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Inter-Relationship between Artificial Intelligence and Performance of the Banking Industry: A Study of Access Bank PLC and First Bank PLC

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Abstract

The introduction of AI into financial services is one of the more inclined forward-looking explorations in today's international financial institutions. This study therefore investigated the inter relationship between Artificial Intelligence (AI) on performance of banking industry with respect to selected deposit money banks (Access Bank Plc. and First Bank Plc.) in Abia state. Descriptive research design was adopted. A total of 150 questionnaires was administered to the staff of Access Bank Plc. and First Bank Plc. Frequency distribution and percentages was determined, the hypotheses were tested using regression analysis and correlation with the help of SPSS version 25.0. Based on empirical investigation and analysis, the findings indicated that; there is significant relationship between artificial intelligence and employees' efficiency and job satisfaction of Access Bank Plc and First Bank Plc, there is significant effect of artificial intelligence on examined financial execution of Access Bank Plc and First Bank Plc. From statistical evidence it could be concluded that, artificial intelligence can be used to improve the customer service experience by automatically pulling up information and suggesting solutions so that the agent can deliver answers to the customer much quicker. Therefore, artificial intelligence has significant relationship with employees' efficiency and job satisfaction and financial execution of Access Bank Plc and First Bank Plc. It is concluded that AI could be applied by commercial banks in Nigeria for better performance. Based on the findings, the study recommends that; artificial intelligence should be adopted in banking operations to enhance performance and help in the attainment of banking objectives as relating to finance; there should be proper and full adoption of artificial intelligence to help enhance customer satisfaction, as this will stimulate customer retention strategy, depending on its application. Also, organizations should adopt the use of artificial intelligence to help ameliorate the challenges, rigors and stress faced by employees in the work place.

Keywords: Artificial Intelligence, Performance, Banking Industry, inter-relationship

Introduction

The relevance of artificial intelligence in business development, growth and expansion cannot be over-emphasized. Artificial intelligence (AI) is the field of science that deals with rivalling the capabilities of modern computer systems to resolve issues using human-like complex capabilities of reasoning, learning and self-correction. Artificial Intelligence (AI) technology plays an important role in banking industry transformation, which has significant impact on the performance of banks. Artificial intelligence in computer system is more efficient and superior than human experts (Mannino, 2015).

Artificial Intelligence (AI) is fundamentally changing the way we work across several different industries such as the banking sector. The relevance of artificial intelligence cuts across promotion of customer service, maximize sales, sharpen cybersecurity, optimize supply chains, free up workers from mundane tasks, improve existing products and point the way to new products. It is hard to think of an area in the enterprise where artificial intelligence- the simulation of human processes by machines, especially computer systems will not have an impact. Within the financial services industry, Artificial Intelligence applications include algorithmic trading, portfolio composition and optimization, model validation, back testing, robo-advising, virtual customer assistants, market impact analysis, regulatory compliance and stress testing. It further allows us to leverage the data available and comprehend consumer behavior and traits through customer analytics to streamline the customer interaction process by making information available and accessible across several touch points. AI can also help businesses with predictive analytics, identifying patterns in data to make more accurate forecasts and decisions (Mejia, 2023).

The reason for the high interest in Artificial Intelligence (AI) for banks is vast and irresistible even for banks developing nations like Nigeria. The strategic application of AI's technologies including machine learning, natural language processing and computer vision can drive meaningful results for banks, from enhancing employee and customer experiences to improving back-office operations (Tucci, 2020). The application of artificial intelligence in the enterprise is profoundly changing the way businesses work. Banking industries are incorporating AI technologies into their business operations with the aim of saving money, boosting efficiency, generating insights and creating new markets.

Banks performance is relevant because it is a measure of the progress and strength of the bank as well as helps in galvanizing the confidence of customers in the bank. Nigerian banks have already adopted elements of Artificial Intelligence AI technologies including software robots to streamline and automate processes and chatbots that on more advanced platforms like the internet, use AI and machine learning to provide human-like interaction and dynamic banking services via chat conversations. Rule-based chatbots like Access Bank Plc and First Bank Plc allows customers to perform basic banking transactions on the go at various levels of sophistication. Therefore, it is imperative to research more on the effectiveness of artificial intelligence on performance of banking industry as regards to commercial banks.

Statement of the Problem

It is evident to state that the implementation of AI has a positive influence on the profitability and the technical efficiency of banks. The banking operational efficiency can be enhanced with the deployment of Artificial Intelligence in risk management (Leo et al., 2019; Dzhaparov, 2020; Donepudi, 2017), in replacing workforce (Brynjolfsson & Mitchell, 2017; Lu et al., 2017), in assessing customers' credit scores (Li, 2020; Aniceto et al., 2020), in lending decision-making (Maha, 2020; Luong, 2019). However, not all prior studies found the positive effect of AI on the bank performance, the results of the study conducted by Frederica and Murwaningsari (2018) showed that AI does not affect banking performance in their study area.

Through the comprehensive review of prior studies related to the research topic, it is important to notice that regarding to the measurement of Artificial Intelligence variable, previous studies have not measured the level of Artificial Intelligence application in banks, they only considered whether banks have applied Artificial Intelligence or not. Most of previous studies have focused on the impact of Artificial Intelligence applications on the bank performance, however, there are few studies on the determinant factor of the efficiency of the use of Artificial Intelligence in banks.

Besides that, many studies have investigated the contribution of the application of Artificial Intelligence in banking sector in technologically advanced countries, there is few studies conducted in developing countries.

This study sought to fill the existing research gap by ascertaining the interrelationship between artificial intelligence (A. I) and performance of the banking industry: a study of Access Bank Plc and First Bank Plc. Specifically, the study examined the relationship between artificial intelligence and employees' efficiency and job satisfaction, determined the effect of artificial intelligence and financial execution of Access Bank Plc and First Bank Plc.

Literature Review

Conceptual Framework

Artificial Intelligence

As propounded by Hassani et al. (2020), artificial intelligence has multiple definitions. As a result, no one definition can define artificial intelligence (Hassani et al. 2020). Legg and Hutter (2007) came up with 70 definitions of artificial intelligence covering multiple views. Colom et al. (2010) defined artificial intelligence as a general mental ability for reasoning, problem-solving, and learning while Snyderman and Rothman (1987) defined artificial intelligence as a general mental ability for reasoning, problem-solving, and learning. Gottfredson (1997) also defined artificial intelligence where more emphasis was given to learning swiftly and the ability to learn from experiences. Hassani et al. (2020) also defined AI as an intelligent system created to use data and to analyze the data as well as involving the performance of certain tasks without the need for programming. AI has a strong capacity to create a foundation for decision making and support through insights and results, collected from vast and complex data sets which are compressed into the manageable scale (Hassani et al. 2020).

In this century AI has evolved from being an academic field to become a key factor in the social and economic mainstream technologies including banking, medical diagnosis, autonomous vehicles as well as voice-activated assistance (Frank 2019).

Artificial Intelligence in Banking Industry

Technological adaptation in the banking sector have been gradual as compared to technological adoption in other sectors. One of the crucial region behind it is the high dependence of banking industry on human involvement, most of the operations were dependent on employed manpower. With time technological inventions were adopted in day-to-day working of banks and it efficiently improved their performance. Application of artificial intelligence in banking sector can make the operations more impactful and hassle free (Manning, 2018). Some of the areas in banking industry, where artificial intelligence can be successfully applied are enlisted below (Noonan, 2018; Punamaraju, 2018).

- Tailored Financial Services,
- Underwriting,
- Voice Aided Banking,
- Data-Driven Loaning Decisions,
- Digitalization of Branches

Areas of Applications or uses of AI

AI based systems area taking place in identifying risks, its management, marketing and providing as supportive tools to the clients. AI promises to do much more, and businesses are looking at all sorts of ways they can benefit from the technology. Therefore, AI was found to be used for the identification of phenomena. In companies around the world, there are a number of its applications.

- Documents Processing,
- Scam Recognition,
- Privacy/ Security Protection,
- Expenditure Configuration Forecast,
- Stock Dealer scheme
- Text and Data Processing,
- Forecasting and Estimation for Investment Decision

Relationship between Artificial Intelligence and Variables of Performance

Effect of Artificial Intelligence on Job Satisfaction and Employees' Efficiency

Throughout the literature on the management of employees three outcomes are often considered vital to understanding if management practices are successful: job satisfaction, job meaningfulness, and employee retention. Job satisfaction can be defined as the degree of positive attitude workers have toward their job (Beer, 1964). Job meaningfulness is the degree to which someone feels that his or her job is worthwhile, useful, and valuable (Kahn, 2010). Employee retention is a measure of how many employees are retained by an organization (Iverson & Pullman, 2010). Taken together, all three represent important measures of employee outcomes.

Research has shown that relationships and interactions with others in the workplace are vital to promoting job satisfaction and efficiency (Tett & Meyer, 2013). These relationships and interactions include informal conversations with colleagues and formal feedback and mentoring from supervisors (Bateman, 2009; Fay & Kline, 2011). In fact, social support derived from such interactions with both colleagues and supervisors is often the primary driver of employee outcomes like job satisfaction, meaningfulness, and retention (Bateman, 2009). This is because humans are social beings who need interactions with other humans (Taneja et al., 2011). Yet, the use of AI systems could possibly reduce or eliminate such social interactions.

How can organizations with employees managed primarily by AI systems promote social interactions? One approach is to build online communities on digital platforms. This approach is similar to many current communities sponsored by companies like Uber or Airbnb. Organizations can set up their own online communities to allow employees to interact not only with other employees but also with the company. These online communities can both build “community” among employees and allow companies to contact and assess the needs of their employees. Of course, issues of privacy should not be overlooked. Organizations must seek and receive approval from employees before monitoring their online actions. That withstanding, this approach can help replace traditional social interactions which seem lost in these new digital AI-enabled work arrangements

Effect of Artificial Intelligence on Financial Execution

Studies on AI in the financial sector have indicated that AI has made major progress in enabling the creation of professional financial applications that have shaped the finance industry (Babel et al., 2019). Through this approach, AI has complemented human capabilities in ensuring that customers can access high-quality services. Major organizations globally utilize AI applications in determining anomalies that lead to the establishment of optimal investment strategies. A study on the AI applications has provided recommendations that innovation such ass trading algorithms should be utilized in integrating information regarding the changing market dynamics and price levels (Johnson et al., 2019). This can be achieved with the proprietary algorithms that make trading rapid and effective (Johnson et al., 2019).

Before implementing the AI features within the organization, the financial management team should ensure that the main tasks which include risk recognition, assessment, and prevention are identified and captured in the system for better market improvements. These unique features have made been a part of the great interventions of the financial industry utilized to increase the delivery of modern and consumer-based services. The capitalists have realized that they require robust methods of dealing with financial procedures as there is an advancement of digitization from the international perspective. The most important aspect is that as the financiers and the private enterprise invest in diverse technological applications, they should pinpoint the emergent areas of the business.

Research studies on chatbots and the simulated subordinates have highlighted that the financial world is embracing these features at a very high rate, which shows that the financial market is rapidly embracing modern innovations (Jakšič & Marinč, 2019). More precisely, such financial institutions as banks require these AI innovations as they need expanded capacities for queries related to customer call centers and client correspondence by e-mail. To satisfy this need, the financial sector has embraced the use of the bank convectional customer service model that has ensured that all customer-related services are synchronized effectively.

The hi-tech personality chatbots are important features implemented by financial organizations as they provide automatic assistance within fiscal applications. The emergence of E-commerce resulted in online fraud where many financial institutions and customers have been defrauded of great sums, which made most of them less confident in utilization diverse online platforms (Donepudi *et al.,* 2020). The system developers have recently incorporated AI to identify and crosscheck all transactions with reliable prevention sectors in a move to increase safety in all the transaction procedures. For example, the studies on how AI is incorporated in the use of banking MasterCard have indicated that this innovation has contributed to the reduction in crime rates. Hence, if the fraudster tries to perform financial transactions with the card, the system quickly scans the card and shares a message to the original user on their emails or phones where the owner of the card will be required to approve the transaction before the operation is completed (Tang, 2021). This approach has greatly helped in the reduction of the criminal cases related to the stealing of MasterCard since the thieves cannot perform any transaction without the owners' consent.

Theoretical Framework

This study is anchored on Resource-based view (RBV) theory. RBV-based digital-capability research focuses on how digital technology creates value for firms (Dong et al., 2009). It is notable that digital resources, such as digital software or digital technology, do not independently explain the performance effect of a firm (Mishra et al., 2007). That is especially the case if the resource is a common technology that competitors might mimic and adopt (Bi et al., 2013). When they are applied independently, digital resources have little direct influence on firm performance, which might explain why the potential of the value of digital resources seems to have faded (Wiengarten et al., 2013). Nevertheless, it is clear that digital resources impact other resources, capabilities, and processes that can enhance performance (Wade & Hulland, 2004). The contingency perspective of the resource-based view suggests that complementary organizational aspects might explain the differential result of using digital technology (Wiengarten et al., 2013).

Research Methodology

The adopted that survey research design which is appropriate due to the nature of the study, primary sources of data in which questionnaire structured using 5 points likert scale of Strongly agreed, agreed, undecided, disagreed and strongly disagreed was used to elicit information from the respondents of the study areas, the population of the study of one hundred and eighteen (118) staff of Access Bank Plc and one hundred and twenty-four (124) staff of First Bank Plc, Abia state given overall total of two hundred and forty-two (242) respondents.

A sample size of 150 determined using Taro Yamane formula, Stratified sampling technique was adopted using Bowley's proportion technique formular to select 73.14 and 76.86 respondents from Access and First Bank Plc respectively. The study adopted a face validity test and a reliability of 70% determined using Cronbach alpha coefficient of reliability while generated data were analyzed using analysis to descriptive statistics of mean, percentages and standard deviation with the aid of Statistical Package for Social Science (SPSS), version 23. Hypotheses were tested using regression analysis and correlation.

Results

Questionnaire Distribution

Table 1 above, shows the distribution of questionnaire to respondents. From the table it can be seen that out of the total 150 questionnaires distributed only 132 were actually completed and returned valid constituting 88.00%, while a total of 6 and 12 were either returned not completed or not returned at all constituting 4.00% and 8.00% respectively. Therefore, this analysis is based on 132 questionnaire correctly filled and returned which formed about 88.00% of respondents who co-operated with the researcher. The high percentage of those who co-operated with the researcher shows that they were familiar with the topic under consideration.

Table 1: Distribution of questionnaire to staff of selected deposit money banks in Abia state and response rate

Respondents	*Distributed questionnaires*	*% Valid & Returned questionnaires*	*% Invalid and returned*	*% Not Returned*
Access Bank Plc.	73 (48.67)	62 (41.33)	4 (2.67)	7 (4.67)
First Bank Plc.	77 (51.33)	70 (46.67)	2 (1.33)	5 (3.33)
Total	**150 (100)**	**132 (88.00)**	**6 (4.00)**	**12 (8.00)**

Source: *Field survey*, 2023

Relationship between artificial intelligence and employees' efficiency and job satisfaction of selected deposit money banks

Six questions were designed in the questionnaire to ascertain the relationship between artificial intelligence and employees' efficiency and job satisfaction of selected deposit money banks in Abia state. From the result the mean responses for items 23 - 28 surpassed the criterion mean (4.08, 4.40, 4.03, 3.93, 3.97 and 4.41 ≥ 3.0). Also, the clustered mean was 4.14 which was accepted, this therefore implies that artificial intelligence has a relationship with employees' efficiency and job satisfaction.

Table 2: What is the relationship between artificial intelligence and employees' efficiency and job satisfaction of selected deposit money banks in Abia state? N = 132

S/N	QUESTIONS	SA 5	A 4	UD 3	D 2	SD 1	TOTAL	MEAN	REMARK
23	Creates flexibility and autonomy	44	69	4	8	7	531	4.08	Accepted
24	Improve training and development	74	47	3	3	5	578	4.40	Accepted
25	Helps in leadership and organizational culture	60	39	1	11	21	502	4.03	Accepted
26	Boost employees' salaries and market value	68	30	17	8	9	536	3.93	Accepted
27	Improve on employees engagements	60	40	8	8	16	516	3.97	Accepted
28	Enhances interpersonal and quality relationship	90	24	7	7	4	585	4.41	Accepted
	Clustered mean for decision rule:-							**4.14**	**Accepted**

Source: Field survey, 2023

Effect of artificial intelligence on financial execution of selected deposit money banks

Eleven questions were designed in the questionnaire to ascertain the effect of artificial intelligence on financial execution of selected deposit money banks in Abia state. From the result the mean responses for items 29 – 39 surpassed the criterion mean (4.31, 4.27, 4.21, 4.25, 3.91, 3.80, 3.88, 4.16, 4.20, 3.33, and 3.42 ≥ 3.0). The clustered mean was 3.98 which was accepted, this therefore implies that artificial intelligence has an effect on financial execution.

Table 3: What is the effect of artificial intelligence on financial execution of selected deposit money banks in Abia state? N = 132

S/N	QUESTIONS	SA 5	A 4	UD 3	D 2	SD 1	TOTAL	MEAN	REMARK
29	Help in account structures	76	38	6	7	5	569	4.31	Accepted
30	Validation of account	69	43	2	8	10	549	4.27	Accepted
31	Defaulting	61	48	4	17	2	545	4.21	Accepted
32	Account reporting	73	38	6	8	7	558	4.25	Accepted
33	Payments	69	25	13	8	17	517	3.91	Accepted
34	Impact on general ledger processes	67	15	12	18	20	487	3.80	Accepted
35	Non-reusable values	56	31	4	22	19	479	3.88	Accepted
36	Ability to activate or deactivate	51	65	6	8	2	551	4.16	Accepted
37	Ability to delete	62	45	3	17	5	538	4.20	Accepted

38	Ability to edit after posting	29	37	15	29	22	418	3.33	Accepted
39	Global or legal entity specification	36	35	12	21	28	426	3.42	Accepted
	Clustered mean for decision rule:-							**3.98**	**Accepted**

Source: Field survey, 2023

Test of Hypotheses

Table 4: Regression results showing the relationship between artificial intelligence and employees' efficiency and job satisfaction of Access Bank Plc and First Bank Plc

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	.274	.203		1.352	.179	-.127	.676
Artificial intelligence	1.014	.049	.878	20.896	.000	.918	1.111

R = 0.878
R-Square = 0.771
Adjusted R-Square = 0.769
Std. Error of the Estimate = 0.52116
Durbin-Watson = 0.172
F-Statistics = 436.656
T-Statistic (df_1 = 1 & df_2 = 132) = 20.896

a. Dependent Variable: employees' efficiency and job satisfaction of selected deposit money banks
b. Predictors: (Constant), Artificial intelligence **Source:** *Researcher's Estimation 2023 SPSS version 25.0 Significance @ 95 confidence level (See SPSS Output –Appendix V)*

As seen in the Tables 4 the regression results showed that the estimated coefficient of the regression parameters has positive sign and thus conform to our a priori expectation, the R- square value of 0.771 which is the coefficient of determination covers 77.1% of the sample variation in the dependent variable is explained or caused by the explanatory variable while 22.9% is unexplained. This remaining could be caused by other factors or variables not built into the model. The high value of R-square is an indication of a good relationship between the dependent and independent variables, meaning that there is a strong positive correlation between artificial intelligence and employees' efficiency and job satisfaction of selected deposit money banks. This means that an increase in the independent variables will bring about improvement in the dependent variable. The regression equation (Y= 0.274+1.014AI+e) shows that employees' efficiency and job satisfaction of selected deposit money banks will always depend on positive constant factor of 0.274 regardless of the existence of other performance indicators. Every unit growth of artificial intelligence will impact on employees' efficiency and job satisfaction of selected deposit money banks by a factor of 1.014.

The R^2 value of 0.769 means that 76.9% of the variations in customers' satisfaction of selected deposit money banks is explained by artificial intelligence integration while the 23.1% is unexplained or explained by other variables indicating that the model is a good predictor. 0.52116 indicates its Standard Error of the Estimate, while Durbin Watson Statistic of 0.172 indicate the presence of no autocorrelation of variables within the partition curve. The F-Statistics of 436.656 measures the goodness of fit of the model which is greater than 2.5 rule of thumbs. The calculated t-Statistic remains 20.896 at (df_1 = 1 & df_2 = 132). With reference to table above, the calculated t-statistics of 20.896 is greater than the critical value (i.e. 1.984), the null hypothesis was rejected and the alternative accepted

Discussion of Findings

There is significant relationship between artificial intelligence and employees' efficiency and job satisfaction of Access Bank Plc. and First Bank Plc. this is in conformity with the work of Elegunde and Osagie, (2020), who research study examined Artificial Intelligence and Employee Performance in the Nigerian Banking Industry, Lagos Nigeria as a study to generalize results. Lastly, there is significant effect of artificial intelligence on examined financial execution of Access Bank Plc. and First Bank Plc. this is in relation to the findings of Thirumoorthi, Kalyanasundaram, & Naganandini, (2022), who concentrated basically to comprehend the different ramifications of Artificial Intelligence and its effect on Banking execution.

Conclusion and Recommendations

It could be concluded that since, the introduction of AI into financial services is one of the more inclined forward-looking explorations in today's international financial institutions. Also, since artificial intelligence has significant relationship with employees' efficiency and job satisfaction and financial execution of Access Bank Plc and First Bank Plc one could say that the usefulness of AI cannot be over-emphasized as it promotes better performance.

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