

APPLICATION OF ARTIFICIAL INTELLIGENCE IN TRANSFORMING SMALL AND MEDIUM SCALE ENTERPRISES IN ANAMBRA STATE.

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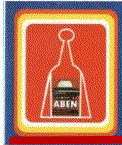
Abstract

This study determined the application of artificial intelligence in transforming small and medium scale enterprises in Anambra State. Two null hypotheses were tested at 0.05 level of significance. Descriptive survey research design was adopted for the study. This study was carried out in Anambra State which is one of five states in the south east zone of Nigeria. The population of the study comprised 2,837 SME managers of enterprises in Anambra State who are registered with the State Ministry of Commerce, Industry and Technology. The sample size of 351 SME managers was used for the study. The sample size was derived using the Taro Yamani formula. A structured questionnaire was used for data collection. The face validity of the instrument was established using the opinions of three experts in business education. The application of Cronbach Alpha reliability method on the two clusters of the instrument yielded coefficient values of 0.84 and 0.82 for clusters B1 and B2 respectively. An overall reliability coefficient value of 0.83 was obtained. From the findings of the study, it was revealed that managers of SMEs in Anambra State applied artificial intelligence in supply chain management and customer service in small and medium scale enterprises in Anambra State based on years of experience. The study further revealed that there is no significant difference in the mean ratings of managers on the extent of application of artificial intelligence in supply chain management and customer service in small and medium scale enterprises in Anambra State. Based on the findings, it was recommended among others that government, in a bid to promote SMEs and make them sustainable, should carry out awareness and training programs to let them know about the existence of certain AI technologies and their usage in their businesses, to encourage them to embrace it for their businesses.

Keywords: Artificial Intelligence, small and medium scale enterprises.

Introduction

The existence of small businesses in different nations is crucial to their growth and development. Over the years, SMEs have been observed to play a role in the job and employment creation dynamics of countries. This position was highlighted by Bandari (2019), who stated that SMEs are of significant importance in the economy as they make substantial contributions to employment generation, innovation, and overall economic expansion. They frequently serve as primary catalysts for economic expansion within communities, as they generate employment opportunities and offer local citizens avenues for economic advancement. According to the European Union (EU), small enterprises are businesses with less than 50 employees, while medium sized enterprises are independent businesses with fewer than 250 employees (Vajjhala & Strang, 2019). Small and medium-sized enterprises (SMEs) are prevalent in Nigeria and are often viewed as the backbone of the Nigerian economy. According to the National Bureau of Statistics, SMEs account for 96% of businesses and 84% of employment creation in Nigeria (Otitoju, 2023). With a total number of about 17.4 million, they account for

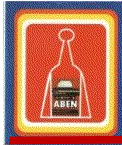


about 50% of industrial jobs and nearly 90% of the manufacturing sector (Ilo, Soyobo&Olowofela, 2023).

The Central Bank of Nigeria defined SMEs as enterprises which have an annual turnover not exceeding Five Hundred Thousand Naira (N500, 000). SMEs are non-subsidiary, independent firms/organizations which employ fewer numbers of employees (Fatima & Akhtar, 2023). Such organizations must and can be registered under any part of the Companies and Allied Matters Act (CAMA) in order to do business in Nigeria (Elendu, 2023). Small and medium scale enterprises are business organizations set-up by individuals or group of individuals, known as business operators, for the main purpose of providing goods and services. Their classification into small and medium enterprises depends on the scale or size of business operators' control. Furthermore, small and medium scale enterprises engage in different types of activities ranging from construction, agro-allied, information technology, manufacturing, educational establishments, business services, tourism and leisure. Small and medium scale businesses exist in the form of sole proprietorship and partnership, though some could be registered as limited liability companies and characterized by: simple management structure, informal employer/employee relationship, labour intensive operation, simple technology, fusion of ownership and management and limited access to capital (Olufemi, 2017).

Small and medium scale businesses are largely present in Anambra State where a large percentage of the residents are entrepreneurs or owners of small and medium businesses. The presence of small and medium scale business has increased economic activities in the State and has helped to improve the revenue base of the State. Some of these enterprises are overseen by managers employed by the business owners. An advantage of this form of business is that the owner or manager is usually involved in daily operations and is in a position to personally safeguard the assets of the business. Business owners, according to Okolo (2014), are people who have the ability to see and evaluate business opportunities, put together the necessary resources to take advantage of them and to initiate appropriate actions to ensure success. The business owners employ and contract the managers to oversee the running of their businesses. A manager can be seen as a person who is responsible for the realization of management processes, which make plans and decisions, organizes, supervises and controls human, financial and information resources of business enterprises. Gorgievski, Ascalon and Stephan (2011) defined a manager as the person employed in an administrative position, who has comprehensive knowledge necessary for leading people and managing an organization in order to achieve optimal realization of set tasks in confined conditions. Thus, the manager of a small-scale business is the person who is employed by the owner of the venture to oversee the management of the business which includes the management of the material and human resources on his behalf.

Nowadays, digital transformation of society and economy is in full swing, offering companies in all industries numerous chances to develop at different levels. Innovative technologies such as artificial intelligence (AI) create new opportunities and solutions where humans and systems have reached their limits (Wangler&Botthof, 2019). AI has become a multi-purpose technology transforming production and service delivery, with the potential to significantly impact economic growth and social progress of SMEs in Nigeria. According to the Organisation for Economic Co-operation and Development (OECD), despite potentially tremendous benefits, SMEs lag in the digital transformation. Emerging technologies, as diverse as they are, offer a range of applications for them to improve performance and overcome the size-related limitations they face in doing business (Nolan, 2019). AI can substantially affect the SME business environment by enhancing the efficiency of public administration, courts and tax

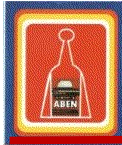


authorities, reducing red tape, securing digital infrastructure, improving SMEs' access to finance, easing skills management and job matching, or reducing the costs of experimentation and innovation (Nolan, 2021, Drydakis, 2022).

Artificial Intelligence (AI) is the ability of machines to do what intelligent humans do. This is a manifestation of the cognitive abilities of machines. In academia, it encompasses the study of how digital computers and algorithms undertake tasks and address intricate problems that typically require human intelligence, reasoning, and predictive capabilities to adapt to dynamic situations (Giuggioli & Pellegrini, 2023). Grover, Kar, and Dwivedi (2022) opined that AI can be defined as the ability of a system to acquire knowledge by evaluating data obtained from its external environment. This acquired knowledge is then utilized to adapt existing plans or generate new ones to effectively respond to changes in the environment. It involves the conceptualization and development of computational systems capable of performing tasks typically associated with human intelligence, such as the recognition of speech, interpretation of visual information, and decision-making processes (Rai et al., 2019). The deployment of AI in businesses includes the utilization of algorithms such as machine learning for text analytics, and predictive models are employed to extract patterns from the data (Sturm et al., 2021). In addition, it entails the implementation of robotic automation and virtual agents to facilitate business processes (Davenport & Ronanki, 2018).

Artificial Intelligence is mainly applied to small and medium-sized businesses to gain a competitive advantage. Artificial intelligence application to SMEs aims to increase company performance and sales, low cost, save time, and improve customer management. Some techniques used to implement artificial intelligence include deep learning, neural networks, expert systems, machine learning, and fuzzy logic. With these various techniques, artificial intelligence remains constant to build flexible, interactive, and adaptive solutions to customers' needs and problems (Strang & Sun, 2019). Numerous options are available to SMEs that want to use AI in their operations. Burian (2020) argued that firms deploy a range of AI tools and solutions, such as machine learning and deep learning, to improve their forecast accuracy and detect problems at an early stage. Organizations have the potential to implement other categories of AI systems, such as the use of ChatBots, language recognition and processing, image recognition, and object manipulation. Examples of technologies in the field include natural language processing (NLP), machine learning systems, gaming systems, and object detection (Greenberg, 2017). AI technology has the capacity to automate several routine and repetitive jobs in nature. This automation process enables the allocation of important time and resources to strategic and creative endeavors. For instance, AI technology has the potential to automate various duties such as data input, customer support, and marketing, enabling people to allocate their efforts to more valuable endeavors. The implementation of this solution has the potential to enhance operational efficiency, minimize expenditures, and enhance the overall productivity of small enterprises (Bandari, 2019). It also has the potential to help small businesses make informed and data-driven decisions (Bandari, 2019).

In today's market, AI has become vital support with services like social media monitoring, self-driving cars, smart assistants like Siri, virtual traveling booking agents, automated financial investing, predict machinery failures, and so on. While SMEs' innovation processes might sometimes be difficult to generalize, several features are commonly discussed in this regard. In comparison to large businesses, SMEs have a unique set of hurdles that may result in poor innovation performance. SMEs often face market failures that pose challenges to their competitive environment and the adoption of innovative ways of doing things, such as limited access to funding, constraints on innovation, and difficulties in complying with environmental

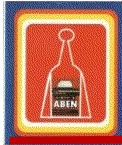


regulations (Commission, 2015; Kursh& Gold, 2016). Additionally, SMEs have greater workforce constraints due to a shortage of or insufficiently skilled people. They lack alternative goods or “cash cows” to offset the low return on investment (ROI) associated with innovation. SMEs frequently struggle to overcome structural hurdles such as a lack of managerial and technical skills, labor market rigidities, and inadequate information about expansion prospects (Borah et al. 2022).

Despite the numerous challenges faced by SMEs in Nigeria, several remarkable businesses have achieved success through innovative approaches and strategic decision-making. It has been shown that SMEs that adopt digital technology aided by AI enhance their competitive advantage and productivity (Chan, Teoh, Yeow, & Pan, 2019; L. Chan et al., 2019; Anuj Kumar & Kalse, 2021). It is widely used in business applications, including automation, data analytics, and natural language processing (Kabir, 2020). Artificial intelligence can be used to track user habits, provide recommendations, improve customer purchasing decisions and search results, communicate media, raise trade sales, improve organizational performance, and lower costs (Basri, 2020; Ulrich, Frank, & Kratt, 2021). Artificial intelligence has the potential to transform small and medium scale enterprises (SMEs) in Anambra State, Nigeria by improving efficiency, productivity and competitiveness. A few AI applications and tools are mostly used by businesses to improve their competitive advantage or integrate their systems. These business areas include improving sales and marketing efforts, supply chain management, automated customer service and communications, and improving recruitment and human resource activities.

Supply chain management (SCM) is a synchronized practice that manages the distribution of goods and services (Goli, 2022). It involves various interconnected functional areas, such as manufacturing, marketing, sales, and transportation. The interconnected or networked channels create value both for the end customer and the company stakeholders through an effective and efficient synchronization of materials, goods, and information flow. A supply chain links various processes from the production of raw materials to the consumption of final products, acting as a conduit for goods and services. The primary aim of SCM is to meet customer requirements by providing the right product at the right place and at the right time, while also maximizing corporate profitability. Companies are employing AI systems in their supply chains to help optimize distribution routes, boost warehouse productivity, streamline factory workflows and more (Tsidulko, 2024). Businesses use AI to manage and optimize supply chain activities such as monitoring product quality, balancing inventory levels, and identifying fuel-efficient delivery routes with more efficiency than traditional software.

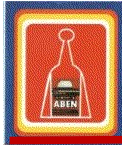
Artificial intelligence can be used to optimize supply chain operations by predicting demand, managing inventory and automating logistics processes. This can help SMEs reduce costs and improve efficiency, allowing them to compete more effectively in the market. AI-powered supply chain management systems can analyze historical sales data and use machine learning algorithms to forecast future demand, enabling businesses to plan production and ordering accordingly. Supply chain optimization also requires tracking physical goods every time they switch hands. Here, AI can automate documentation with its ability to intelligently enter, extract, and classify data embedded in text files to help ensure the integrity of multiparty transactions. Some manufacturers are taking advantage of AI in forecasting, using it to predict production capacity and optimize warehouse capacity based on customer demand (Tsidulko, 2024). Organizations use AI to optimize shipping and delivery, manage warehouse capacity, track inventory, forecast demand for specific parts and components, improve worker safety, and help ensure the integrity of transaction records throughout global supply chains.



Small and medium sized enterprises can greatly benefit from the application of artificial intelligence in customer service. Artificial intelligence in customer service refers to the use of intelligent technology to create support experiences that are fast, efficient, and personalized. AI-powered customer service tools enable organizations to automate experiences, streamline workflows, and assist agents ultimately saving time and money (Wren, 2024). AI-powered chatbots and virtual assistants can help streamline customer interactions, providing instant support and reducing wait times. This can lead to improved customer satisfaction and loyalty. AI in customer service is about leveraging intelligent technology to provide quick, personalized, and seamless support experiences. When implemented correctly, AI can foster authentically human customer connections. Arzikulov (2021) asserted that small businesses are leveraging AI to enhance their customer service, gather data, and identify optimal solutions tailored to their specific requirements. By analyzing customer data and feedback, AI systems can identify patterns and trends, allowing businesses to proactively address customerimprove overall customer experience. Voice search and built-in ChatBots are widely recognized as prominent AI technologies that are highly favored by customers for their ability to facilitate product discovery, information retrieval, and addressing common inquiries.

The use of AI-powered chatbots in customer service is becoming increasingly popular among small and medium scale business owners (Bandari, 2019). Chatbots are automated programs that can interact with customers, providing quick and efficient responses to their queries. This is an attractive option for small business owners, as it allows them to free up time and resources that would otherwise be spent on customer service. AI-powered chatbots use natural language processing (NLP) to understand customer queries and provide appropriate responses. This technology enables chatbots to understand customer intent and provide accurate answers to their questions. AI-powered chatbots also use machine learning (ML) to improve their responses over time, becoming more accurate and helpful with each interaction. An automated chat platform helps SMEs measure their customer engagement, complaints, and experiences to reduce the number of resources needed for customer interactions (Borah et al., 2022). This brings about more significant customer engagements, thus increasing the company's revenue and retention. The aim of AI in these business areas is to understand the customers' needs by determining the purchase pattern to increase the range of service.

Furthermore, to solve customers' issues, artificial intelligence can help organize customers' inquiries. This helps in reducing time-wasting for customers that require help with basic queries. AI technology can be used to automate routine customer service tasks, such as answering basic questions and handling routine inquiries (Bandari, 2019). This can free up customer service staff to focus on more complex and high-value tasks, helping to improve the overall customer experience. In addition, AI technology can be used to analyze customer feedback and data to identify trends and patterns, which can help small businesses to make informed decisions about how to improve customer service. Artificial intelligence improves customer experience and also brings significant business benefits. Incorporating artificial intelligence into customer service decrease costs, improve customer satisfaction, boost agent efficiency and increase productivity and efficiency. AI can lower customer service costs by automating routine tasks and inquiries, empowering support teams to resale more issues with fewer resources. By implementing AI-powered solutions in these areas, SMEs in Anambra State can transform their operations, improve efficiency and productivity and compete more effectively in the market. AI can help SMEs and reduce errors, enabling owners and managers to focus on more strategic aspects of the business. By leveraging the power of AI, these businesses can



drive, create new opportunities for their owners and employees, and contribute to the overall development of the state's economy.

Statement of the Problem

Although SMEs play a crucial role in the global economy and could benefit from artificial intelligence, adoption rates among SMEs in Anambra state remain relatively low. The slow pace of artificial intelligence adoption appears to be due to factors such as perceived high costs and the lack of capacity to implement and maintain such systems. Many small and medium businesses in Nigeria seem to view AI as being the exclusive preserve of big businesses that can afford it; they see it as being very expensive and requiring technical maneuvering to delve into it. SMEs and their owners in Nigeria most often feel that the cost of deployment or adoption of AI and its numerous technologies are inhibitive in nature in terms of cost. AI technology requires specialized hardware and software, and the cost of both can be prohibitive for small businesses that operate on tight budgets. This can make it difficult for small businesses to stay competitive with larger organizations that have more resources to invest in AI technology. Another challenge faced by small businesses is the lack of expertise and knowledge in AI technology. Implementing AI technology requires a certain level of technical know-how, and many small businesses struggle to find employees with the right skill set. However, most small businesses lack these skills requirements and lack the financial resources to attract human resources that can handle it.

Furthermore, AI technology is constantly evolving, and small businesses must continuously invest in training and education to stay up-to-date with the latest advancements. Managers and owners of small businesses feel that they lack the infrastructure needed to deploy AI in their business operations. The notion of "this is how we used to do it" tend to have prevented businesses, especially those that may be regarded as small in size in terms of human or material resources in Nigeria from adopting technology and AI in their business operations. They are afraid to change old ways, sometimes for fear of the unknown and uncertainties that might result from accepting AI. Some SMEs in Nigeria refuse to adopt AI for emotional reasons, such as making people not lose their jobs. They believe that when technologies are adopted in business, those who traditionally did their jobs before will have to make way, thereby losing their source of livelihood. This creates different opportunities for SMEs since they will be affected, and it is also essential to have adequate optimization from the manufacturing companies. All these are factors that drive the application of artificial intelligence tools. Artificial intelligence if applied could satisfy these demands. There is therefore the need to find out whether small and medium scale enterprises apply artificial intelligence in transforming their performance and productivity, hence the need for the study.

Research questions

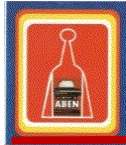
The following research questions guided the study

1. What is the extent of application of artificial intelligence in supply chain management in small and medium scale enterprises in Anambra State?
2. What is the extent of application of artificial intelligence in customer service in small and medium scale enterprises in Anambra State?

Hypotheses

The null hypotheses were tested at 0.05 level of significance:

1. There is no significant difference in the mean ratings of SMEs managers on the extent of application of artificial intelligence in supply chain management based on years of experience.
2. There is no significant difference in the mean ratings of SMEs managers on the extent of application of artificial intelligence in customer service based on years of experience.



Method

A descriptive survey research design was adopted for the study. Nworgu (2015) defined survey research as the design in which a group of people or items are studied by collecting and analyzing data from only a few people or items considered to be representative of the entire group. This study was carried out in Anambra State which is one of five states in the south east zone of Nigeria. The population of the study comprised 2,837 SME managers of enterprises in Anambra State who are registered with the State Ministry of Commerce, Industry and Technology. The sample size of 351 SME managers was used for the study. The sample size was derived using the Taro Yamani formula. Instrument for data collection was a structured questionnaire titled ‘Managers’ Extent of Application of Artificial Intelligence in Small and Medium Scale Enterprises Questionnaire’. It has two major sections, A and B. Section A contains the demographic information of the respondents based on years of experience while Section B consists of two sub-sections of B1 and B2 according to the research questions. Section B contained 10 and 11 items respectively on a 5-point rating scale of Very High Extent (VHE), High Extent (HE), Moderate Extent (ME), Low Extent (LE), Very Low Extent (VLE) representing 5,4,3,2 and 1 respectively.

The face validity of the instrument was established using the opinions of three experts from business education. To establish the instrument's reliability, the questionnaire was administered on a sample of 20 small and medium scale managers in Enugu State who are not part of the population of the study. The application of Cronbach Alpha reliability method on the two clusters of the instrument yielded coefficient values of 0.84 and 0.82 for clusters B1 and B2 respectively. An overall reliability co-efficient value of 0.83 was obtained for the instrument which shows that the instrument has a high internal consistency and is therefore considered suitable for the study. The researchers, with the help of three research assistants distributed copies of the questionnaire. The research assistants were instructed on how to distribute copies of the questionnaire to ensure that managers filled the questionnaire. Data related to the research questions were analyzed using mean and standard deviation and to determine the spread of the respondents means while ANOVA was used to test the hypotheses at 0.05 level of significance. Statistical Package for Social Sciences (SPSS) version 23 was used in the analysis of data. For the hypotheses, one-way analysis of variance (ANOVA) was used to test the null hypotheses at 0.05 level of significance. P-value was used for decision making for the hypotheses. Where the calculated p-value is less than or equal to the stipulated level of significance 0.05 ($p \leq 0.05$), it implies that there was significant difference between respondents' mean scores. Under this condition, the null hypothesis of no significant difference is rejected. On the other hand, if the p-value is greater than or equal to the alpha level of 0.05 ($p \geq 0.05$), the null hypothesis of no significant difference is accepted.

Results

Research Question 1

What is the extent of application of artificial intelligence in supply chain management in small and medium scale enterprises in Anambra State?

Table 1: Mean responses of managers on the extent of application of artificial intelligence in supply chain management in SMEs in Anambra State **N= 307**

S/no	Items on supply chain management	Mean	SD	Decision
1.	Optimizing workflows through simulations	2.35	0.53	Low extent
2.	Discovering patterns and relationships within data sets	2.06	0.67	Low extent
3.	Ensure appropriate documentation of	2.43	0.56	Low extent



	transactions			
4.	Forecasting customer demand	2.29	0.48	Low extent
5.	Building strong supplier relationships	2.32	0.47	Low extent
6.	Monitoring inventory levels to detect when stocks are low.	2.33	0.47	Low extent
7.	Enhances supplier selection	2.30	0.46	Low extent
8.	Tracking inventory through machine language	1.61	0.65	Low extent
9.	Reducing errors through forecasting	1.93	0.68	Low extent
10.	Exploring online catalogues for potential suppliers	2.08	0.67	Low extent
11.	Processing purchase orders	1.99	0.71	Low extent
	Cluster Mean	2.15		Low extent

Data in Table 1 show a cluster mean of 2.15 indicating that managers applied artificial intelligence in supply chain management to a low extent in small and medium scale enterprises in Anambra State. Item by item analysis in Table 1 showed that all the items with mean scores ranging from 1.61 to 2.43 were applied by managers of SMEs to a low extent. The standard deviations of 0.46 to 0.71 showed homogeneity in SMEs managers' responses indicating greater consensus of opinion.

Research Question 2

What is the extent of application of artificial intelligence in customer service in small and medium scale enterprises in Anambra State?

Table 2: Mean responses of managers on the extent of application of artificial intelligence in customer service in SMEs in Anambra State **N= 307**

S/no	Items on customer service	Mean	SD	Decision
12.	Using advanced algorithms to analyze customer data	2.25	0.79	Low extent
13.	Ability in interpreting client data	2.05	0.47	Low extent
14.	Using AI to evaluate client feedback	2.47	0.66	Low extent
15.	Anticipating one's customer needs	2.28	0.55	Low extent
16.	Analyzing vast volumes of historical and real-time data to identify patterns and trends	2.22	0.71	Low extent
17.	Predicting future demand more accurately	2.34	0.73	Low extent
18.	Using image recognition to analyze visual data	2.31	0.56	Low extent
19.	Forecasting customer behaviour	2.41	0.76	Low extent
20.	Enhancing customer relationship management	2.44	0.77	Low extent
21.	Tailoring marketing campaigns	2.04	0.48	Low extent
	Cluster Mean	2.28		Low extent

Data in Table 2 show a cluster mean of 2.28 indicating that managers applied artificial intelligence in customer service to a low extent in small and medium scale enterprises in Anambra State. Item by item analysis in Table 2 shows that items with mean scores ranging from 2.04 to 2.47 were applied by managers of SMEs to a low extent. The standard deviations of 0.47 to 0.79 showed homogeneity in SMEs managers' responses indicating greater consensus of opinion.

Testing of Null Hypotheses

Hypothesis 1



There is no significant difference in the mean ratings of SMEs managers on the extent of application of artificial intelligence in supply chain management based on years of experience.

Table 3: Summary of analysis of variance on the mean responses of SME's managers on the extent of application of artificial intelligence in supply chain management based on years of experience

N= 307							
Sources of variance	of	Sum of Squares	df	Mean Square	F	P-value	Decision
Between Groups		.8.891	2	5.678	1.547	.169	Not Significant
Within Groups		418.422	304	3.442			
Total		437.404	306				

As shown in Table 3, there is no significant difference among the three groups in terms of their mean responses on the extent of application of artificial intelligence in supply chain management in small and medium scale enterprises in Anambra State based on years of experience (5 years and below, 6 -10 years and above 10 years), as the F-ratio (2, 304) is 1.547 and P-value (.169) is greater than the stipulated 0.05 level of significance. Therefore, the null hypothesis is not rejected.

Hypothesis 2

There is no significant difference in the mean ratings of SMEs managers on the extent of application of artificial intelligence in customer service based on years of experience.

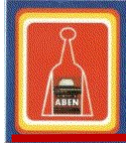
Table 4: Summary of analysis of variance on the mean responses of SME's managers on the extent of application of artificial intelligence in customer service based on years of experience

N= 307							
Sources of variance	of	Sum of Squares	df	Mean Square	F	P-value	Decision
Between Groups		1.7	2	1	.349	.496	Not Significant
Within Groups		1046.5	304	3.9			
Total		1044.3	306				

Data analysis in Table 5 show that there is no significant difference among the three groups in terms of their mean responses on the extent of application of artificial intelligence in customer service in small and medium scale enterprises in Anambra State based on years of experience (5 years and below, 6 -10 years and above 10 years), as the F-ratio (2, 304) is .349 and P-value (.496) is greater than the stipulated 0.05 level of significance. Therefore, the null hypothesis is not rejected.

Discussion of Findings

The results of the study indicated that managers of small and medium scale industries in Anambra state applied artificial intelligence in supply chain management to a low extent. This implies that majority of them in Anambra State often lack strong technology skills in supply chain



management, data management, cyber security and have a relatively weak understanding of the process for appropriate documentation of transactions and keeping track of inventories through machine language which helps in forecasting customer demand. It should be noted that the AI phenomenon is relatively recent regarding business applications; therefore, several companies have not yet developed the models and tools required to identify and select the necessary AI skills. This finding is in consonance with the findings of Ebuka, Emmanuel and Idigo (2023) who found out that most SMEs in Nigeria are still operating manually; hence, they do not enjoy the massive potential of AI deployment and remain perpetually small in size. It is seen that majority of the SMEs do not use AI in their businesses. Norgren (2023) stated that by implementing AI in supply chain management (SCM), companies can mitigate risks and reduce errors, delays, and wastage. AI can also contribute to predictive maintenance, minimising downtime and costly repairs, while process optimization can streamline operations and maximise productivity. Embracing AI in the SMEs holds immense potential for increased productivity, profitability, and overall success. Usmani et al. (2023) found out that artificial intelligence application in supply chain management have aided companies in realizing the value of artificial intelligence, developing strategies and plans to swiftly transition to digital technology, and streamlining workflows to improve supply chain efficiency. The result of the first hypothesis indicated that there is no significant difference among the managers of SMEs on the extent of application of artificial intelligence in supply chain management in small and medium scale enterprises in Anambra State based on years of experience. Therefore, it followed that the null hypothesis of no significant difference was not rejected.

The results of the study revealed that managers applied artificial intelligence in customer service to a low extent in small and medium scale enterprises in Anambra State. This implies that SMEs managers applied artificial intelligence to a low extent in examining the application and the effectiveness of artificial intelligence within organization, consumers' requirements, preferences, and views by analyzing customer sentiment, guiding business choices, and enhancing customer happiness. This could be as a result of inability of SMEs managers to interpret client data and using AI to evaluate client data, anticipating one's customer needs and tailoring marketing campaign. In view of this, Okoye et al. (2023) stated that when SMEs embrace electronic ways of attending to customers, it will boost the quality of their services as well as increase the sales coverage. Ewuga, et al. (2023) stated that technology can help SMEs improve their efficiency and productivity, provide better customer service and reach new customers and markets. Borah et al. (2022) found out that artificial intelligence-enabled procedures boost organizational performance, save expenses, increase sales, streamline customer management, enhance data gathering and processing, save time, and minimize errors. Communication with clients appears to boost attendance, particularly in a customer-oriented scenario. The result of the second hypothesis indicated that there is no significant difference among the managers of SMEs on the extent of application of artificial intelligence in customer service in small and medium scale enterprises in Anambra State based on years of experience. Therefore, it followed that the null hypothesis of no significant difference was not rejected.

Conclusion

From the findings of the study, it was revealed that managers of SMEs in Anambra State applied artificial intelligence in supply chain management and customer service to a low extent in small and medium scale enterprises in Anambra State. The prospects of AI are enormous when applied in the right way and used properly. However, small and medium scale businesses in Nigeria still appear to be shying away from it as a result of the apparent perception that the cost is inhibitive and that they might lack the expertise to properly apply AI, given the small nature of



their business. There are also some SMEs that are completely ignorant about the possibilities of AI and its potential to improve their efficiency, sustainability, and profitability. This is probably the reason that most SMEs in Nigeria especially Anambra State still execute their businesses in old ways. The study concludes that most SMEs in Nigeria are still operating manually, and hence, do not enjoy the massive potential of AI application; hence, they remain perpetually small in size with limited expansion potential.

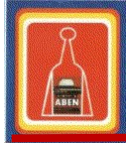
Recommendations

Based on the findings of the study, the following recommendations are made:

1. The government, in a bid to promote SMEs and make them sustainable, might carry out awareness and training programs to let the SMEs know about the existence of certain AI technologies and their usage in their business so as to encourage them to embrace it for their businesses.
2. For SMEs to grow and become competitive enough to challenge larger firms, some aspects of AI that are not costly, such as using ChatBot and AI target audience adverts, need to be deployed.
3. Governments should make technology more affordable for SMEs. This could be done through subsidies or tax breaks.
4. Private sector organizations should provide support and resources to SMEs that are trying to integrate technology. This could include mentoring, consulting, or access to technology.

References

- Nworgu, B. G. (2015). *Educational research: Basic issues and methodology*. Owerri: Wisdom Publishers
- Arzikulov, O. (2021). Artificial intelligence to increase the efficiency of small businesses. *ISJ Theoretical & Applied Science*, 8(100), 412-415.
- Bandari, V. (2019). The impact of artificial intelligence on the revenue growth of small businesses in developing countries: An empirical study. *Reviews of Contemporary Business Analytics*, 2(1), 33-44.
- Basri, W. (2020). Examining the impact of artificial intelligence (AI)-assisted social media marketing on the performance of small and medium enterprises: toward effective business management in the Saudi Arabian context. *International Journal of Computational Intelligence Systems*, 13(1), 142.
- Borah, S., Kama, C., Rakshit, S., & Vajjhala, N. R. (2023). Applications of artificial intelligence in small and medium sized enterprises.
- Burian, J. (2020). The complex choreography of supply chain resilience. *Industry Week*.
- Chan, C. M., Teoh, S. Y., Yeow, A., & Pan, G. (2019). Agility in responding to disruptive digital innovation: Case study of an SME. *Information systems journal*, 29(2), 436-455.
- Chan, L., Morgan, I., Simon, H., Alshabanat, F., Ober, D., Gentry, J., . . . Cao, R. (2019). *Survey of AI in cybersecurity for information technology management*. Paper presented at the 2019 IEEE technology & engineering management conference (TEMSCON).
- Commission, E. (2015). *User guide to the SME definition*. Retrieved from <https://data.europa.eu/doi/10.2873/620234>
- Davenport, T. H., & Ronanki, R. (2018). Artificial intelligence for the real world. *Harvard Business Review*, 96(1), 108-116.
- Drydakakis, N. (2022). Artificial Intelligence and reduced SMEs' business risks. A dynamic capabilities analysis during the COVID-19 pandemic. *Information Systems Frontiers*, 24(4), 1223-1247.
- Ebuka, A. A., Emmanuel D., & Idigo, P. (2023). Artificial Intelligence as a catalyst for the Sustainability of Small and Medium Scale Businesses (SMEs) in Nigeria. *Annals of Management and Organization Research*, 5(1), 1-11.
- Elendu, C.R. (2023). Evaluation of business partnerships in Nigeria under the companies and Allied Matters Act (Cama 2020). *Journal of Commercial and Property Law*, 10(2), 104-115.



- Ewuga, S. K., Egieya, Z. E., Omotosho, A., & Adegbite, A. O. (2023). Comparative review of technology integration in SMEs: A tale of two-economies-The United States and Nigeria. *Engineering Science and Technology Journal*, 4(6), 555-570
- Fatima, M., & Akhtar, S.J. (2023). Performance of micro, small and medium enterprises in Aligarh District of Uttar Pradesh. *SEDME (Small Enterprises Development, Management & Extension Journal)*.
- Giuggioli, G., & Pellegrini, M. M. (2023). Artificial intelligence as an enabler for entrepreneurs: a systematic literature review and an agenda for future research. *International Journal of Entrepreneurial Behavior & Research*, 29(4), 816-837.
- Goli, M. (2022). The role of AI and ML in revolutionizing supply chain management. *International Journal of Scientific Research and Management*, 10(6), 918-928.
- Grover, P., Kar, A. K., & Dwivedi, Y. K. (2022). Understanding artificial intelligence adoption in operations management: insights from the review of academic literature and social media discussions. *Annals of Operations Research*, 308(1-2), 177-213.
- Ilo, B.M., Soyebbo, Y.A., & Olowofela, O.E. (2023). Monetary policy and small and medium enterprises (SMEs) performance in Nigeria. *Modern Management Review*, 28(2), 25-37.
- Kabir, M. E. (2020). Artificial Intelligence in Business and Future Prospect. *IAR Journal of Entrepreneurship, Innovation & Design Thinking*, 1(1).
- Kursh SR, Gold NA (2016) Adding fintech and blockchain to your curriculum. *Bus Educ Innov J* 8(2):6-12
- Nolan, A. (2021). *Artificial intelligence, its diffusion and uses in manufacturing*.
- Nolan, A. (2019). *Artificial intelligence and the technologies of the next production revolution*.
- Norgen, A. (2023). *Implementing artificial intelligence in supply chain management*. Master's Programme in Management Master's Programme in Marketing
- Nworgu, B. G. (2015). *Educational research: Basic issues and methodology*. Owerri: Wisdom Publishers
- Okolo, J.E. (2014). *Assessment of financial management practices adopted by small and medium enterprises (SMEs) in Anambra State*. Unpublished M.Sc Thesis submitted to the Department of Vocational Education, Faculty of Education, Nnamdi Azikiwe University, Awka
- Okoye, C. C., Nwankwo, D. O., Okeke, N. M., Nwankwo, E. E., & Eze, S. U. (2023). Electronic Commerce and Sustainability of Smes in Anambra State. *Business and Economics in Developing Countries (BEDC)*, 1(1): 01-10
- Otitoju, M.A., Safugha, G.F., Vincent, E.O., & Chukwu, C.M. (2023). Review of the Naira redesign and its effect on micro, small, and medium enterprises (MSMEs). *Advances in Applied Sociology*, 13(9), 662-673.
- Rai, A., Constantinides, P., & Sarker, S. (2019). Next generation digital platforms: toward human-AI hybrids. *MIS quarterly*, 43(1), iii-ix.
- Strang KD, Sun Z (2019) Managerial controversies in artificial intelligence and big data analytics. In: Sun Z (ed) *Managerial perspectives on intelligent big data analytics*. IGI-Global: Hershey, PA, pp 55-75. <https://doi.org/10.4018/978-1-5225-7277-0.ch004>.
- Sturm, T., Gerlach, J. P., Pumplun, L., Mesbah, N., Peters, F., Tauchert, C., . . . Buxmann, P. (2021). Coordinating human and machine learning for effective organizational learning. *MIS quarterly*, 45(3).
- Tsidulko, J. (2024). Benefits of AI in the supply chain.
- Usmani, A., Sharma, M., Bung, P., Kurma, R. Ahmad, F., & Gupta, A. (2023). Key variables influencing artificial intelligence implementation in supply chain management: An empirical analysis on SMEs. *Migration Letters*, 20(11) (2023), 1284-1307.
- Vajjhala NR, StrangKD(2019) Impact of psycho-demographic factors on smartphone purchase decisions. In: Qiu E (ed) *Proceedings of the information system and system management conference*. Rabat University, Morocco. <http://www.issm.net/program.html>
- Wangler, L. & Botthof, A., 2019. E-Governance: Digitalisierung und KI in der öffentlichen Verwaltung. In: V. Wittpahl, Hrsg. *Künstliche Intelligenz. technologie, Anwendung, Gesellschaft*. Heidelberg: Springer-Verlag, pp. 122-141.
- Wren, H. (2024). AI in customer service: All you need to know.