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Effects of Artificial Intelligence on Business Performance in the Banking Industry (A Study of Access Bank Plc and United Bank for Africa-Uba)

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Abstract
Purpose: *This study focused on the pivotal role that artificial intelligence had played in enhancing business performance, especially in the areas of achieving business objectives.This paper examined the effects of artificial intelligence on business performance.*
Design/Methods/Approach: *Survey research design was used in this study. 200 copies of questionnaires were administered to employees and customers of Access Bank Plc and United Bank for Africa (UBA). Simple random sampling technique was adopted in selecting respondents, and content validity was employed to validate the research instrument. Data collected were analyzed with regression analysis.*
Findings: *Customer satisfaction, service quality, competitive advantage and employees' efficiency; as non-financial business measures were all discovered and proven to be aided by artificial intelligence. Findings aligned with previous related studies on artificial intelligence (although which centered on financial objectives), and its effect on business. The R^2 value of 0.574, 0.445, 0.295 and 0.386 explained the level of variation in each of the sampled variables explained by AI.*
Practical Implications: *Banks and other technology receptive firms in Nigeria should push for full adoption of AI, as it brings greater value, efficiency and effectiveness to business. However, firms should be strategic and purpose driven when adopting AI, in order to get the best from its application in their respective firms.*
Originality/Value: *This research is the original works of the authors. The research used primary data in identifying the nexus between AI and non-financial business performance; thus, producing new knowledge and revelations as to how AI helps in achieving non-financial business objectives.*
Keywords*: Artificial Intelligence, Customer Satisfaction, Service Quality, Competitive Advantage, Employee Efficiency, Technology, Business and Performance.*

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I. Introduction

The performance of businesses is very crucial in predicting, ascertaining and evaluating the level or extent of growth and outcomes in business organizations. The performance of a business, whether financial or non-financial, provides a yardstick upon which business stakeholders can gauge and measure the degree of effectiveness, efficiency, overall productivity, as well as profitability of such organization or business enterprise. To stimulate and augment the performance of a firm, business-minded stakeholders have seen and witnessed the influx of sophisticated technologies, mechanisms and inventions, all targeted at improving business performance, supplementing business operations with respect to human deficiencies and introducing new ways of doing things, which is embedded in contemporary issues within Artificial Intelligence. The emerging technologies are said to have a great potential to transform the ways of living of human lives and the business operating models of companies all over the world. It becomes important to study both the capabilities and limitations of machine intelligence and its potential impact in human life, society and business. (Soni, Sharma, Singh & Kapoor, 2018).

Thus, Artificial Intelligence (AI) serves as an offshoot of these technologies and inventions. Technologies and inventions seem to be the main engine of an improved standard of living in the contemporary world today, and judging from this assumption, businesses are very much included. They are not in isolation, neither are they exempted. AI is a field of science and technology and its purpose is to develop computers that can think, see, hear, walk, talk and interestingly, feel like humans. A major thrust of artificial intelligence is the development of computer functions normally associated with human intelligence such as reasoning, learning, and problem solving (O'Brein, 2003). Intriguing questions abound about the possibility of intelligent thinking machines. For example, British AI pioneer Alan Turing in 1950 proposed a test for determining if machines could think. According to the Turing test, a computer could demonstrate intelligence if a human interviewer, conversing with an unseen human and an unseen computer, could not tell which was which, when presented with both scenarios (O'Brein, 2003).

The changes in the business world have been transformed by intelligent machines and advanced technologies. These machines are programmed such that they can perform tasks and functions which prior to this time, could only be performed by humans with specialized knowledge, special abilities and extensive and in-depth training. The present age and contemporary business world today is at the moment, the most exciting period of human existence. It is a period where technological innovations, ideas and inventions are taking place very rapidly. The world is gradually getting accustomed to seeing specialized cameras serving as security, robots functioning in the workplace, cars driving themselves (self driving cars), machines transacting business and many more; thus, ushering in some of the technologies the world have witnessed through the advent of artificial intelligence (Wisskirchen, Biacabe, Bormann, Muntz, Niehaus, Soler & Brauchitsch, 2017).

II. Problem Statement

A number of firms have adopted the use of technologies in their day to day operations. The use of technology has overtime affected the way businesses are been transacted, such that, organizations are attesting to how useful and important, artificial intelligence had become, in the performance of their operations and execution of tasks. The impact of artificial intelligence on business performance has been empirically evaluated by various researchers (Wisskirchen, Biacabe, Bormann, Muntz, Niehaus, Soler & Brauchitsch, 2017; Soni, Sharma, Singh & Kapoor, 2018; Bataller & Harris, 2016; Matthew Scherer, 2016). The focus of these past studies is of mixed outcomes and financial performance indicators are the dependent variables. Also, the availability of literatures on the subject matter is probably scanty because artificial intelligence is an emerging field in this part of the world.

These studies also placed focus on robotics, job factors, intelligent algorithm, health and safety issues, data safety, as well as financial objectives. Therefore, a gap needs to be filled that adequately and comprehensively explores the non-financial performance objectives of an organization and how these objectives are stimulated by artificial intelligence.

III. Literature Review

This section reviewed literatures on the subject matter in order to identify areas of convergence and divergence of views. This review focused on conceptual clarifications, theoretical framework and empirical studies within the same thematic areas. The nexus between artificial intelligence and business performance, as well as AI's importance to business cannot be underemphasized; the direct impact of artificial intelligence on the customer, as well as the employee would constitute the crux of this study. One can infer that this study would place its gaze on the non-financial performance of a business with artificial intelligence serving as a catalyst. In order to ascertain the impact of artificial intelligence on business performance (non-financial), it becomes pertinent to perform a critical review of the conceptual terminologies related to this study and also execute conceptual clarifications of relevant literatures, to provide an understanding of the extent of knowledge that previous researchers had carried out on the topic of concern.

Previous Knowledge on Artificial Intelligence and Business Performance

Wisskirchen et al., (2017) carried out a research titled "Artificial Intelligence and Robotics and Their Impact on the Workplace"**.** The study was able to discuss legal, economic and business issues, such as changes in the future labour market and in company structures, impact on working time, remuneration and on the working environment, new forms of employment and the impact of labour relations. The study was able to establish the risk and opportunities which are attached to artificial intelligence. For risks, the study acknowledged that AI will entail short term disadvantages. This, they posited by saying several million jobs worldwide are under threat and there may not be employment opportunities in other sectors for these employees because they lack sufficient training to perform efficiently and effectively in a new environment.

With the introduction of ever more new machines and intelligent IT systems, humans will become increasingly irrelevant for work profession. Wisskirchen et al., (2017) recommended that "Creative Solutions" from employee representatives, national lawmakers and companies are required in order to manage the problems that will arise subsequently. On the opportunity angle, the study admitted that AI opens new opportunities for companies and individuals. Humans are adaptable and will create new jobs. The use of intelligent IT systems improves efficiency and help decrease the time required to be spent on the product or the service, and the associated costs as well. The time saved, especially for dangerous works, can be used by human beings for other work or for leisure. AI should thus result in a growth of prosperity. Wisskirchen et al., (2017) took a step further by saying, technical developments will lead to a situation in which older employees and employees with disabilities can be better integrated; while machines can perform dangerous work. The new job models that will become prevalent as a result of AI, digitalization and the global integration of workers will be a grand chance for the younger generation to have more free time and to create an individual working atmosphere. Conclusively, the study by Wisskirchen et al., (2017) posited that both blue (informal) and white-collar (formal)

sectors will be affected by a potential loss of jobs and that the digitalization (and automation) of services is a global phenomenon and trend.

Another related study was carried out by Soni et al.,(2018). This research was titled "Impact of Artificial Intelligence on Business".The study centered on innovation with artificial intelligence as a talking point. The paper attempts to answer why every company want to be an AI company or want to acquire AI companies. The study also seeks to answer the question regarding why there is an exponential growth in the usage of AI. The paper attempt at answering these questions by scanning a number of business newsletters, AI magazines, journal papers, conference articles, machine learning posts, annual reports of the companies, press releases, stock market websites, online forums and many other platforms to gather the data required to help in their investigation.

The study by Soni et al.,(2018) investigated the effect of the amazingly increasing intelligent behavior of machines on the growth rate and changing behavior of the business all over the world. The study attempts at answering the questions raised by investigating 100 AI start-ups born all over the world, to meet customers' expectations in different application areas. The research positioned that increase in productivity, time and cost efficiency, human error reduction, faster business decisions, customer preference, predictions, and sales maximization are some of the merits of automation, cognitive technologies, and data analysis using AI algorithm. In furtherance, the research stated categorically that AI wave is on and appetite for AI growth is on an exponential increase. The research aims at carrying out further studies which will help the human community to get prepared and accept the changes with the rapid infusion of AI in human life and business.

Another literature which was examined by this study was the paper presented on "Artificial Intelligence in Business: Balancing Risk and Reward" by Dr. Rob F. Walker, Vice President, Decision Management and Analytics, Pegasystems in 2017. The paper examined if AI was truly a match for creativity; if machines can do what we (as thinking entities) can do; exploring the human/artificial intelligence continuum; optimizing AI through control & collaboration; AI Algorithm Quality Assurance (QA) Process; and how AI technologies benefit the business. The paper posited that AI can deliver tremendous business value, but it must first be operationalized. Real-time customer engagement is one area in which AI has been successfully operationalized and is delivering unprecedented business benefits. A real-time environment in which the models receive fast feedback on decisions and lots of data provides the perfect conditions for machine learning. Many companies can now test and perfect AI models in real-time with the data from millions of customer interactions per day.

In a more profound research, focusing on "Customer Satisfaction" and AI, which is one of the non-financial parameters used to measure business performance in this study, an interesting discovery was made with regards to the banking sector. Yeshodeep Khati & Emil Åberg (2018) carried out a research on"Artificial Intelligence in Customer Service: A Study on Customers‟ Perceptions regarding IVR Services in the Banking Industry".The purpose of the paper was to explore consumer perspectives on automated IVR (International Voice Recognition) customer services. Based on the findings of their study, they argued that customers are open to learn and adapt to IVR telephone customer service as long as it is advanced enough so that it can provide adequate customer service. Customers using the services currently are in doubts about the benefits of the system and are left without a choice. Leading to this it was found that customers are skeptical towards the quality of AI-driven customer service as it is today, however, they do express optimism and believe that it will be better in the future and they have accepted that there will be a change in technology.

When looking specifically at the banking industry, the findings of Yeshodeep Khati & Emil Åberg (2018) suggested that consumers usually don't have much interaction with their banks, but when they do, they prefer to talk to a regular person over an automated response. This is due to the fact that the consumers believe that the AI-provided responses could misinterpret the caller or lack the latest information which could cause frustration that would not have been caused if the call was responded by a real person. There is however a lack of communication from the company side to explain the benefits of using the IVR to its customers, and this could potentially affect their relationship with their banks. The cause and effect appear to be companies taking liberty in cutting cost and generating profits rather than providing a satisfactory customer service. One major thing to note is that ability to guarantee a satisfactory customer service is the quintessential aspect in creating and maintaining customer loyalty; thus, it is important to see the degree and extent to which IVRs are able to provide a satisfactory customer service. It should also be mentioned that consumers consider banking services to be of high importance since they would not let someone who they don't have much confidence in to take care of their money, and therefore they expect customer service to be of high quality as well.

An Extension of the Technology Acceptance Model (TAM) and the Task Technology Fit (TTF) to Understand Artificial Intelligence Adoption

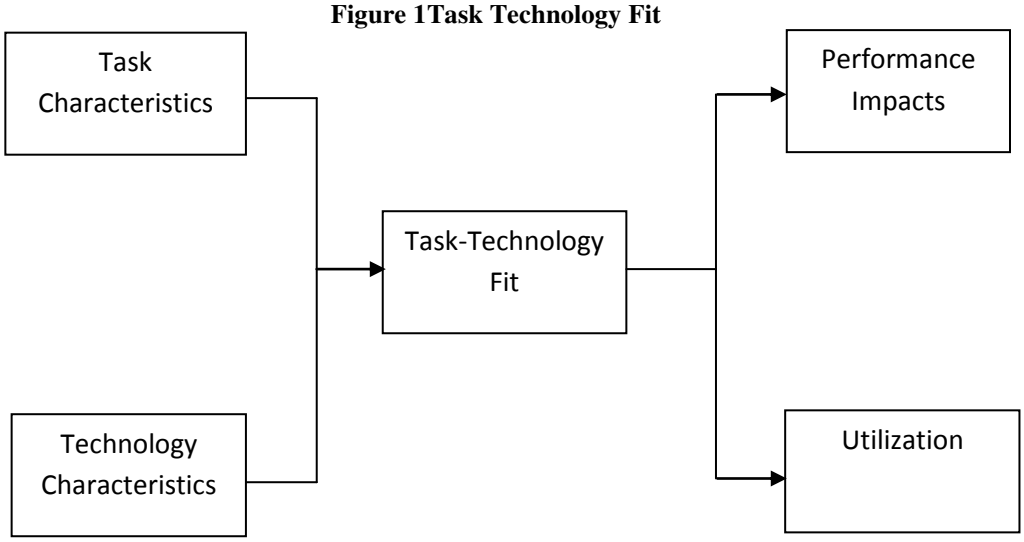
Task Technology Fit

According to Goodhue et al. (1995), Task-Technology Fit (TTF) emphasizes individual impact. Individual impact refers to improved efficiency, effectiveness, and/or higher quality. Goodhue et al. (1995)

assumed that the good fit between task and technology is to increase the likelihood or utilization and also to increase the performance impact since the technology meets the task needs and wants of users more closely. Simply put, we are talking of compatibility.

The model is suitable for investigating the actual usage of the technology especially testing of new technology to get feedback. Task-Technology Fit is said to be good for measuring the technology applications already in the marketplace. In this case, the Task-Technology Fit model can be used to explain how artificial intelligence (technology) can help in guaranteeing improved quality, efficiency, effectiveness, as well as increased performance impact within a business concern. The model is depicted below:

Figure 1Task Technology Fit



Task-technology fit (Goodhue and Thompson, 1995)

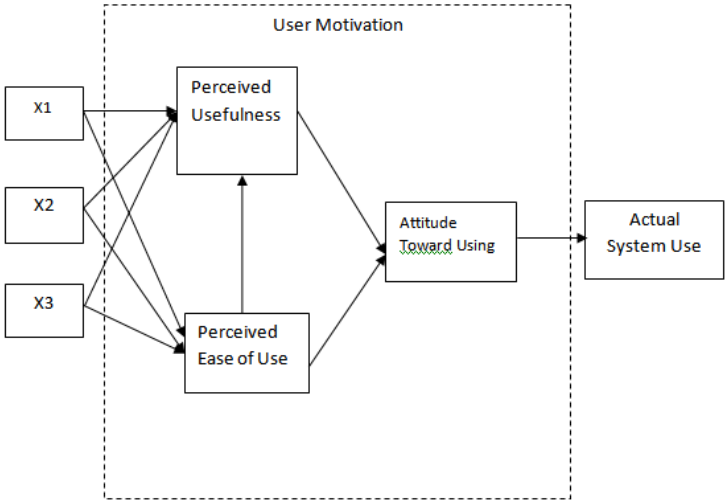
Technology Acceptance Model (TAM)

TAM was introduced by Fred Davis in 1986 for his doctorate proposal. TAM is specifically tailored for modelling user's acceptance of information systems or technologies. In 1989, Davis employed TAM to shed light on computer-usage behaviour. The goal of Davis was to explain the general determinants and indicators of computer acceptance that lead to explaining users' behaviour across a wide range of end-user computing technologies and user populations.

The basic TAM model included and tested two specific beliefs:

1. Perceived Usefulness (PU)
2. Perceived Ease of Use (PEU)

Figure 2*Original Technology Acceptance Model*



Original Technology Acceptance Model (Davis, 1986)

Perceived usefulness is defined as the potential user's (business) subjective likelihood that the use of a certain system (artificial intelligence) will improve his/her action. Perceived ease of use refers to the degree to which the potential user (in this case, maybe a business) expects the target system to be effortless (Davis, 1989).

Hypothetical Formulation

The research hypotheses for this study are given below:

Hypothesis 1:

$H_{0:}$ Artificial intelligence does not enhance customers' satisfaction in the banking industry

Hypothesis 2:

$H_{0:}$ Artificial intelligence does not have effects on quality service delivery for customers in the banking industry

Hypothesis 3:

$H_{0:}$ Artificial intelligence does not have effects on competitive advantage in the banking industry

Hypothesis 4:

$H_{0:}$ Artificial intelligence does not contribute to employees' efficiency and job satisfaction in the banking industry

IV. Materials & Methods

Research Design & Data Collection

Survey research design was used for the collection of data for this study. What informed the idea of a survey research design was to keep the response in check and to ensure that they are not manipulated or controlled by externalities. To guarantee high level of accuracy, the likert scale (multiple choices) was used, to allow for the sampling/airing of divergent views. The population of this study covers employees of Access Bank and United Bank of Africa (UBA). Also, customers of these banks were sampled and their responses were well documented.

In the course of this study, simple random sampling technique method was adopted to evaluate the response of employees and customers of Access Bank and UBA. The researcher used a sample size of **200** participants, drawn from the population under study.

100 employees were randomly selected, while **100** customers were also randomly selected, to make it a total of **200** sampled participants. Simple random sampling technique involved homogeneous characteristics of the population of the study. Also each element of the population had an equal chance of being selected and represented.

Measurement Validation

Validity as used here was the degree, appropriateness, or extent to which an instrument actually measured what it was intended to measure. **Content validity** was used, as it was able to ensure that the respondents are knowledgeable and are quite savvy with the questions given in the questionnaire. To validate the data instrument, the researcher scrutinized the items of the questionnaire to ensure its relevance and they were not at variance with the objective of the study. Based on the criticisms, comments and suggestions, a modification of a well – structured and organized instrument was made of the questionnaire items, which were used in the final production of the questionnaires. To cap it all, the researcher ensured that the respondents are people that are familiar with the topic under study.

Method of Data Analysis

The researcher, for the purpose of this study, used simple percentage method of data analysis and the **Regression** method of testing the hypothesis, in ascertaining the impact or influence, artificial intelligence has on business performance (non-financial).

V. Results

The major findings gotten from the analysis of data gathered, using SPSS, are presented, to establish how artificial intelligence influences business performance. This study focused on how artificial intelligence influences business performance, using non-financial objectives, such as customer satisfaction, service quality, competitive advantage and employee efficiency. The findings of this research are presented in tables, and they are given below.

Testing of Hypotheses

The Coefficient of determination *i.e.* R^2 (0.574) of hypothesis I revealed 57.4% of the total variation in ***CS*** (customer satisfaction) is explained by ***AI*** (artificial intelligence). This implies that out of the 100% impact on customer satisfaction, artificial intelligence account for 57.4%. The F-statistic (130.657) and the P-value (0.000) confirms the significant impact of artificial intelligence on customer satisfaction. ***Therefore, the***

regression analysis indicates the rejection of the null hypothesis (H_0). This implies that Artificial Intelligence help enhance customers' satisfaction in Access Bank and UBA, translating to the acceptance of the Alternative Hypothesis (H_1).

Coefficientofdetermination*i.e.*R^2(0.445) of hypothesis IIshown by the SPSS analysis impliesthat44.5%ofthetotalvariationin***SQ***(servicequality)isexplainedby***AI***(artificial intelligence).Thisimpliesthatoutofthe100%impactonservicequality,artificialintelligencesupportaccountfor44.5%. TheF-statistic(77.921)andtheP-value(0.000)confirmsthesignificantimpactofartificialintelligenceonservicequality.***Therefore,theregressionanalysisindicatestherejectionofthenullhypothesis(H_0).ThisimpliesthatArtificialIntelligencehaseffectsonqualityservicedeliveryforcustomersofAccessBankandUBA,translatingtotheacceptanceoftheAlternativeHypothesis(H_1).***

The regression coefficient of hypothesis III,*CA* (***competitive Advantage***) with respect to *AI* (***Artificial Intelligence***) is 0.496 with standard error, t-stat. and p-value of 0.091, 5.449 and 0.000 respectively. The positive regression coefficient implies that ***Artificial Intelligence*** help in achieving competitive advantage for Access Bank and UBA. With the p-value (0.000) less than 5% (0.05), *AI* (***Artificial Intelligence***) is statistically significant to influence *CA* (***competitive advantage). Therefore, the regression analysis indicates the rejection of the null hypothesis (H_0). This implies that Artificial Intelligence has effects on competitive advantage for Access Bank and UBA, translating to the acceptance of the Alternative Hypothesis (H_1).***

The Coefficient of determination of hypothesis IV *i.e.* R^2 (0.386) revealed that 38.6% of the total variation in ***EE*** (employee efficiency) is explained by ***AI*** (artificial intelligence). This implies that out of the 100% impact on employee efficiency, artificial intelligence account for 38.6%. In table 4.27, the F-statistic (44.671) and the P-value (0.000) confirms the significant impact of artificial intelligence on employee efficiency. The regression coefficient of *EE* (***employee efficiency***) with respect to *AI* (***Artificial Intelligence***) is 0.799 with standard error, t-stat. and p-value of 0.120, 6.684 and 0.000 respectively. The positive regression coefficient implies that ***Artificial Intelligence*** contributes to employees' efficiency in Access Bank and UBA. With the p-value (0.000) less than 5% (0.05), *AI* (***Artificial Intelligence***) is statistically significant to influence *EE* (***employee efficiency). Therefore, the regression analysis indicates the rejection of the null hypothesis (H_0). This implies that Artificial Intelligence contributes to employees' efficiency in Access Bank and UBA, translating to the acceptance of the Alternative Hypothesis (H_1).***

Discussion on Results

This research has been able to explore the non-financial objectives of business that are stimulated by artificial intelligence. As a form of reiteration, previous research has done nothing or little to justify how artificial intelligence impact on business performance with emphasis on non-financial objectives; this constituted the problem statement of this research work.

However, the findings of this research work, aligns with that made by Wisskirchen et al., (2017) in a research titled "Artificial Intelligence and Robotics and Their Impact on the Workplace". The research findings posited that efficient use of intelligent IT systems help decrease the time required for the product or the service, and this is in line with the submission made under "service quality" as a non-financial objective measure. The study further stated that the time saved, especially for dangerous works, can be used by human beings for other work or for leisure, which aligns with "employee efficiency and job satisfaction" (also a non-financial performance measure),

Furthermore, the findings made in this study were in tandem with a research work carried out by Sohi et al., (2018). This research was titled "Impact of Artificial Intelligence on Business".The research positioned that increase in productivity, time and cost efficiency, human error reduction, faster business decisions, customer preference, predictions, and sales maximization are some of the merits of automation, cognitive technologies, and data analysis using AI algorithm. This research work also emphasized on how artificial intelligence help in achieving productivity and time efficiency (service quality), customer preference (customer satisfaction), human error reduction (employee efficiency) and sales maximization (which invariably leads to competitive advantage).

In addition, the findings of this research work, upon juxtaposition, were in tandem with the result/conclusion of the paper presented on "Artificial Intelligence in Business: Balancing Risk and Reward" by Dr. Rob F. Walker, Vice President, Decision Management and Analytics, Pegasystems in 2017. The paper positioned that AI can deliver tremendous business value, but it must first be operationalized. Real-time customer engagement is one area in which AI has been successfully operationalized and is delivering unprecedented business benefits. A real-time environment in which the models receive fast feedback on decisions and lots of data provides the perfect conditions for machine learning. Many companies can now simulate and perfect AI models in real-time with the data from millions of customer interactions per day. This submission aligns with the conclusions drawn on customer satisfaction as well as competitive advantage, where emphasis was made on getting feedbacks and how it leads to competitive advantage.

The results given by the analysis conducted were quite insightful and revealing. The research had 99 respondents, representing customers, and 73 respondents, representing employees, to make up a total of 172 respondents. The summation of all responses, using the likert scale of strongly agree, agree, undecided, disagree, and strongly disagree tend towards the strongly agree and agree scale, thereby giving us positive responses and a higher possibility of rejecting H_0 and accepting H_1.

In the test of hypotheses, under the test of hypothesis 1, it was revealed; upon carrying out the regression analysis, that artificial intelligence help enhance customers' satisfaction in Access Bank and UBA. This was explained by the R^2 value, which shows that 57.4% of the total variation in CS (customer satisfaction) is explained by artificial intelligence. The p-value (0.000) confirms the significant impact of artificial intelligence on customer satisfaction, at 5% significance level.

Under hypothesis 2, result shows that artificial intelligence is helpful in quality service delivery for customers of Access Bank and UBA. This was substantiated by the R^2 value which shows that 44.5% of the total variation in SQ (service quality) is explained by AI (artificial intelligence). The p-value (0.000) also shows the significant impact of artificial intelligence on service quality.

Under hypothesis 3, the result shows that artificial intelligence helps in achieving competitive advantage for Access Bank and UBA. This was established by the R^2 value of 0.295, although not huge, but substantial, which shows that 29.5% of the total variation in CA (competitive advantage) is explained by artificial intelligence. The p-value (0.000) further explains the significant impact of artificial intelligence on competitive advantage.

Under hypothesis 4, the result shows that artificial intelligence contributes to employees' efficiency in Access Bank and UBA. This was corroborated by the R^2 value of 0.386, although not huge, but substantial, which shows that 38.6% of the total variation in EE (employee efficiency) is explained by artificial intelligence. The p-value (0.000) confirms the significant impact of artificial intelligence on employees' efficiency.

VI. Summary, Conclusions and Recommendations

Summary

This study was based on establishing the extent to which artificial intelligence, influence or impact on business performance, using non-financial performance measures of customer satisfaction, service quality, competitive advantage and employee efficiency. Emphasis had been made in the course of analyzing the data for this research, that artificial intelligence, to a large extent, impact on business performance, especially in the banking sector (using Access Bank and UBA).

The adoption of artificial intelligence, has indubitably, paved way for employing a more sophisticated, crafty and nuanced approach to carrying out business activities generally. This adoption has seen companies utilize artificial intelligence to their advantage, and by extension, using it as a tool to gain competitive edge over rivals, as well as improving their products and services. In addition, artificial intelligence is believed to have helped in enhancing customer satisfaction and guaranteeing employee efficiency, as a result of reduced workload. All these were examined in the course of this research work. In order to achieve the main aim of this research work, which was to determine how artificial intelligence impact on business performance, the questionnaire instrument was used in sampling opinions of respondents, and at the end of the analysis, the following findings were made:

i. Firstly, it became empirically proven that artificial intelligence helped enhance customers' satisfaction in Access Bank and UBA;
ii. Furthermore, it was established that artificial intelligence is helpful in quality service delivery for customers of Access Bank and UBA;
iii. In addition, it was substantiated by the findings that artificial intelligence helped in achieving competitive advantage for Access Bank and UBA;
iv. In the final analysis, it was agreed, based on findings gotten from the analysis that artificial intelligence contributes to employees' efficiency in Access Bank and UBA.

Conclusions

In light of the researcher's findings, it has been established that artificial intelligence, to a large and reasonable extent, impact on business performance, using non-financial objectives as a parameter. Non-financial objectives used were customer satisfaction, service quality, competitive advantage and employee efficiency.

Having examined the results displayed in the analysis contained in chapter 4, the following conclusions can be made:

i. That a direct positive relationship exists between artificial intelligence and customer satisfaction. This implies that, customer satisfaction measures and yardsticks such as repeat and continuous patronage, service experience, ease of transacting, product/service accessibility, customer convenience, amongst others, are to a large extent, aided by the utilization of artificial intelligence.

ii. That the way and manner service is being rendered, help in boosting the performance of a business enterprise. However, rendering of this service can be enhanced through effective utilization of artificial intelligence, which according to the result obtained in the analysis, is very helpful in achieving service quality, and this invariably, will impact on business performance positively.
iii. That gaining or achieving competitive edge in the contemporary business world we have today is heavily reliant on how well we can utilize artificial intelligence in business. Achieving competitive advantage is now a question of which company can make good use of artificial intelligence, which is a strategy in itself.
iv. That there exists a nexus between artificial intelligence and the work rate/efficiency of workers in an organization. It is safe to posit that utilization of artificial intelligence by an organization reduce stress and work overload on the part of the employees, and this translates to increased efficiency in performing other tasks best handled by humans.
v. That artificial intelligence is gradually becoming an indispensable component of a business, especially in the contemporary business world, and therefore, must be embraced fully to achieve increased business performances and sustainable growth.

In the final analysis, it is safe to posit that artificial intelligence, to a large extent, impact on business performance positively, using non-financial objectives as a yardstick or performance measure.

Recommendations

Artificial intelligence has been proven by this research to enhance business performance. The usefulness and potentiality of artificial intelligence cannot be overemphasized. However, in all of its usefulness, artificial intelligence can still be regarded as a work-in-progress (WIP), implying that it can still be improved upon to better enhance business performance.

Based on the research findings, the following recommendations are made:

i. Artificial intelligence should be adopted in business operations to enhance performance and help in the attainment of business objectives, especially in the non-financial angle;
ii. There should be proper and full adoption of artificial intelligence to help enhance customer satisfaction, as this will stimulate continuous patronage and foster repeat purchase and also serve as a customer retention strategy, depending on its application;
iii. Organizations should adopt the use of artificial intelligence to help ameliorate the challenges, rigors and stress faced by employees in the work place. This, according to this research, would translate to employee efficiency and job satisfaction;
iv. Application and use of artificial intelligence should be taught as a course in business to enhance understanding of the intricacies and technicalities associated with its use, adoption and application, to foster better business performance.
v. Research should be undertaken to evaluate how well artificial intelligence can be continually adapted to the ever-changing and dynamic business environment, in order to increase the functionality of artificial intelligence in the business space;
vi. Organizations should be very strategic and purpose driven when adopting artificial intelligence, in order to get the best from its application in their respective organizations.

Further Research Areas

It is noteworthy to state that the field of artificial intelligence, especially as it relates to business has very few researches to its name. Researchers are yet to fully undertake a research study on artificial intelligence and how it affects business performance. Further research could be undertaken in the following areas:

i. Extending the study to analyze the impact of artificial intelligence on business, with emphasis on non-financial objectives;
ii. Extending the study to non-profit oriented organizations;
iii. Other non-financial performance measures can be employed in further research work to allow for a more robust finding, discovery and new knowledge;
iv. Going deeper into the subject matter, "artificial intelligence" by evaluating each branch of artificial intelligence and how they can be utilized in business operations.

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