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ARTIFICIAL INTELLIGENCE-MACHINE LEARNING (AI-ML) TECHNOLOGY AND CUSTOMER MANAGEMENT OUTCOMES IN HOSPITALITY ENTERPRISES IN CALABAR METROPOLIS

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Abstract

The research evaluates Artificial Intelligence-Machine Learning (AI-ML) technology and customer management outcomes in hospitality enterprises in Calabar Metropolis. The study was conducted to examine the level of correlation between AI-Machine Learning technology and customer segmentation in hospitality enterprises in Calabar Metropolis; and to assess the extent to which AI-Machine Learning technology correlates with customer retention in hospitality enterprises in Calabar Metropolis. The research adopts the survey research design. The study uses primary sources of data. A structured questionnaire was the major instrument for data collection. The study adopts the purposive sampling technique. Cronbach Alpha statistic was used to obtain the value of 0.75 as the instrument reliability ratio. Descriptive and inferential statistics were employed for data analysis. The findings reveal that there is a positive and significant level of correlation between AI-Machine Learning technology and customer segmentation in hospitality enterprises in Calabar Metropolis; AI-Machine Learning technology and customer retention in hospitality enterprises in Calabar Metropolis. The study concludes that AI-Machine Learning (AI-ML) technology significantly correlates with customer management outcomes in hospitality enterprises in Calabar Metropolis. The study recommends among others that hospitality enterprises in Calabar Metropolis should always train and retrain the handlers of AI-ML infrastructures so as to consistently achieve improved customer segmentation in the corporate entities; and management of

hospitality firms in Calabar Metropolis need to periodically update their AI-ML software and hardware so as to evade system failure while boosting customer retention in the going concerns.

KEYWORDS: Artificial Intelligence-Machine Learning (AI-ML) technology, Customer.

INTRODUCTION

It is a truism that Artificial Intelligence(AI) has continued to make waves in various sectors of the world economy for decades now. Its Machine Learning (ML) dimension has continued to be adopted by various businesses possibly for improved corporate performance. Njoku (2024) believes that AI represents the totality of technologies that enable computers execute different kinds of advanced functions. These functions include the ability to see; the capacity to understand and the competence to carry out the translation of both written and spoken language. It does not exclude the strength to analyze numerical information and non-numerical data. This agrees with the views of Stryker and Kavlakogbu (2024) who asserts that AI is a technology which enables computers imitate human learning and such other competences like comprehending, solving problems, making decisions, being creative and being able to demonstrate capacity to be autonomous.

Though John McCarthy was the first person to use the term AI in 1956 (Smith, 2006), Alan Turing was the one who conceptualized AI before it was so called hence the popular Turing test (Coursera, 2024). Turing was a renowned Mathematician from Britain (Njoku, 2024). Beschokov (2024) maintains that ML is a branch of AI which involves the process of teaching a computer to take instructions from information by way of evaluating and taking decisions from enormous evidence collections. Oracle (2024) defines ML as an aspect of AI which concentrates on the building of systems that learn or boost performance on the basis of the information or data they consume. Crabtree (2023) explains that ML helps computers to learn from data. It entails a situation whereby computers make decisions and predictions without being explicitly programmed to take the decisions or to make the predictions. ML deeply involves the creation and implementation of algorithms which drive the decisions and predictions. The algorithms which are meant for performance improvement over time become more accurate and more effective when they process more data. Staff (2024) reveals that ML is a tool for various commercial activities which include the suggestion

of products to consumers based on the consumers' previous purchases, the prediction of stock market fluctuations and the translation of texts from one language to another language.

Aggarwal and Subhashis (2024) opine that ML helps for personalized support by way of customer data analysis to predict needs and tailor interactions accordingly. It is a great tool for optimizing service delivery, ensuring the improvement of agent productivity as well as for customer satisfaction. It helps to anticipate customer needs and behaviours; it automates repetitive tasks like data entry, ticket routing and basic customer inquiries. It can analyze large volumes of customer feedback, social media posts and various unstructured data for the extraction of valuable insights. ML, round-the-clock customer support can be provided and this enhances accessibility and responsiveness despite time zones and geography. Customers can get responses to their queries instantly irrespective of their location and without waiting for live agents. It streamlines customer service workflows via customer service automation, optimization and improved resource allocation. With ML, there is minimal to zero chance of fraud hence ML algorithms have the capacity to analyze problems and detect anomalies in customer interactions and transactional data to promptly fish out fraudulent activities like unauthorized account access or unusual purchase behaviours (Aggarval and Subhashis, 2024).

This study focuses on AI-ML technology and customer management outcomes in hospitality enterprises. In the context of this study, customer management outcomes mean the use of AI-ML to enhance customer segmentation and customer retention in hospitality enterprises in Calabar Metropolis. Kiely (2024) defines the segmentation of customers as the very act of categorizing customers into different groups or segments on the basis of the characteristics they share especially as it affects their demographic, purchase behavioural and communication patterns. It enhances more effective resource use; the personalization of experiences; better customer connections and boosted marketing campaign results. Davey (2023) reveals that the information gathering methods are: face-to-face or telephone interviews, surveys, customer reviews, purchase history and in-person conversations.

Customer retention is yet another customer management outcome which this study investigates. Customer retention typically measures the capacity of a firm to retain its customers over a specified time period. Hashemi-Pour, Gillis and Sachs (2024) maintain that customer retention can be seen as a metric which

measures customer loyalty and indeed, it is an enterprise's ability to retain its customers over time. It has the capability to predict customer satisfaction, customer re-purchase behavior, engagement of customers as well as customer emotional ties to a preferred brand. Customer retention methods include the collection of numerical and non-numerical information and the analysis of same, trust, the social media, customer feedback, customer relationship management, customer support services and customer loyalty incentives, as well as the provision of customers with those services that are in alignment with their needs.

This study on AI-ML and customer management outcomes in hospitality enterprises in Calabar Metropolis is geared towards assessing how ML influences customer segmentation and customer retention in the hospitality firms. This is with a view to bridging research gaps while contributing to knowledge.

1.1 Statement of the Problem

The researchers have observed that many hospitality enterprises in Owerri are yet to employ ML in their customer management efforts. This is certainly not to the best interest of the enterprises and their customers. The ideal situation is that any hospitality firm that desires to have pleasant customer management outcomes in the present day world ought to embrace ML in its day to day business activities. Be that as it may, it is disturbing that many business entities in the hospitality sector find it difficult to embrace ML and they are yet to take any serious-minded steps to deploy ML technology in the going concerns. This unhealthy situation has the ability to adversely affect customer segmentation and customer retention in the outfits. All these have no tendencies of ushering any business to the next higher level.

In addition, empirical studies accessed by the researchers on AI, ML and customer management did not indicate the relationship between AI-ML and both customer segmentation and customer retention in hospitality firms in Calabar Metropolis. The implication of this is that research gaps exist on these relationships. Based on the research gaps, the researchers embarked on this study not only to fill the gaps but also to contribute to knowledge.

1.2 Objectives of the Study

The main objective of this study is to investigate AI-Machine Learning (AI-ML) technology and customer management outcomes in hospitality enterprises in Calabar Metropolis. The study specifically intends to:

i. examine the level of correlation between AI-Machine Learning technology and customer segmentation in hospitality enterprises in Calabar Metropolis.
ii. assess the extent to which AI-Machine Learning technology correlates with customer retention in hospitality enterprises in Calabar Metropolis.

1.3 Research Questions

Based on the objectives of the study, the researchers developed the following research questions:

i. What is the level of correlation between AI-Machine Learning technology and customer segmentation in hospitality enterprises in Calabar Metropolis?
ii. To what extent does AI-Machine Learning technology correlate with customer retention in hospitality enterprises in Calabar Metropolis?

1.4 Hypotheses

In alignment with the research questions, the researchers developed the following null hypotheses:

H_{01}: There is no significant level of correlation between AI-Machine Learning technology and customer segmentation in hospitality enterprises in Calabar Metropolis.

H_{02}: There is no significant extent to which AI-Machine Learning technology correlates with customer retention in hospitality enterprises in Calabar Metropolis.

1.5 Scope of the Study

Geographically, the study focuses on Calabar Metropolis, the Seat of the Government of Cross River State. The content scope shows the relationship between AI-Machine Learning technology and customer segmentation in hospitality enterprises in Calabar Metropolis; AI-Machine Learning technology and customer retention in hospitality enterprises in Calabar Metropolis. The unit scope comprises of the Chief Executives and Unit Heads of Marketing, Accounting/Finance, Human Resources, Information Technology(IT), Customer Services and Operations in hospitality enterprises in Calabar Metropolis. This is in agreement with the objectives of the study.

1. REVIEW OF RELATED LITERATURE

The review of related literatures consists of conceptual, theoretical and empirical reviews. The gap in literature is also identified.

2.1 Conceptual Review

This section examines the major concepts which this study investigates.

2.1.1 AI-ML and Customer Segmentation

AI-ML seems to have the capacity to effectively impact customer segmentation in business organizations. Tepfer (2024) opines that with the instrumentality of ML, marketing staff are equipped to go deep into having comprehensive customer insights so as to forecast customer responses while delivering hyper-personalized customer-experiences which encourages long term loyalty on the part of the customers. Using ML for segmentation of customers instills in marketers the abilities to carry out an analysis of extensive sets of data and gain insights that are useful which may be very unattainable to achieve manually. Such boosts customer lifetime value and energizes all-round corporate growth.

Again, enterprises gain from enhanced accuracy, scalability and real time adaptability (Tepfer, 2024). Lewandowski (2024) assert that ML methods definitely identify customer segments and such becomes more difficult when manually done. ML for customer segmentation is efficient and ensures higher accuracy. ML can be supervised learning, unsupervised learning and reinforcement learning. In fact, Amutha and Khan (2023) assert that making good use of data analysis and ML algorithms has the ability to enable business establishments have useful and sound insights into the clientele at their disposal with a view to ensuring that their services or offerings are customized in order to solve specific problems. Reilly (2024) maintains that ML is a powerful tool that helps firms identify the customers most likely to churn with a view to taking actions to prevent such. It helps companies to identify the clients that are most profitable so as to attract and retain more of the likes of such customers.

2.1.2 AI-ML and Customer Retention

It is possible that AI-ML may be a wonderful instrument for achieving customer retention. It could be realistic that ML models like regression, clustering, classification and recommendation models helps with various aspects of retention like predicting customer churn and recommending products or services.

Indeed, Sikri, Jameel, Idrees and Kaur (2024) admit that though there exist many ML approaches like “Support Vector Machine (SVM), Logistic Regression, Naïve Bayes, Artificial Neural Network (ANN) “etc which have proved to be effective in classifying and predicting related problems, very few of the algorithms have been used to predict customer churn. Pranav (2024) points out that by leveraging AI, enterprises gain deeper insights into customer behavior while fostering loyalty and satisfaction hence customer retention. El-Fotouh and Akanbi (2024) examined the impact of predictive analytics and ML on customer retention and loyalty in service-oriented businesses and they are of the revelation that enterprises which employ predictive analytics and ML enhance their customer retention rates while boosting their corporate service

quality and customer loyalty. The predictive models are decision trees, neural networks and ensemble methods.

1.2 Theoretical Review

The researchers used the Rogers' Diffusion of Innovation theory in analyzing AI-Machine Learning (AI-ML) technology and customer management outcomes in hospitality enterprises in Calabar Metropolis.

2.2.1 Diffusion of Innovation Theory

The Diffusion of Innovation theory was developed by E.M Rogers in 1962. Halton, Kelly and Pere (2023) in Njoku (2024) describe the theory as a hypothesis which shows the way new developments in technology as well as other advancements spread across societies and cultural settings beginning from introduction to a level of adoption that is widespread. The theory explains the reason behind the adoption of ideas that are new, new practices and the reason why adopting new ideas spreads out over a long time frame.

Rogers who was a communication theorist at the University of New Mexico maintains that the core persons in the theory include the innovators, early majority, late majority and laggards. Innovators are the persons who are not risk averse but are very open to taking risks and in fact, they are the first set of people to attempt new ideas. The early adopters are persons who have interest in the trying of new technologies so as to show their utility among societal members. Early majority refers to people who create the avenue for an innovation to be used with the society's mainstream. They are also members of the general population. The late majority are those who emulate the early majority by way of adoption of the innovation as an integral part of their day-to-day life and they are of course, part of the general population. The laggards are the people who lag or stay behind the general population in the adoption of innovative products and new ideas (Halton, Kelly and Pere (2023) in Njoku (2024).

AI-ML is a technology which many businesses adopt at various stages of their corporate existence. While some represent the innovators, early adopters and early majority, many others may certainly become the late majority and laggards (Njoku, 2024).

2.3 Empirical Review

The researchers employed various empirical studies to add value to the study:

Abdulhamid and Abubakar (2024) in Njoku (2024) investigated the role of AI on the performance of small and medium scale enterprises in Nigeria. The major objective of the study was to examine how AI could be employed in advancing business operations in Nigerian SMEs. Extant literature method was used in the study. It was found that AI is necessary for keeping a safe distance from others while doing business from

a secure location and improving customer loyalty and bringing in business for organizations and at the same time giving a competitive edge to the SMEs. Their study concludes that SMEs stand to benefit from the application of AI in the organizations.

Essien, Odejide, Okoronkwo and Afolabi (2024) in Njoku (2024) did 'a paradigmatic discourse on the correlation between investing in AI, effective communication and national transformation'. The objectives of their study were to investigate the extent of the adoption of AI technology and communication in the transformation of Nigeria; to identify the potential benefits and drawbacks of incorporating AI and communications into Nigeria's transformation efforts; and to examine the ethical, legal and social implications of AI on Nigeria's transformation as it relates with data privacy, transparency and accountability. The extant literature approach was adopted by the researchers. The study finds that AI in communication has the capacity to transform business and Nigeria's economy. Investing in technology and infrastructure may reduce AI's negative effects on the employment market. Government regulation and investment in AI, if properly done, have the capacities to accelerate Nigeria's digital transformation. The researchers concluded that AI application to the communication process could lead to faster, more accurate and more efficient exchanges of information while improving user experience and communication quality based on the ability to send customized messages.

Patil (2023) investigates ML in e-business enhancement: An empirical analysis. The study was conducted to evaluate the effect of ML on demand forecasting for online business; examine the relevance of customer engagement to the growth of online business; and to assess the influence of cross-selling on the things being sold. The survey research design was adopted. Data analysis was committed to percentage rate analysis, correlation analysis, regression analysis and Structured Equation Modelling. It was found that ML improved demand forecasting for online business, enabled e-commerce enterprises analyze the behavior of shoppers; helped to engage them and helped in improving goods and services. It helped to boost the relevance of cross-selling on the things being sold. The study concludes that ML was a great tool for allowing product segmentation for sustainability in growth and development.

Mekuri-Ndimele (2022) assessed 'Machine Learning and business growth of manufacturing companies in Rivers State'. The study was conducted to determine the effect of ML on market share, corporate diversification and business expansion of manufacturing companies in Rivers State. The survey research design was adopted. Descriptive statistics and regression analysis were used for data analysis. It was found that ML positively and significantly influenced market share, diversification and business expansion in the

corporate entities. The study concludes that ML impacted positively on business growth in the enterprises. It recommends that robotics should be embraced for market share improvement by the firms.

Sriram, Lakshmi, Podile, Naved, and Kumar (2021) investigated the 'role of ML and their effect on business management in the world today'. The extant literature approach was adopted in the study. They submit that ML enables enterprises to take smarter corporate decisions while effectively providing solutions to enterprise challenges. ML is an opportunity-creating tool for going concerns and it automates business processes and automations while enhancing the cognitive engagement between workers and customers. It gives solutions to customer problems including matters relating to password. Their study concludes that AI-ML is relevant in business product development and growth.

Gap Identified in Literature

Empirical studies accessed by the researchers in the area of Artificial Intelligence (AI) did not assess the relationships which this present student evaluates. Efforts were not made by previous researchers to examine the level of correlation between: AI-Machine Learning technology and customer segmentation in hospitality enterprises in Calabar Metropolis; AI-Machine Learning technology and customer retention in hospitality enterprises in Calabar Metropolis. Based on these identified research gaps, this present study covers the gaps.

Methodology

The study employs the survey research design. The population of the study comprises of the Chief Executives and Units Heads of Marketing, Accounting/Finance, Human Resources, Information Technology(IT), Customer Services and Operations in ten (10) hospitality enterprises in Calabar Metropolis. The total population of the study is 70. The study uses the Taro Yamen's formula for sample size determination to obtain a sample size of 60 for the study. Therefore, 60 copies of the questionnaire were administered to respondents in the study hospitality enterprises. The sources of data include the primary and secondary sources. While the questionnaire was the major instrument of data collection used for the study as a primary data tool, the researchers relied on texts, journals and internet sources for secondary data. The validity of the instrument was done by showing the instrument to research experts for their inputs and by ensuring that the study focused on the research questions. The reliability ratio of the instrument was done with the use of pilot study whose results were committed to Cronbach alpha statistic. A ratio of 0.75 was

obtained. The instrument was therefore 75% reliable. The study employs the descriptive statistics of mean and standard deviation for data analysis. Spearman Product Moment Correlation analysis was used to test hypotheses. The rejection of null hypothesis was based on $P<0.05$.

Data Presentation & Analysis/Discussion of Results

Out of the 60 questionnaire copies distributed to the respondents, only 52 copies were properly filled and returned. This means 87% return.

Research Question 1:

What is the level of correlation between AI-Machine Learning technology and customer segmentation in hospitality enterprises in Calabar Metropolis?

Table 1: Respondents' responses on the level of correlation between AI-Machine Learning technology and customer segmentation in hospitality enterprises in Calabar Metropolis

Q/No	Item	SA	A	UN	D	SD	N	Mean	Std. Dev.
1	AI-Machine Learning technology helps hospitality enterprises to segment customers based on customer behavior, customer preferences and demographics.	22	21	4	2	3	52	4.10	0.977
2	Based on the customer segmentation competences of AI-ML technology, management trains and retrains staff on its relevance and management in the enterprises for optimal performance.	20	19	8	1	4	52	3.96	0.84

Field Survey (2024)

The Table 1 above presents data from responses by the respondents under study. The result also disclosed a strong agreement by the respondents on their opinion on the level of correlation between AI-Machine Learning technology and customer segmentation in hospitality enterprises in Calabar Metropolis. The

results further show that the respondents agreed to the facts that: AI-Machine Learning technology helps hospitality enterprises to segment customers based on customer behavior, customer preferences and demographics ($\bar{\bar{x}} \pm \text{S.D}$ of 4.10 ± 0.977); based on the customer segmentation competences of AI-ML technology, management trains and retrains staff on its relevance and management in the enterprises for optimal performance (with a $\bar{\bar{x}} \pm \text{S.D}$ of 3.96 ± 0.84).

Research Question 2:

To what extent does AI-Machine Learning technology correlate with customer retention in hospitality enterprises in Calabar Metropolis?

Table 2: Respondents' responses on the level of correlation between AI-Machine Learning technology and customer retention in hospitality enterprises in Calabar Metropolis

Q/No.	Item	SA	A	UN	D	SD	N	Mean	Std. Dev.
3	AI-Machine Learning technology aids hospitality firms in retaining the customers they attract to the enterprises.	24	19	5	1	3	52	4.15	0.995
4	The retention of customers in the hospitality outfits gives management the opportunity to improve the AI-ML infrastructures in the going concerns.	18	22	7	3	2	52	3.98	0.879

Field Survey (2024)

The Table 2 above presents data from responses by respondents on the level of correlation between AI-Machine Learning technology and customer retention in hospitality enterprises in Calabar Metropolis. The results show that majority of the respondents affirmed to the statements. There is a high level agreement by the respondents on the opinion that AI-Machine Learning technology aids hospitality firms in retaining the customers they attract to the enterprises as the result accounted for a mean of 4.15 and a standard deviation of 0.995. The result has indicated that the majority of the respondents agreed to the item statement that the retention of customers in the hospitality outfits gives management the opportunity to improve the AI-ML infrastructures in the going concerns (with a $\bar{x} \pm \text{S.D}$ of 3.98 ± 0.879).

Testing of Hypotheses

Ho_1: There is no significant level of correlation between AI-Machine Learning technology and customer segmentation in hospitality enterprises in Calabar Metropolis. **Table 3: Correlation analysis between** AI-Machine Learning technology and customer segmentation in hospitality enterprises in Calabar Metropolis

Item	Mean	Standard Deviation	Correlation Coefficient	P-value
AI-Machine Learning technology	4.10	0.977	0.969	0.001
Customer segmentation.	3.96	0.84		

SPSS Correlation Analysis Output (2024).

The above table shows the correlation analysis between AI-Machine Learning technology and customer segmentation in hospitality enterprises in Calabar Metropolis. The result shows a p-value of 0.001. It also shows a correlation coefficient of 0.969. The result shows a p-value less than 0.05 being the level of significance. This implies the rejection of the

null hypothesis and acceptance of the alternative hypothesis. Accordingly, the correlation coefficient between AI-Machine Learning technology and customer segmentation in hospitality enterprises in Calabar Metropolis is statistically significant. And so, there is a significant level of correlation between AI-Machine Learning technology and customer segmentation in hospitality enterprises in Calabar Metropolis.

Ho_2: There is no significant extent to which AI-Machine Learning technology correlates with customer retention in hospitality enterprises in Calabar Metropol**Table 4: Correlation analysis between AI-Machine Learning technology and customer retention in hospitality enterprises in Calabar Metropolis**

Item	Mean	Standard Deviation	Correlation Coefficient	P-value
AI-Machine Learning technology	4.15	0.995	0.944	0.001
Customer retention	3.98	0.879		

SPSS Correlation Analysis Output (2024).

The table above shows the correlation analysis between AI-Machine Learning technology and customer retention in hospitality enterprises in Calabar Metropolis. The result shows a p-value of 0.001 and correlation coefficient of 0.944. Since the result shows a p-value less than 0.05 being the level of significance, it implies the rejection of the null hypothesis and the acceptance of the alternative hypothesis. Accordingly, the correlation coefficient between AI-Machine Learning technology and customer retention in hospitality enterprises in Calabar Metropolis is statistically significant. Therefore, there is a significant extent to which AI-Machine Learning technology correlates with customer retention in hospitality enterprises in Calabar Metropolis.

2. Findings

After the data analysis, the study found that:

1. There is a significant level of correlation between AI-Machine Learning technology and customer segmentation in hospitality enterprises in Calabar Metropolis.
2. There is a significant extent to which AI-Machine Learning technology correlates with customer retention in hospitality enterprises in Calabar Metropolis.

5.1 Discussion of Findings

The findings made in this study are discussed as follows:

The fact that AI-Machine Learning technology helps hospitality enterprises to segment customers based on customer behavior, customer preferences and demographics as table 1 indicates implies that Machine Learning (ML) is a key tool for customer segmentation. The table further shows that based on the customer segmentation competences of AI-ML technology, management trains and retrains staff on its relevance and management in the enterprises for optimal performance. Patil (2023) investigates ML in e-business enhancement: An empirical analysis. The survey research design was adopted. Data analysis was committed to percentage rate analysis, correlation analysis, regression analysis and Structured Equation Modelling. It was found that ML improved demand forecasting for online business, enabled e-commerce enterprises analyze the behavior of shoppers; helped to engage them and helped in improving goods and services. It helped to boost the relevance of cross-selling on the things being sold. The findings made by Patil (2023) agree with the findings made in this present study.

Given that AI-Machine Learning technology aids hospitality firms in retaining the customers they attract to the enterprises as shown on table 2, it implies that ML is a great instrument for defeating customer defections. The same table 2 reveals that the retention of customers in the hospitality outfits gives management the opportunity to improve the AI-ML infrastructures in the going concerns. Mekuri-Ndimele (2022) assessed 'Machine Learning and business growth of manufacturing companies in Rivers State'. The survey research design was adopted. Descriptive statistics and regression analysis were used for data analysis. It was found that ML positively and significantly influenced market share,

diversification and business expansion in the corporate entities. The findings by Mekuri-Ndimele (2022) are in alignment with the findings in this present study.

5.2 Conclusion and Recommendations

5.2.1 Conclusion

This study concludes that AI-Machine Learning (AI-ML) technology significantly correlates with customer management outcomes in hospitality enterprises in Calabar Metropolis. It helps hospitality enterprises to segment customers based on customer behavior, customer preferences and demographics. AI-Machine Learning technology also aids hospitality firms in retaining the customers they attract to the enterprises.

The study therefore infers that any business organization especially hospitality enterprises that relegates Artificial Intelligence-Machine Learning (AI-ML) technology to the background risks customer defections and unsustainable customer segmentations. The researchers submit that Artificial Intelligence (AI)-ML remains one of the most potent technologies for effective customer management outcomes of customer segmentation and customer retention.

5.2.2 Recommendations

Based on the findings, the researchers made the following recommendations:

1. Hospitality enterprises in Calabar Metropolis should always train and retrain the handlers of AI-ML infrastructures so as to consistently achieve improved customer segmentation in the corporate entities.
2. Management of hospitality firms in Calabar Metropolis need to periodically update their AI-ML softwares and hardwares so as to evade system collapse while boosting customer retention in the going concerns.

5.2.3 Contribution to Knowledge

This study contributes to knowledge by providing empirical literature and by bridging research gaps on the relationships between AI-Machine Learning technology and customer segmentation in hospitality enterprises in Calabar Metropolis as well as AI-Machine

Learning technology and customer retention in hospitality enterprises in Calabar Metropolis. The study adds to the body of existing knowledge in the area of Artificial Intelligence-Machine Learning (AI-ML) technology. In fact, it provides the foremost empirical cum visible study on Artificial Intelligence-Machine Learning (AI-ML) technology as it relates to customer management outcomes in Calabar Metropolis, Nigeria.

5.2.4 Implications for Further Research

As this present study focuses only in Calabar Metropolis, further research ought to be done with a wider geographical scope to investigate areas outside Calabar Metropolis. The present study also concentrates on customer segmentation and customer retention indicators of customer management outcomes. Future researchers need to work on other indices of customer management outcomes. This study anchors only on hospitality firms. This indicates that future researchers should investigate AI-ML technology in other entities and industries outside hospitality enterprises and hospitality industry. In this research, the survey research design was employed to evaluate AI-Machine Learning (AI-ML) technology and customer management outcomes in hospitality enterprises in Calabar Metropolis. Future researchers need to vary the methodology over the same relationships to determine if there may be consistency or reliability in the results obtained. They may employ epistemological research method, ex post facto approach or even desk research among others.

In fact, this study assessed only the Chief Executives and Unit Heads in the study hospitality firms. Future researchers need to expand their survey scope to accommodate other staff in hospitality organizations over the proxies and linkages evaluated in this research. Given that this study examines the correlation between AI-ML technology and customer management outcomes in hospitality enterprises in Calabar Metropolis, future researchers should ascertain the correlation between AI-ML and business viability in the hospitality enterprises in Calabar and even in other types of business organizations in Calabar and outside Calabar.

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