostly in Urban center gives a competitive advantage by using AI	177	4.08	.775
Our access to various branches boost the use of AI	179	3.85	.902
Generally our staff are promoted to use AI	179	3.91	.853
Valid N (list wise)	177		

Table IV presents descriptive statistics findings on the view of respondents concerning the effect of perceived ease of use in improving customer quality service in commercial banks.

In concluding above these findings in Table 4.4, Table 4.5 and Table 4.6 are in line with Noreen *et al*. (2023) study which revealed that factors (awareness, attitude, subjective norms, perceived usefulness, perceived benefits, perceived ease of use and knowledge of artificial intelligence technology) had a significant and positive relationship with the intention to adopt AI in the banking sector. However, perceived risk shows a negative but significant relationship with the intentions to adopt AI.

5.6 Correlation Analysis

Correlation analysis is a statistical technique used to determine the degree of correlation between two variables. The Pearson product-moment correlation is a popular method for determining a correlation coefficient, which can have a positive or negative value due to covariance. A correlation value between 0.10 and 0.29 indicates a moderate to weak strength, while a coefficient between 0.30 and 0.49 is considered medium strength.

The empirical relationship between customer satisfaction and perceived usefulness of AI, perceive benefits of AI and perceived ease of use of AI is shown in Table V.

Table V: Correlations Analysis

		1	2	3	4
1.	Pearson Correlation	1			
	Sig. (2-tailed)				
	N	179			
2.	Pearson Correlation	.342**	1		
	Sig. (2-tailed)	.000			
	N	174	174		
3.	Pearson Correlation	.348**	.633**	1	
	Sig. (2-tailed)	.000	.000		
	N	177	172	177	
4.	Pearson Correlation	.520**	.419**	.520**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	179	174	177	179

**. Correlation is significant at the 0.01 level (2-tailed).

Where: 1 = Perceived Usefulness of AI, 2 = Perceived Benefits, and 3 = Perceived Ease of Use 4 = Customer Satisfaction

A significant positive correlation was identified between perceived usefulness of AI and customer satisfaction, with a ρ-value of 0.001, indicating a positive link between perceived usefulness of AI among employees and a rise in customer satisfaction.

A positive correlation was observed between the availability of perceived benefits of AI and customer satisfaction, with a r = 0.419 with a significance level of ρ≤0.000. This implies that an increase in perceived benefits of AI leads to an upward trend in customer satisfaction, while a downward trend in perceived benefits of AI results in a drop in customer satisfaction in the banking sector.

The correlation between perceived ease of use of AI and customer satisfaction was also found to be robust and statistically significant, with r = 0.520. This suggests that commercial bank employees have positive mindset regarding the use of AI in banking endeavors.

5.7 Factors of AI adoption in Banking Industry

Table VI presents the main determinants of AI adoption. The results show that gender, education, perceived usefulness of AI, perceived benefits of AI, and perceived ease of use of AI were statistically significant in influencing customer satisfaction in the commercial banks. The difference was observed among bank types and the model was significant at 1% level.

Table VI: Marginal effects on factors influencing AI Usage

Variables	Coefficient	NMB	CRDB	NBC	KCB	AZANIA
Age	0.0228	0.00182	0.00128	0.00124	0.0052	0.0073
	(0.0211)	(0.00169)	(0.00119)	(0.00116)	(0.0050)	(0.0045)
gender	0.740***	0.0591***	0.0416***	0.0401***	0.013***	0.005***

*Corresponding Author: **Mohamed Aziz.**

	(0.725)	(0.0782)	(0.0737)	(0.0733)	(0.0734)	(0.0722)
Marital status	0.0597	0.00477	0.00336	0.00324	0.0086	0.0078
	(0.0410)	(0.00331)	(0.00233)	(0.00226)	(0.0035)	(0.0042)
Education	2.512***	0.154**	0.167***	0.144***	0.00620***	0.00547***
	(0.494)	(0.0673)	(0.0338)	(0.0320)	(0.372)	(0.299)
Perceived Usefulness of AI	0.494**	0.0394*	0.0278*	0.0267*	0.010*	0.018*
	(0.252)	(0.0204)	(0.0145)	(0.0140)	(0.30)	(0.38)
Perceived Benefits of AI	0.523**	0.0418**	0.0294**	0.0283**	0.013**	0.023**
	(0.220)	(0.0179)	(0.0129)	(0.0125)	(0.34)	(0.42)
Perceived Ease of Use of AI	1.048***	0.0837***	0.0589***	0.0567***	0.042***	00.35***
	(0.358)	(0.0303)	(0.0211)	(0.0204)	(0.49)	(0.48)
Constant cut2	4.717***				0.52	0.73
	(0.895)					
Observations	180	180	180	180	180	180

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table VI shows that gender of the respondent was an important determinant (ρ≤0.01) that influenced the adoption of AI in the study area. Being male increases the probability of adopting AI by 72.5 percent among bank employees The results further indicate that all banks (NMB, CRDB, NBC, KCB and AZANIA) were highly significant at 1%. Being male increase the probability of adopting AI by 7.82 among NMB employees, 7.37 percent among CRDB employees, 7.33 among NBC employees and, 7.34 among AZANIA employees. These findings are consistent with the findings in a study by Khalayleh & Al-Hawary (2022), Belov & Abramov (2020), Caron (2019), Rahman *et al.* (2023), Cîmpeanu *et al.* (2023) and Noreen *et al.* (2023) who observed that gender has a positive influence on the adoption of technology.

Education of the respondents was an important factor in determining AI adoption at 1 percent significant level. These results are consistent with earlier studies (Thowfeek *et al.*, 2020) that literacy level positively increases awareness and hence facilitates the adoption of a number of AI.

Results in Table VI show that perceived usefulness of AI has a positive effect of AI adoption. The value was statistically significant at 10%. These findings are in contrast to the findings in a study by Sadriwala & Sadriwala (2022). who found that, perceived usefulness of AI by bank officials, is likely to adopt AI to improve customer satisfaction.

It is also evident from Table VI that, perceived benefits had positive and significant influence on the adoption of AI at a 5 percent significance level. The AI techniques involved in the financial sector increase the valuation of customer experience due to AI algorithms recollecting, processing, and analyzing customer behaviour as was affirmed by Tulcanaza-Prieto *et al.* (2023).

Perceived ease of use of AI is significant at 1 percent to all the selected five commercial banks. This finding is in agreement with the general belief that AI is an essential tool for fraud detection and risk prevention. The absence of regulatory requirements, data privacy and security, and lack of relevant skills and IT infrastructure are significant challenges of AI adoption. These results indicate that attitude towards AI, perceived risk, perceived trust, and perceived ease of use significantly influence intention to adopt AI in banking services (Alqasa, 2023).

Discussion and Implication

This study reveals that five factors via gender, education, perceived useful, perceived benefits and perceived ease of use have an influence in AI adoption to improve customer satisfaction. These variables are essential for predicting AI adoption intention and the relationships between these predictors and the dependent variable were statistically significant. It is crucial for bank managements to initiate extensive marketing communication efforts to spread information about the benefits of innovation services using AI technology in the banking industry.

The relationship between gender and gender and education among employees in banking were found to be significant and positive. Perceived usefulness, perceived benefits and perceived ease of use were statistically significant as building

*Corresponding Author: **Mohamed Aziz.**

trust in the use of new technology in banking transactions can increase user's intention to adopt new technology. AI plays a significant role in banks' intention to adopt or use AI devices, so decision-makers in the banking industry should create opinion leaders from existing clients and/or renowned personalities to promote the benefits of AI in banking services using social media and traditional media platforms.

The findings suggest that building a positive or favorable attitude towards AI in banking services is a winning strategy for implementing AI effectively. The adoption of AI should mitigate clients' safety and security concerns while offering greater convenience and user-friendliness. However, challenges such as lack of proper IT infrastructure, regulatory systems, and potential security threats are prevalent in the sector. Policymakers in the banking sector should overcome these challenges concerning AI implementation.

Conclusion

The research presents empirical evidence supporting the influence of demographic and socio-cultural variables on the adoption of new technology, particularly artificial intelligence (AI), in commercial banking. Notably, gender and educational attainment are statistically correlated with employees' readiness to utilize AI to enhance customer satisfaction, reinforcing the notion that these demographic factors play a significant role in technology adoption.

The study highlights the perceived usefulness of AI, with respondents indicating a strong belief in its positive impact on customer satisfaction. The mean scores for perceived usefulness ranged from 3.72 to 3.88, suggesting that a considerable number of participants recognize AI's effectiveness in improving customer experiences within commercial banks.

Furthermore, the perceived benefits of AI adoption are closely linked to customer satisfaction. The findings reveal that respondents associate customer satisfaction with the advantages provided by AI, such as transaction efficiency and ease of use. The mean scores for perceived benefits ranged from 3.81 to 3.97, indicating that these benefits are crucial in shaping customer satisfaction with financial services.

Lastly, the research underscores the importance of perceived ease of use in AI adoption. A significant positive correlation was found between perceived ease of use and customer satisfaction, with mean scores indicating that the user-friendliness of e-banking services enhances customer experiences. The scores ranged from 3.85 to 4.08, further emphasizing that ease of use is a vital factor in fostering customer satisfaction in the context of AI services.

Recommendations

The study highlights the perceived usefulness of artificial intelligence (AI) in commercial banks, emphasizing the need for banking departments to stay updated on technological advancements in this field. The integration of AI, particularly neural network systems, is recommended due to its ability to rapidly learn and process data, which enhances customer understanding and service quality.

Furthermore, the research identifies significant benefits associated with AI adoption in commercial banks. Access to advanced technological skills facilitates the implementation of AI, providing a competitive edge. The findings suggest that banks should benchmark against industry leaders to adopt best practices in operations, products, and management. This process necessitates budget allocation for technology and infrastructure while balancing the associated information security risks to protect customer data and finances.

The study also notes the increasing demand for digital services in banking, indicating a shift away from traditional solutions. It encourages banks to incorporate AI into various business processes, including face detection, speech recognition, and customer behavior analysis.

However, the study acknowledges its limitations, particularly the sample size of 180 respondents drawn from only five commercial banks. Despite this, the use of an extended UTAUT model through an e-questionnaire adds originality to the research, providing valuable insights for retail bankers in customer segmentation, targeting, and profiling.

Areas for Further Studies

This study aimed at examining the factors influence the use of Artificial Intelligence in improving customer satisfaction in banking industry Mwanza City, Tanzania. The findings of this study indicate that there are still gaps to be addressed, as similar research could be conducted in areas beyond Mwanza. While this study adopted a quantitative approach, future research could apply different methodologies to gather more extensive and diverse data from a variety of sources.

REFERENCES

1. Abdulai, A., & Huffman, W. (2014). The adoption and impact of soil and water conservation technology: An endogenous switching regression application. Land economics, 90(1), 26-43.
2. Abdulwahab, L., and Zulkhairi Md Dahalin. "A conceptual model of Unified Theory of Acceptance and Use of Technology (UTAUT) modification with management effectiveness and program effectiveness in context of telecentre." *African Scientist* 11, no. 4 (2021).
3. Adamu, G (2020), Effect of customer relationship management on organizational performance of AIRTEL Nigeria in Adamawa State, Nigeria, *Direct Research Journal of Management and Strategic Studies*, Vol. 2, pp 5-12
4. Adeniyi, M. M. (2023). *Customer Relationship Management and Organizational Performance of Selected Banks in Ogun State, Nigeria* (Doctoral dissertation, Kwara State University (Nigeria).
5. Adeogun, M. (2022). Increasing Patron's Outreach and Engagement through Relationship Marketing: A Case Study. *Journal of Library Administration*, *62*(3), 359-375.
6. Agarwal, P., Swami, S., & Malhotra, S. K. (2024). Artificial intelligence adoption in the post COVID-19 new-normal and role of smart technologies in

*Corresponding Author: **Mohamed Aziz.**

transforming business: a review. *Journal of Science and Technology Policy Management*, *15*(3), 506-529.

7. Aguas, P. P. (2022). Fusing Approaches in Educational Research: Data Collection and Data Analysis in Phenomenological Research. *Qualitative Report, 27*(1).
8. Ahmed, S. (2021). A gender perspective on the use of artificial intelligence in the African fintech ecosystem: case studies from South Africa, Kenya, Nigeria, and Ghana.
9. Ahsan, M. J. (2023). Unlocking sustainable success: exploring the impact of transformational leadership, organizational culture, and CSR performance on financial performance in the Italian manufacturing sector. *Social Responsibility Journal*.
10. AlNuaimi, B. K., Singh, S. K., Ren, S., Budhwar, P., & Vorobyev, D. (2022). Mastering digital transformation: The nexus between leadership, agility, and digital strategy. *Journal of Business Research,* 145, 636-648.
11. Alqasa, K. M. A. (2023). Impact of artificial intelligence-based marketing on banking customer satisfaction: examining moderating role of ease of use and mediating role of brand image. Transnational Marketing Journal, 11(1), 167-180.
12. Alqudah, O., Jarah, B., Alshehadeh, A., Almatarneh, Z., Soda, M., & Al-Khawaja, H. (2023). Data processing related to the impact of performance expectation, effort expectation, and perceived usefulness on the use of electronic banking services for customers of Jordanian banks. *International Journal of Data and Network Science*, *7*(2), 657-666.
13. Alrowwad, A. A., Abualoush, S. H., & Masa'deh, R. E. (2020). Innovation and intellectual capital as intermediary variables among transformational leadership, transactional leadership, and organizational performance. *Journal of Management Development*, *39*(2), 196-222.
14. Ameen, N., Tarhini, A., Reppel, A., & Anand, A. (2021). Customer experiences in the age of artificial intelligence. *Computers in human behavior*, 114, 106548.
15. Assaker, G., Hallak, R., & El-Haddad, R. (2020). Consumer usage of online travel reviews: Expanding the unified theory of acceptance and use of technology 2 model. *Journal of Vacation Marketing*, *26*(2), 149-165.
16. Ayaz, A., & Yanartaş, M. (2020). An analysis on the unified theory of acceptance and use of technology theory (UTAUT): Acceptance of electronic document management system (EDMS). *Computers in Human Behavior Reports*, *2*, 100032.
17. Azad, M. S., & Rahman, S. (2017). Factors influencing adoption, productivity and efficiency of hybrid rice in Bangladesh. The Journal of Developing Areas, 51(1), 223-240.
18. Baishya, K., & Samalia, H. V. (2020). Extending unified theory of acceptance and use of technology with perceived monetary value for smartphone adoption at the bottom of the pyramid. *International Journal of Information Management*, *51*, 102036.
19. Baiyewu O (2022), The impact of customer relationship management on organizational performance: a case study of Dangote Flour Mill, Kano State, Master's Degree Thesis Vaasa University, Nigeria.
20. Bartholomew, T. T., Joy, E. E., Kang, E., & Brown, J. (2021). A choir or cacophony? Sample sizes and quality of conveying participants' voices in phenomenological research.*MethodologicalInnovations*, *14*(2),2059799 1211040063.
21. Bedu, E. J., Foroudi, P., & Palazzo, M. (2024). Artificial intelligence (AI) systems, customer experience and preference in the tourism industry in Ghana: Focus on Accra Metropolis. In Contemporary Marketing and Consumer Behaviour in Sustainable Tourism (pp. 208-222). Routledge
22. Belfguira, R. B. (2023). *Quantitative Correlational Analysis of Artificial Intelligence Integration into the Banking Industry's Customer Relationship Management System* (Doctoral dissertation, University of Phoenix).
23. Belov, A., & Abramov, Y. (2020, September). Approach for Increasing the Adaptability of Digital Outdoor Advertising. In 2020 IEEE International IOT, Electronics and Mechatronics Conference (IEMTRONICS) (pp. 1-5). IEEE.
24. Bhattacharya, C., & Sinha, M. (2022). The Role of Artificial Intelligence in Banking for Leveraging Customer Experience. *Australasian Accounting, Business and Finance Journal*, *16*(5), 89-105.
25. Bock, D. E., Wolter, J. S., & Ferrell, O. C. (2020). Artificial intelligence: Disrupting what we know about services. *Journal of Services Marketing*, 34(3), 317-334.
26. Buntak, K., Kovačić, M., & Mutavdžija, M. (2021). Application of Artificial Intelligence in the business. International journal for quality research, 15(2), 403.
27. Byomire, G., Namisango, F., & Kafuko, M. M. (2016, May). Use of social media to strengthen service delivery for urban agriculture in Uganda. In 2016 IST-Africa Week Conference (pp. 1-7). IEEE.
28. Byrapu, S. R. (2023). Big Data Analysis in Finance Management. *Journal of Algebraic Statistics*, *14*(1), 142-149.
29. Caron, M. S. (2019). The transformative effect of AI on the banking industry. Banking & Finance Law Review, 34(2), 169-214.
30. Chatterjee, S., Ghosh, S. K., & Chaudhuri, R. (2020). Knowledge management in improving business process: an interpretative framework for successful implementation of AI–CRM–KM system

*Corresponding Author: **Mohamed Aziz.**

in organizations. *Business Process Management Journal*, *26*(6), 1261-1281

31. Chatterjee, S., Rana, N. P., Tamilmani, K., & Sharma, A. (2021). The effect of AI-based CRM on organization performance and competitive advantage: An empirical analysis in the B2B context. *Industrial Marketing Management*, *97*, 205-219.
32. Cichosz, M., Wallenburg, C. M., & Knemeyer, A. M. (2020). Digital transformation at logistics service providers: barriers, success factors and leading practices. The *International Journal of Logistics Management,* 31(2), 209-238.
33. Cîmpeanu, I. A., Dragomir, D. A., & Zota, R. D. (2023). Banking Chatbots: How Artificial Intelligence Helps the Banks. In Proceedings of the International Conference on Business Excellence (Vol. 17, No. 1, pp. 1716-1727).
34. Connor, M., de Guia, A. H., Pustika, A. B., Sudarmaji, Kobarsih, M., & Hellin, J. (2021). Rice farming in central Java, Indonesia—adoption of sustainable farming practices, impacts and implications. Agronomy, 11(5), 881.
35. Eaton, S. E. (2020). Ethical considerations for research conducted with human participants in languages other than English. *British Educational Research Journal*, *46*(4), 848-858.
36. Eftekhari Sinjani, S. S., Rousta, A., & Naami, A. (2022). Investigation of factors influencing on acceptance of use of financial technologies with moderating role of perceived risk (case study: Pasargad Bank). *International Journal of Finance & Managerial Accounting*, *7*(26), 187-196.
37. Fares, O. H., Butt, I., & Lee, S. H. M. (2023). Utilization of artificial intelligence in the banking sector: A systematic literature review. *Journal of Financial Services Marketing*, *28*(4), 835-852.
38. Frascarelli, C., Bonizzi, G., Musico, C. R., Mane, E., Cassi, C., Guerini Rocco, E., ... & Fusco, N. (2023). Revolutionizing cancer research: the impact of artificial intelligence in digital biobanking. *Journal of Personalized Medicine*, *13*(9), 1390.
39. Gallego-Gomez, C., & De-Pablos-Heredero, C. (2020). Artificial intelligence as an enabling tool for the development of dynamic capabilities in the banking industry. *International Journal of Enterprise Information Systems (IJEIS)*, *16*(3), 20-33.
40. Garekwe, L., Ferreira-Schenk, S. J., & Dickason-Koekemoer, Z. (2024). Modelling Factors Influencing Bank Customers' Readiness for Artificial Intelligent Banking Products. International Journal of Economics and Financial Issues, 14(1), 73-84.
41. Gil-Gomez, H., Guerola-Navarro, V., Oltra-Badenes, R., & Lozano-Quilis, J. A. (2020). Customer relationship management: digital transformation and sustainable business model innovation. *Economic research-Ekonomska istraživanja*, *33*(1), 2733-2750.
42. Gul, R., Ellahi, N., Leong, K., & Malik, Q. A. (2024). The complementarities of digitalisation and productivity: redefining boundaries for financial sector. *Technology Analysis & Strategic Management*, *36*(1), 1-13..
43. Gupta, M., Garg, N., Jain, N., Saini, P., Roy, S., & Sati, M. (2024). Analysis of Financial Performance Pre and Post Use of Artificial Intelligence Applications Via CAMELS Lens: With Special Reference to HDFC Bank. *International Journal of Intelligent Systems and Applications in Engineering*, *12*(5s), 324-337.
44. Hariyanti, A. O., Hidayatullah, S., & Prasetya, D. A. (2020). Analysis of the Acceptance and Use of Mobile Banking Services Using the Unified Theory of Acceptance and Use of Technology (Case Study of Bank Jatim Pasuruan Branch). *International Research Journal of Advanced Engineering and Science*, *5*(1), 254-262.
45. Hassan, M. U., Iqbal, A., & Iqbal, Z. (2018). Factors affecting the adoption of internet banking in Pakistan: An integration of technology acceptance model and theory of planned behaviour. International Journal of Business Information Systems, 28(3), 342-370.
46. Hess, T. J., McNab, A. L., & Basoglu, K. A. (2014). Reliability generalization of perceived ease of use, perceived usefulness, and behavioral intentions. MIS quarterly, 38(1), 1-28.
47. Homburg, C., & Wielgos, D. M. (2022). The value relevance of digital marketing capabilities to firm performance. *Journal of the Academy of Marketing Science*, *50*(4), 666-688.
48. Hossain M S, Kabir S B and, Mahbub N (2019), Competitive Strategies and Organizational Performance: Determining the Influential Factor Conquer Over the Rivals in the Food Industry of Bangladesh, *International Review of Management and Marketing*, Vol. 9, Issue 3, pp.100-105
49. Hukins, C., & Duce, B. (2022). Usefulness of self-administered questionnaires in screening for direct referral for polysomnography without sleep physician review. *Journal of Clinical Sleep Medicine*, *18*(5), 1405-1412.
50. Ivanov, S., & Webster, C. (2019). Conceptual framework of the use of robots, artificial intelligence and service automation in travel, tourism, and hospitality companies. Robots, artificial intelligence, and service automation in travel, tourism and hospitality, 7-37.
51. Jakšič, M., & Marinč, M. (2019). Relationship banking and information technology: The role of artificial intelligence and FinTech. *Risk Management*, *21*, 1-18.
52. Javed, M., Rashid, M. A., Hussain, G., & Ali, H. Y. (2020). The effects of corporate social responsibility

*Corresponding Author: **Mohamed Aziz.**

on corporate reputation and firm financial performance: Moderating role of responsible leadership. *Corporate Social Responsibility and Environmental Management*, *27*(3), 1395-1409.

53. Kagwa, C. K. C. (2024). Effectiveness of Artificial Intelligence (AI) Chatbots in Improving Customer Satisfaction in E-Commerce in Rwanda. European *Journal of Technology*, 8(4), 13-24.
54. Kahenya, W. D., Sakwa, M., & Iravo, M. (2014). Assessing use of information communication technologies among agricultural extension workers in Kenya using modified UTAUT model. International Journal of Sciences: Basic and Applied Research, 16(2), 11-22.
55. Kaya, O., Schildbach, J., AG, D. B., & Schneider, S. (2019). Artificial intelligence in banking. Artificial intelligence.
56. Kessy S S A (2019), The Influence of Relationship Marketing Strategies on the Performance of Commercial Banks in Tanzania, Tanzania *Journal of Development Studies*, Vol. 17, Issue 2, pp.115-130
57. Khalayleh, M., & Al-Hawary, S. (2022). The impact of digital content of marketing mix on marketing performance: An experimental study at five-star hotels in Jordan. International Journal of Data and Network Science, 6(4), 1023-1032.
58. Kikwete, C. (2024). Effects of Artificial Intelligence Integration on Supply Chain Forecasting Accuracy in Tanzania. *American Journal of Supply Chain Management*, 8(1), 56-67.
59. Kim, Myung Ja, and C. Michael Hall. "What drives visitor economy crowdfunding? The effect of digital storytelling on unified theory of acceptance and use of technology."*Tourism Management Perspectives* 34 (2020): 100638.
60. Kinyanjui, E. (2020). *Influence of digital transformation processes on customer relationship management among commercial banks in Kenya* (Doctoral dissertation, Strathmore University).
61. Kiplimo, J. (2019). Customer relationship management system and satisfaction among
62. Kirongo, A., & Odoyo, C. (2020). Research philosophy design and methodologies: A systematic review of research paradigms in information technology.
63. Ko, A., Fehér, P., Kovacs, T., Mitev, A., & Szabó, Z. (2022). Influencing factors of digital transformation: management or IT is the driving force?. International Journal of Innovation Science, 14(1), 1-20.
64. Königstorfer, F., & Thalmann, S. (2020). Applications of Artificial Intelligence in commercial banks–A research agenda for behavioral finance. *Journal of behavioral and experimental finance*, *27*, 100352.
65. Korpel, M. C. A., & Oesch, J. (2021). *Delimitation criticism: a new tool in biblical scholarship* (Vol. 1). Brill.
66. Liu, Y., & Chen, Z. (2023). A new model to evaluate the success of electronic customer relationship management systems in industrial marketing: the mediating role of customer feedback management. *Total Quality Management & Business Excellence*, *34*(5-6), 515-537.
67. Macha D P and Massawe N M (2023). Financial Technology in Tanzania: Assessment of Growth Drivers, *The African Economic Research Consortium*, Nairobi, Kenya.
68. Mamela, T. L., Sukdeo, N., & Mukwakungu, S. C. (2020, August). The integration of AI on workforce performance for a South African Banking Institution. In *2020 International Conference on Artificial Intelligence, Big Data, Computing and Data Communication Systems (icABCD)* (pp. 1-8). IEEE.
69. Manesh, M. F., Pellegrini, M. M., Marzi, G., & Dabic, M. (2020). Knowledge management in the fourth industrial revolution: Mapping the literature and scoping future avenues. *IEEE Transactions on Engineering Management*, *68*(1), 289-300.
70. Masanja, N., & Mkumbo, H. (2020). The application of open source artificial intelligence as an approach to frugal innovation in Tanzania. Int. J. Res. Innov. Appl. Sci, 5(3), 2454-6194.
71. Maseke, B. F. (2024). The transformative power of artificial intelligence in banking client service. *South Asian Journal of Social Studies and Economics*, *21*(3), 93-105.
72. Maxwell, J. A. (2021). Why qualitative methods are necessary for generalization. *Qualitative Psychology*, *8*(1), 111.
73. Mazikana, A. T. (2023). The Effect of Customer Life Cycle Management on Firm Performance within the Insurance Industry in Harare, Zimbabwe. *Zimbabwe (March 4, 2023)*.
74. McLean, G., & Osei-Frimpong, K. (2019). Hey Alexa… examine the variables influencing the use of artificial intelligent in-home voice assistants. Computers in Human Behavior, 99, 28-37.
75. Mezmir, E. A. (2020). Qualitative data analysis: An overview of data reduction, data display, and interpretation. *Research on humanities and social sciences*, *10*(21), 15-27.
76. Migdadi, M. M. (2021). Knowledge management, customer relationship management and innovation capabilities. *Journal of Business & Industrial Marketing*, *36*(1), 111-124.
77. Mohajan, H. K. (2020). Quantitative research: A successful investigation in natural and social sciences. *Journal of Economic Development, Environment and People*, *9*(4), 50-79.
78. Morgan, D. L., & Nica, A. (2020). Iterative thematic inquiry: A new method for analyzing

*Corresponding Author: **Mohamed Aziz.**

qualitative data. *International Journal of Qualitative Methods*, *19*, 160

79. Mõttus, R., Wood, D., Condon, D. M., Back, M. D., Baumert, A., Costantini, G., ... & Zimmermann, J. (2020). Descriptive, predictive and explanatory personality research: Different goals, different approaches, but a shared need to move beyond the Big Few traits. *European Journal of Personality*, *34*(6), 1175-1201.
80. Muhammed, S., & Zaim, H. (2020). Peer knowledge sharing and organizational performance: the role of leadership support and knowledge management success. *Journal of knowledge management*, *24*(10), 2455-2489.
81. Mungla C (2018), Effects of Customer Relationship Management systems on financial performance of Commercial Banks in Kenya, Masters' Degree Thesis, Strathmore University, Nairobi, Kenya.
82. Mustapha, R., Kareem, O., Adeniyi, M. M., & Adebayo, A. A. (2023). Customer Relationship Management and Organizational Performance of Selected Banks in Ogun State, Nigeria. *African Journal of Management and Business Research*, *11*(1), 213-288.
83. Mwangi C G (2020), Influence of Customer Relationship Management Dimensions on Performance of Classified Accommodation Facilities in Coast Region of Kenya, Doctorate Degree Thesis, Kenya Methodist University, Nakuru, Kenya.
84. Mwirigi, R. N. (2018). *Customer relationship management and Satisfaction of commercial* Nairobi, Kenya
85. Nguyen, T. T., Nguyen, H. T., Mai, H. T., & Tran, T. T. M. (2020). Determinants of digital banking services in Vietnam: Applying utaut2 model. *Asian Economic and Financial Review*, *10*(6), 680.
86. Nithya, N., & Kiruthika, R. (2021). Impact of Business Intelligence Adoption on performance of banks: a conceptual framework. *Journal of Ambient Intelligence and Humanized Computing*, *12*, 3139-3150.
87. Nkanata M P (2018), Customer Relationship Marketing and Organizational Performance in Crop Protection Industry: Case of Realipm Limited Company in Kenya, Master's Degree Thesis, Kenyatta University, Nairobi, Kenya.
88. Noreen, U., Shafique, A., Ahmed, Z., & Ashfaq, M. (2023). Banking 4.0: Artificial intelligence (AI) in banking industry & consumer's perspective. Sustainability, 15(4), 3682.
89. Northey, G., Hunter, V., Mulcahy, R., Choong, K., & Mehmet, M. (2022). Man vs machine: how artificial intelligence in banking influences consumer belief in financial advice. International Journal of Bank Marketing, 40(6), 1182-1199.
90. Nurlaila, P. (2022). PERFORMANCE MODEL: Satisfaction, Commitment and Reward Based. *KINERJA: Jurnal Manajemen Organisasi dan Industri*, *1*(1), 19-26.
91. O'Caoimh, R., Sezgin, D., O'Donovan, M. R., Molloy, D. W., Clegg, A., Rockwood, K., & Liew, A. (2021). Prevalence of frailty in 62 countries across the world: a systematic review and meta-analysis of population-level studies. *Age and ageing*, *50*(1), 96-104.
92. Ochuba, N. A., Adewunmi, A., & Olutimehin, D. O. (2024). The role of AI in financial market development: enhancing efficiency and accessibility in emerging economies. *Finance & Accounting Research Journal*, *6*(3), 421-436.
93. Ogutu, S. O., Okello, J. J., & Otieno, D. J. (2014). Impact of information and communication technology-based market information services on smallholder farm input use and productivity: The case of Kenya. World development, 64, 311-321.
94. Omoge, A. P., Gala, P., & Horky, A. (2022). Disruptive technology and AI in the banking industry of an emerging market. *International Journal of Bank Marketing*, *40*(6), 1217-1247.
95. Orel, Y., Khodykina, Y., & Chernova, T. (2023). Philosophy of the Future in the Context of Scientific and Pedagogical Workers Training and Artificial Intelligence Application. *Futurity Philosophy*, *2*(1), 44-62
96. Othman, B. A., Harun, A., De Almeida, N. M., & Sadq, Z. M. (2020). The effects on customer satisfaction and customer loyalty by integrating marketing communication and after sale service into the traditional marketing mix model of Umrah travel services in Malaysia. *Journal of islamic marketing*, *12*(2), 363-388.
97. Pandey, P., & Pandey, M. M. (2021). *Research methodology tools and techniques*. Bridge Center.
98. Peter, N. M. (2018). Customer Relationship Marketing and Organisational Performance In Crop Protection Industry: Case Of Realipm Limited Company In Kenya (Doctoral Dissertation, Kenyatta University).
99. Qasaimeh, G., Yousef, R., Al-Gasaymeh, A., & Alnaimi, A. (2022, February). The effect of artificial intelligence using neural network in estimating on an efficient accounting information system: Evidence from jordanian commercial banks. In *2022 International Conference on Business Analytics for Technology and Security (ICBATS)* (pp. 1-5). IEEE.
100. Quintão, C., Andrade, P., & Almeida, F. (2020). How to improve the validity and reliability of a case study approach?. *Journal of Interdisciplinary Studies in Education*, *9*(2), 264-275.
101. Rachmawati, I. K., Bukhori, M., Majidah, Y., & Hidayatullah, S. (2020). Analysis of use of mobile banking with acceptance and use of technology (UTAUT). *International Journal of Scientific and Technology Research*, *9*(8), 534-540.

*Corresponding Author: **Mohamed Aziz.**

102. Rahman, M. S., Bag, S., Gupta, S., & Sivarajah, U. (2023). Technology readiness of B2B firms and AI-based customer relationship management capability for enhancing social sustainability performance. *Journal of Business Research*, *156*, 113525.
103. Rahman, M., Ming, T. H., Baigh, T. A., & Sarker, M. (2023). Adoption of artificial intelligence in banking services: an empirical analysis. International Journal of Emerging Markets, 18(10), 4270-4300.
104. Ramadhani, R., & Lubis, U. S. (2021). The Function of the Delimitation Contradictory Principle in the Settlement of Land Plot Boundary Disputes. *International Journal Reglement & Society (IJRS)*, *2*(3), 136-148.
105. Ronzani, C. M., da Costa, P. R., da Silva, L. F., Pigola, A., & de Paiva, E. M. (2020). Qualitative methods of analysis: an example of Atlas. TI™ Software usage. *Revista Gestão & Tecnologia*, *20*(4), 284-311.
106. Saarikko, T., Westergren, U. H., & Blomquist, T. (2020). Digital transformation: Five recommendations for the digitally conscious firm. Business horizons, 63(6), 825-839.
107. Sadriwala, M. F., & Sadriwala, K. F. (2022). Perceived usefulness and ease of use of artificial intelligence on marketing innovation. International Journal of Innovation in the Digital Economy (IJIDE), 13(1), 1-10.
108. Salameh, R., & Lutfi, K. (2021). The role of artificial intelligence on limiting Jordanian commercial banks cybercrimes. *Accounting*, *7*(5), 1147-1156.
109. Sarfaraz, J. (2017). Unified theory of acceptance and use of technology (UTAUT) model-mobile banking. Journal of Internet Banking and Commerce, 22(3), 1-20.
110. Schoch, K. (2020). Case study research. *Research design and methods: An applied guide for the scholar-practitioner*, 245-258.
111. Scott, D. R. (2020). *Leadership styles and the effects on organizational performance* (Dissertation, California Southern University).
112. Setiawan, R., Cavaliere, L. P. L., Koti, K., Ogunmola, G. A., Jalil, N. A., Chakravarthi, M. K., ... & Singh, S. (2021). *The Artificial Intelligence and Inventory Effect on Banking Industrial Performance* (Doctoral dissertation, Petra Christian University).
113. Severine, K. (2020). The Influence of Relationship Marketing Strategies on the Performance of Commercial Banks in Tanzania. *Tanzania Journal of Development Studies*, *17*(2).
114. Seys, D., Coeckelberghs, E., Sermeus, W., Van Zelm, R., Panella, M., Babu Payedimarri, A., & Vanhaecht, K. (2021). Overview on the target population and methods used in care pathway projects: a narrative review. *International Journal of Clinical Practice*, *75*(10), e14565.
115. Shaik, I. A. K., Mohanasundaram, T., KM, R., Palande, S. A., & Drave, V. A. (2023). An Impact of Artificial Intelligence on customer relationship management (CRM) in retail banking sector. *European Chemical Bulletin*, *12*(5), 470-478.
116. Shufutinsky, A. (2020). Employing use of self for transparency, rigor, trustworthiness, and credibility in qualitative organizational research methods. *Organization Development Review*, *52*(1), 50-58.
117. Singh, K., & Misra, M. (2021). Linking corporate social responsibility (CSR) and organizational performance: The moderating effect of corporate reputation. *European Research on Management and Business Economics*, *27*(1), 100139.
118. Syam, N., & Sharma, A. (2018). Waiting for a sales renaissance in the fourth industrial revolution: Machine learning and artificial intelligence in sales research and practice. Industrial marketing management, 69, 135-146.
119. Tang, S. M., & Tien, H. N. (2020). Impact of artificial intelligence on vietnam commercial bank operations. *International Journal of Social Science and Economics Invention*, *6*(07), 296-303.
120. Thowfeek, M. H., Samsudeen, S. N., & Sanjeetha, M. B. F. (2020). Drivers of artificial intelligence in banking service sectors. Solid State Technology, 63(5), 6400-6411.
121. Tulcanaza-Prieto, A. B., Cortez-Ordoñez, A., & Lee, C. W. (2023). Influence of customer perception factors on AI-enabled customer experience in the Ecuadorian banking environment. Sustainability, 15(16), 12441.
122. Van Veldhoven, Z., & Vanthienen, J. (2022). Digital transformation as an interaction-driven perspective between business, society, and technology. Electronic markets, 32(2), 629-644.
123. Varpio, L., Paradis, E., Uijtdehaage, S., & Young, M. (2020). The distinctions between theory, theoretical framework, and conceptual framework. *Academic Medicine*, *95*(7), 989-994.
124. Vears, D. F., & Gillam, L. (2022). Inductive content analysis: A guide for beginning qualitative researchers. *Focus on Health Professional Education: A Multi-disciplinary Journal*, *23*(1), 111-127.
125. Visser, K., Slattery, M., & Stewart, V. (2021). Help or hinder? An assessment of the accessibility, usability, reliability and readability of disability funding website information for Australian mental health consumers. Health & social care in the community, 29(5), 1378-1390.
126. Wang, C., Ahmad, S. F., Ayassrah, A. Y. B. A., Awwad, E. M., Irshad, M., Ali, Y. A., ... & Han, H. (2023). An empirical evaluation of technology

*Corresponding Author: **Mohamed Aziz.**

acceptance model for Artificial Intelligence in E-commerce. *Heliyon*, *9*(8).

127. Wang, Z., He, Y., Li, L., Zhang, M., Ruan, H., Zhu, Y., & He, S. (2022). New metabolic health definition might not be a reliable predictor for mortality in the nonobese Chinese population. *BMC Public Health*, *22*(1), 1-10.
128. Wang, Z., Jing, Z., Li, S., Qi, G., & Wang, Z. (2023, September). Research and Application of Multi-Source Data Collection Method of Power System Based on Microservice Idea. In *2023 International Conference on Power System Technology (PowerCon)* (pp. 1-5). IEEE.
129. Wilter, M. M. (2023). *Effect of Financial Technology Adoption on Performance of Commercial Banks in Meru County, Kenya* (Doctoral dissertation, KeMU).
130. Zouari, G., & Abdelhedi, M. (2021). Customer satisfaction in the digital era: evidence from Islamic banking. *Journal of Innovation and Entrepreneurship*, *10*, 1-18.

*Corresponding Author: **Mohamed Aziz.**