

Impact of Big Data Analytics on the Performance of Multinational Companies in Nigeria: A Case Study of Guinness Nigeria Plc

Odeh, Job Adah, PhD¹; and Usman, Madugu, PhD²

¹Department of Business Administration, University of Abuja, Nigeria. ²Department of Public Administration, University of Abuja, Nigeria.

Corresponding author: usman.madugu@uniabuja.edu.ng

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Abstract

The poor performance of multinational firms in Nigeria, even though they were getting more access to data-driven technologies, led to worries about the effectiveness of big data analytics in influencing organisational performance. The paper has also explored how big data analytics affects the performance of multinational companies in Nigeria with reference to Guinness Nigeria Plc. The research design was a cross-sectional survey. A total of 839 employees in Guinness in Benin City, Lagos and three regional divisions were used to obtain a sample of 325 employees through the Krejcie and Morgan formula with a 20 percent non response adjustment. There was the use of the cluster sampling method that would provide representation within operations units. A structured questionnaire was used to gather primary data, and regression analysis was used to analyse data with the assistance of SPSS version 27. The results indicated that text analytics, video analytics, and audio analytics positively and statistically impacted the performance of organisations. The researchers concluded that big data analytics acted as a strategic tool that increased decision-making, operational performance, and competitive advantages. It was advised that Guinness Nigeria Plc ought to enhance its analytics by using context-sensitive text processing systems to improve operational optimisation, real-time video surveillance on customer engagement, and high-end audio analytics tools to improve customer engagement.

Keywords: Big Data Analytics, Text Analytics, Video Analytics, Audio Analytics, Organisational Performance, Multinational Companies

Introduction

The fast growth of digital technologies has redefined the manner in which companies conduct their businesses on a global scale where the use of big data analytics is shaping the modern-day business transformation. Organisations around the world are now creating and processing enormous amounts of both structured and unstructured data in the form of transactions, social media, sensors and multimedia streams. This change has transformed the competitive logic, in which value is now formed through the power to derive insights out of data, and not just to amass it. MNCs are especially pressurized to make sense of complex data settings across different markets, regulatory systems and consumer behaviours. In this regard, big data analytics is no longer an edge technology but a central

organisational process that shapes strategic choices, operational effectiveness, and market sensitivity.

Big data analytics can be defined as a scientific method of gathering, processing, and analysing large and varied data sets in order to reveal patterns and associations and provide actionable information. Its applicability to organisational performance is in the fact that it can lead to improved accuracy in decision-making, market trends prediction, and resource allocation. The modern analytics goes beyond numerical data to encompass textual, visual, and audio data, hence providing a more integrated view of business environments. An example is text analytics that allows companies to derive customer attitudes, online feedback, and internal messages that can have a direct impact on marketing campaigns and customer satisfaction (Raman et al., 2022; Lee et al., 2018). The progress of natural language processing and machine learning has also made these insights even more reliable (Asudani et al., 2023; Wu et al., 2025).

Another dimension is video analytics, which is the visual data capturing behavioural patterns. It enables companies to track customer movement, enhance the layout of their stores, and increase operational efficiency in retail and manufacturing settings (Xu et al., 2022; Zhang et al., 2022). Video analytics would be used to inform distribution logistics, warehouse management, and consumer engagement strategies of the company like Guinness Nigeria Plc, particularly in dynamic urban markets. Audio analytics, in its turn, is concerned with deriving meaning out of voice and sound data. It facilitates the use of applications like customer service analysis, brand perception analysis, and advertising analysis (Hildebrand et al., 2020; Yang et al., 2024). Combined, these dimensions demonstrate that big data analytics goes beyond traditional data, offering multidimensional insights that can influence firm performance in subtle ways.

Performance, especially in multinational corporations working in Nigeria is a complex concept that includes financial performance, efficiency with regard to operations, market share, and strategic flexibility. Such companies work in a very difficult environment, which is marked by infrastructural limitations, regulatory inconsistency, and dynamic consumer demands. Consequently, performance cannot be measured only by using financial measures, it is a capability to react to uncertainty, to hold on to competitive advantage and organisational resilience. In the case of Guinness Nigeria Plc, performance is a measure of profitability, as well as its ability to adjust to the local market environment and its alignment with the global corporate strategies.

The relations between big data analytics and firm performance in this respect seem to be complicated and context-related. On the one hand, analytics can help multinational companies to learn more about Nigerian consumers, predict changes in demand, and streamline supply chains. Conversely, data quality, technological infrastructure and organisational readiness might also affect the effectiveness of these capabilities. An example of how text, video, and audio analytics may be used in improving decision-making in Guinness Nigeria Plc is through marketing, operations, and customer interactions. However, the degree to which the analytics can be translated into the quantifiable

performance outcomes is still an open question that is informed by both internal capacities and the Nigerian business environment in general.

Statement of the Problem

Ideally, the multinational companies were supposed to be efficient, flexible and profitable in a wide range of markets. It was expected that the introduction of sophisticated technologies, including big data analytics, would reinforce the decision-making process, enhance customer insights, and increase operational coordination. The companies that could access extensive data sets and analytical solutions were expected to do better than its competitors by relating strategies to real-time market intelligence and consumer behaviour trend. In this ideal state, the role of data-driven decision-making was placed in the set of enabling the consistent performance and long-term competitiveness.

But the real-life situation facing multinational businesses in Nigeria was a more complicated case. Companies like Guinness Nigeria Plc had been operating in a climate characterized by unstable economic factors, infrastructural limitations and unstable consumer demand. These circumstances had already worked to yield irregular performance results. As an example, the Nigerian manufacturing and consumer goods industries were regularly hit by a drop in profits caused by volatility in the foreign currency, increasing production and distribution inefficiencies. Even though these firms could access vast amounts of data that can include sales, customer interactions, and supply chains, it was not clear how well these data resources were being analysed and converted into performance advantages. This disconnect also created concerns on whether the current technological capabilities were being fully utilized to meet the challenges relating to operations and the market.

There were also gaps in the empirical literature that warranted further research. Though previous researchers had determined that text analytics could support financial performance by understanding customer sentiment and interpreting customer feedback (Raman et al., 2022; Lee et al., 2018), the extent to which these insights would be applied to performance in a new market such as Nigeria was not well explored. On the same note, video and audio analytics were shown to have potential to optimise operations and engage customers (Xu et al., 2022; Hildebrand et al., 2020), but the empirical evidence on whether these dimensions related to firm performance in African multinational setting was limited. Other trends in machine learning and natural language processing were more recent and emphasized the increasing analytical capacity (Asudani et al., 2023; Wu et al., 2025), yet their influence on the companies like Guinness Nigeria Plc were not thoroughly researched. This gap implied the necessity to consider the impacts of various dimensions of big data analytics on the performance of organisations in this particular situation as a whole.

The Research Questions

Consequent upon the statement of the problem, the following research questions were drawn:

1. How does text analytics influence the performance of multinational companies in Nigeria, with specific reference to Guinness Nigeria Plc?
2. What effect does video analytics have on the performance of Guinness Nigeria Plc?
3. To what extent does audio analytics affect the performance of Guinness Nigeria Plc?

Objectives of the Study

The main objective of this study is to examine the impact of big data analytics on the performance of multinational companies in Nigeria, with specific reference to Guinness Nigeria Plc. To attain that major objective, the specific objectives included to:

- i. evaluate the effect of text analytics on the performance of Guinness Nigeria Plc.
- ii. assess the influence of video analytics on the performance of Guinness Nigeria Plc.
- iii. determine the effect of audio analytics on the performance of Guinness Nigeria Plc.

Literature Review

Conceptual Framework

Big Data Analytics

Big data analytics has been more and more presented as a strategic capability that enables organisations to derive meaningful insights on big, complex, and fast-moving datasets. It involves a set of tools and techniques aimed to process structured and unstructured data to facilitate decision-making, innovation, and operational efficiency. The modern views offer more than just a technological infrastructure; big data analytics can be viewed as a dynamic organisational resource that influences how companies perceive their environment and how they react to the forces of competition (Raman et al., 2022). The increasing use of data-driven processes is indicative of a larger movement in business around the world, with companies that successfully implement analytics in their operational strategies showing more adaptability and performance results. As applied in this study, big data analytics is a valuable perspective through which to view the process by which Guinness Nigeria Plc is managing a dynamic and challenging market environment. The company produces large amounts of data in its value chain, production and distribution as well as marketing and customer interaction. The capacity to process these datasets in real time can have an impact on the effectiveness with which the firm predicts demand, supply chains, and optimises its products. The recent developments in artificial intelligence and machine learning have only increased the scope of big data analytics and allowed organisations to work with a broader range of data types and reveal previously hard to identify patterns (Asudani et al., 2023; Korostin, 2025). This implies that the strategic resources of Guinness Nigeria Plc, which involve its ability to capitalize on these analytical capabilities, may influence its performance to some extent.

Text Analytics

Text analytics is an essential aspect of big data analytics, which aims at the extraction of insights off textual sources of data like customer reviews, social media communication, emails and internal reporting. It uses natural language processing methods to determine sentiment, patterns and create predictive information. In the recent past, transformer-based model advancements have made the accuracy and situational interpretation of textual information much better, and companies can extract more insightful interpretations of customer behaviour and communication within organisations (Wu et al., 2025; Koushal et al., 2025). This has widened the scope of text analytics to include more descriptive analysis to more predictive and prescriptive uses. Combined with this work, text analytics is especially applicable to the attempts of Guinness Nigeria Plc to comprehend the preferences of consumers and brand perception in the context of the Nigerian market. The company deals with a very competitive industry where customer satisfaction and comments can have direct impact on sales and market share. There is evidence that textual data, when analysed correctly, could give a signal of market trends and performance results in the early stages (Lee et al., 2018; Raman et al., 2022). Nevertheless, the usefulness of text analytics in this respect can be determined by the capacity of the firm to manage linguistic differences, informal and formal communication forms, and different quality of data. These issues demonstrate the importance of critically evaluating the role of text analytics in performance and not just thinking that there is a linear correlation.

Video Analytics

Video analytics is the process of analyzing visual data in an automated fashion to identify patterns, track activities, and provide actionable insight. It is a combination of computer vision, machine learning, and real-time processing technologies that assist in interpreting video streams to facilitate operational efficiency and strategic decision-making. The most recent studies have emphasized the growing popularity of edge-based video analytics systems, which enable a faster data processing speed and less latency in analyzing data (Xu et al., 2022; Li et al., 2024). This is especially applicable in places where quick decision-making is highly important like retail business and supply chain management. Video analytics can be relevant in the context of improving operational visibility and customer engagement strategies in the context of Guinness Nigeria Plc. An example to illustrate this is the customer flow in a retail store which would be used to determine the placement of the products and the promotional efforts, and a monitoring of the work at the warehouse would be used to determine the inefficiency in the distribution processes. It has been found that video analytics can enhance organisational efficiency by allowing real-time monitoring and responsive actions to address challenges faced in operations (Zhang et al., 2022; Sinyavskaya, 2023). But there are also issues associated with its use in the costs of infrastructure, data privacy and the technical knowledge needed to implement it effectively. These considerations indicate that the connection between video analytics and

performance will probably be dependent on the organisational preparedness and situational issues in the Nigerian business climate.

Audio Analytics

Audio analytics is the process of deriving useful information out of sound and voice data, achieved through methods, including speech recognition, acoustic feature analysis and machine learning. In recent years, it is receiving growing attention because of the development of deep learning models, which allow more precise classification and interpretation of audio signals (Mou and Milanova, 2024; Gourisaria et al., 2024). This has widened its use in different fields such as customer service, marketing, and monitoring the operations. Audio analytics enables companies to understand customer engagement, identify emotional indicators, and gauge communication success, hence the insights that supplement other data analysis. In this context, audio analytics have the potential to be valuable to Guinness Nigeria Plc in the context customer engagement and brand perception. As an example, voice interaction analysis in customer care centres or sound aspect in advertisement campaigns can help identify information about customer satisfaction and communication efficiency. It has been found that voice analytics are potentially helpful in improving decision-making and performance by enabling the detection of nuances in textual or numerical data (Hildebrand et al., 2020; Yang et al., 2024). However, reading audio information is naturally complicated as it presupposes the contextual interpretation of language, intonation, and cultural peculiarities. The complexity of this issue highlights the importance of investigating the application of audio analytics in particular organisational and cultural contexts.

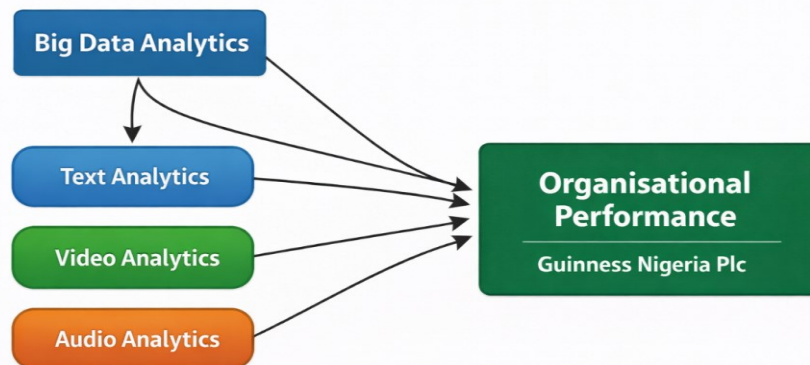
Performance

Performance has been a key concept in organisational studies and it is a measure of how successful a firm is in meeting its strategic and operational goals. It is usually modelled as a multidimensional measure which includes financial performance, operational effectiveness, market share and customer satisfaction. The capability of managing various market environments with congruence to global strategies determines performance in multinational companies. This is more so in the emerging economies like Nigeria where companies have to navigate infrastructural issues, regulatory developments and unstable economies. When it comes to the context of this research, the performance of Guinness Nigeria Plc can be defined as the reflection of the financial performance of this company and its ability to adjust to the local market forces. The company functions in a competitive and fast-evolving environment where the likes of consumers and the economy may change at any time. In this way, performance is not only the result of internal efficiency, but also the strategic responsiveness and resilience. Big data analytics integration in organisational processes can help affect these dimensions by offering timely and relevant information that can be used to make decisions. Nevertheless, the degree of these analytical abilities to translate into better performance is an empirical issue that is the focus of this study.

Theoretical Framework

The research is based on the Resource-Based View (RBV) which was firstly described by Wernerfelt in 1984. This theory assumes that sustained competitive advantage is realised when firms have and effectively use valuable, rare, inimitable, and non-substitutable resources. Big data analytics have been viewed as a resource of this kind in modern studies, as it has the potential to produce distinctive insights and improve decision-making processes (Raman et al., 2022). The RBV also makes the external conditions in the market marginal and gives more focus on internal abilities implying that the variation in performance among firms can be attributed to the variation in the endowment and utilisation of resources. The biggest assumption of RBV is that the competitive advantage and performance are mainly driven by internal resources. This has been broadened to encompass intangible assets like data, analytical skills and technological infrastructure. The theory has however been criticised due to its weak attention to the dynamics of the environment and its predisposition to the assumption that the resources are stable in the fast-evolving markets. The opponents state that resources can become less valuable as time goes by when firms do not respond to external changes. Irrespective of these observations, the RBV continues to be extensively used because of its high explanatory ability in the context of how internal capabilities can be used to determine performance. It is powerful because it offers a systematic approach to the study of the development and exploitation of strategic resources by firms. This paper conceptualises big data analytics such as text, video, and audio analytics as a strategic resource that can affect the performance of Guinness Nigeria Plc. The implementation of RBV makes it possible to understand more about the deployment of these analytical abilities within the organisation and the impact of it on the performance results in the Nigerian setting.

Conceptual Framework



The conceptual model shows how big data analytics are related to organisational performance, where the big data analytics is the overarching independent construct. Based on this proximate construct, three critical dimensions are derived, namely text analytics, video analytics, and audio analytics, suggesting that they are not independent variables but instead are elements of the larger analytics capability. All these dimensions are directly related to organisational performance, like that of Guinness Nigeria Plc, implying that they alone lead to performance outcomes. The assumption incorporated in the model is that the capability of the firm to utilize insights out of textual, visual, and audio data may influence its operational effectiveness, client cognition, and operational responsiveness. It also suggests that even though big data analytics is a cohesive capability, the performance is achieved through the following discrete but interrelated dimensions of analysis.

Review of Empirical Studies

Asudani et al. (2023) surveyed the impact of word embedding models on text analytics in deep learning settings with the focus of explaining how embedding decisions influenced the performance of downstream natural language processing. The research was international as opposed to being specific to one country. It took a review design methodologically, thus, a standard population, sample size and probability sampling frame were not feasible. Instead, the authors synthesised previous literature in word embeddings, deep learning architectures and text analytics tasks using documentary evidence based on published literature and they compared and thematically analysed those studies. They noted that the embedding selection had a significant impact on performance in sentiment analysis tasks, text classification, and named entity recognition, and advised more attentive selection of embeddings to tasks and domains. One of the greatest constraints was that being a review, the models were not tested under a single organisational environment. The value of using it in this research is that it demonstrates that the text analytics capability is not only

dependent on the volume of data, but also on the model selection, which is also applicable to how Guinness Nigeria Plc may turn the textual data into performance benefits.

The authors of the study by Wu et al. (2025) analyzed transformer-based text understanding frameworks to understand the recent developments in natural language processing and demonstrating why transformer models outperformed previous recurrent models. The work was also seen to be global and benchmark based as opposed to country based. Methodologically, it was in the form of a conference paper design that was constructed on model discussion, benchmark comparison, and analytical illustration, and therefore no human population, field sample, or survey-based sampling methodology was mentioned. The authors used secondary benchmark data sets and model evaluation processes of pretraining, fine-tuning, and performance comparison and evaluated the results with benchmark metrics like F1 and task performance. Their results showed that transformer models were highly successful on standard benchmarks, but they were computationally expensive, and they suggested more effort on efficiency and multimodal integration. This weakness was that the paper had made a priority that benchmarked technical performance over organisational application at the level of the firm. In the current study, it reinforces the argument that state-of-the-art text analytics may enhance the quality of decisions, but the translation between the model accuracy and business performance in a multinational headquartered in Nigeria had to be empirically tested.

Koushal et al. (2025) have conducted a review of the relationship between machine learning and natural language processing with the aim of describing how machine learning had revolutionized text classification, sentiment analysis, machine translation, and question answering. Through the institutional base, which was in India, the study was found, although its evidence base was extensive and literature-based. It employed a review design, and therefore, did not describe a standard study population, sample size, or field sampling process. It used published academic resources as its sources of information, and data were collected by compiling the literature and comparing the ideas. The thematic and descriptive analysis was done. The article discovered that deep learning and transformer-based models had supplanted most rule-based methods due to their ability to handle contextual knowledge in a better way, and it suggested the further incorporation of advanced machine learning into NLP systems. Its weakness was that it was conceptual and not validating these claims in a business organisation. In this research, it proved helpful since it placed text analytics in a bigger machine-learning capability framework, but did not demonstrate the impact of such capability on Guinness Nigeria Plc in particular.

Korostin (2025) explored the possibility of applying machine learning to real-time text analytics systems, and the aim was to find technical solutions and performance metrics of scalable, accurate and transparent text-stream processing. The author was affiliated with the study as it related to Belgium but the issue was cross-sectoral and international. It was not a survey or an experiment with respondents, but a technical article methodologically, and therefore there was no standard population, sample size, or sampling method

described. It was based on the documentary and systems-oriented evidence of the real-time text analytics situations, and the analysis was conceptual and performance-oriented. The results showed that the effectiveness of the platforms was correlated with the adaptability of the algorithm, its scalability, accuracy, and transparency of the results and the author suggested the optimisation strategies that would provide a balance between speed and interpretability. The weakness was that the article did not introduce a firm-specific case in an African market. In this study, it was especially applicable since Guinness Nigeria Plc could only enjoy the advantages of text analytics once the underlying system can process rapid commercial data in such a manner that it is reliable to provide managerial action.

The survey by Siino et al. (2023) was comparative on the question of whether text preprocessing remained relevant to transformers and classical classifiers, and the aim was to establish the impact of popular preprocessing methods to NLP model performance. This research was not field-constrained geographically and its orientation was comparative and computational. It did not apply population, respondent sample and social sampling technique because it relied on multiple datasets and families of classifiers, and not on a population study. Text datasets and previous modelling pipelines provided data, and computational experimentation and comparison between preprocessing alternatives were used to collect data. The comparison was based on performance evaluation. The authors discovered that preprocessing continued to be important, though less so by model family with transformers tending to need less aggressive preprocessing than conventional classifiers. They suggested a context-dependent and not routine preprocessing strategy. One of the weaknesses was that the findings were task- and dataset-specific. In this research, the implication is rather straightforward, since the quality of any text analytics solution utilized by Guinness Nigeria Plc would not rely merely on algorithms but on the manner in which textual data are ready to be analyzed.

Xu et al. (2022) created a survey of edge video analytics with the aim of mapping applications, systems, and enabling the techniques to process video at a point nearer to the data source. The article was global in nature rather than limited to one geographical instance. It assumed a survey design and, therefore, it did not follow the traditional population, sample size, and field sampling methods. Rather, it summarized previous studies on video analytics in application, including surveillance, traffic control, and emergency management and evaluated these works in systems and architecture perspective. The authors discovered that edge video analytics minimized the latency and bandwidth overheads and maximized responsiveness, but at the cost of energy consumption, model complexity, and implementation limitations. They suggested the further development of system optimisation and resource-conscious design. Its weakness was that, being a survey, it did not approximate direct effects of the performance of businesses. In the context of this research, it offered the technical rationale as to why video analytics may be important to Guinness Nigeria Plc, particularly with regard to retail visibility, warehousing, and supply-chain surveillance.

Li et al. (2024) studied timely video analytics services at the network edge with the goal of trade-off recognition accuracy and delay in limited network and computing conditions. It was systems based and not attached to a field sample in a single country. It was also not a survey design, but methodologically, an engineering and simulation design and therefore, no respondent population, human sample size and sampling technique were mentioned. It used computational scenarios, network-edge constraints and model service schedule data, and evaluated them based on timeliness and recognition trade-off measures. The research established that the current methods could not easily minimize delay, yet still maintain accuracy, and suggested better ways of realizing timely analytics. It suggested service strategies that collectively took into account transmission and computation limits. The main shortcoming was that the work itself was technical and did not evaluate the business performance of a particular company. In this paper, it was important since video analytics can only impact performance at Guinness Nigeria Plc when the system provides operational decisions within a reasonable time.

Khadka and Ghimire (2024) explored the concept of distributed real-time video analytics where vehicle detection is done on CPU edge nodes, and the aim was to address the issue of limited scalability and single-point failure inherent to single-node analytics. The authors affiliated the work to Nepal and it was presented at a conference held in Singapore. It used an experimental system design on Microsoft Azure Cloud, Apache Kafka, and an optimised YOLOv8 model. Since it was not a human-subject study, no social population sample or survey sample was described, and conventional sampling could not be used. Video streams that were processed by the distributed architecture were used to gather data, and comparative analysis of system performance was done. The authors discovered that distributed processing could enhance real-time and robustness and suggested scalable edge-oriented deployment of video analytics workloads. The weakness was that the experiment was conducted on vehicle detection in a technical setting and not organisational performance. To conduct the research, the message to apply here is that video analytics can be used to assist performance only in case the infrastructure is scaled to be used operationally.

Yaseen et al. (2019) suggested deep learning hyper-parameter optimisation of cloud-based video analytics with the aim of enhancing the classification performance by a dynamically optimised convolutional network. The research was not oriented towards a definite national field context. It was a cloud-based experimental design with a methodology based on fetching videos in cloud storage, pre-process and classification using a tuned convolutional system. There was no applicable respondent population, social sample, or survey sampling method. Video streams were used as the source of information and collection was system-based and analysis was done using classification performance and optimisation processes. The authors found that automatic tuning enhanced video object classification and advised intelligent hyper-parameter optimisation of cloud video analytics. The study also had a weakness whereby it focused on technical classification

performance rather than enterprise value creation. Regarding Guinness Nigeria Plc, the article implied that the effectiveness of video analytics relied on the quality of optimisation, yet the business profitability was yet to be proved in a multinational business environment. Sivalakshmi et al. (2024) investigated cloud-based video analytics and transfer learning algorithms of smart retail store surveillance and security, which aimed to enhance monitoring and retail protection. The article seemed to have been prepared in an engineering and conference setting and not by a survey of the country-specific field. It also followed a technical system design and therefore no standard population, sample size or social sampling method was stated. Surveillance video settings were used to capture data and analysed through cloud-based video analytics and transfer learning processes. This paper has identified that transfer learning and cloud-enabled surveillance enhanced smart retail surveillance and detection ability and it suggested the broad use of intelligent surveillance systems at the retail environment. Its weakness was that the paper concentrated more on security and surveillance performance, rather than on other areas of organisational performance like profitability or responsiveness in the market. In this case, though, it proved most pertinent as Guinness Nigeria Plc functions within the context of retail-related distribution which video intelligence has the potential to influence operational control and efficiency where customers are concerned.

Mou and Milanova (2024) examined model-compression approaches to audio classification of edge devices, the goal of which is to identify how efficiency and accuracy can be balanced in the environment of limited computing capabilities. This was not a country-specific study, which adhered to an experimental machine-learning design. It failed to mention a human population or survey sample since its datasets were technical audio benchmarks, namely ESC-50, UrbanSound8K and AudioSet. These benchmark datasets were used to gather data and processed using deep learning models, such as CNN and LSTM architectures, on edge platforms. The authors discovered that model-compression methods made it possible to successfully classify audio on resource-constrained devices with a relatively small accuracy degradation, and they suggested compression-aware architecture to be deployed at the edge. Its weakness was that benchmark data sets do not reflect absolutely on the actual commercial sound environments. In this case, the paper was applicable since the audio analytics in Guinness Nigeria Plc would be required to operate within realistic cost and infrastructure limits as compared to a perfect laboratory setting.

In Gourisaria et al. (2024), a comparative study of audio classification based on MFCC and STFT features and machine learning was conducted, the aim of which was to identify which feature representations provided a more accurate classification. The research was not designed as a single geographical field location and it employed a technical comparative design. Since it was not a respondent-based study, the standard population, sample size and sampling processes could not be utilized. The authors utilized audio-related datasets and MFCC and STFT features, and they compared the performances and classified them with the help of machine learning methods. They discovered that feature selection had a great impact on classification performance and suggested that feature engineering should

be done carefully when using audio analytics. One major weakness was that the research focused on the performance of technical classification as opposed to the performance at the business level. In the current research, this would mean that the usefulness of audio analytics to Guinness Nigeria Plc would be determined by the representation and modelling of audio signals and not just the availability of audio data.

Hassan et al. (2024) considered the poultry audio signal classification using deep learning and burn layer fusion whose aim was to enhance resilience to sound classification despite variations in inputs. The research was not a field survey in business but technical modelling research involving poultry audio signals. It used experimental design of digital audio signal processing, convolutional neural networks, and a custom burn layer which injected controlled random noise during training. No social sample, survey sampling procedure, or human population was mentioned. Poultry audio signals were gathered and deep learning classification metrics were applied to the data. The authors discovered that the burn layer enhanced the resistance to signal variation and suggested the architecture to more robust audio classification systems. It was limited by the fact that its application field was agricultural audio instead of commercial enterprise audio. In this research, it was methodological and not contextual in the sense that it demonstrated that robustness is important to audio analytics and that noisy Nigerian operating environments might need equally robust models.

Poroshenko and Kovalenko (2024) investigated audio event analysis in network-based audio analytics systems with the objective of developing a method for recognising audio events through preprocessing, sound separation, and machine-learning modelling. The research was connected to Ukraine via the journal of publication, but the issue it was discussing was more general. It employed a method-development design as opposed to a survey or case-study design. In this regard, no standard population, sample size or a method of probability sampling was indicated. Audio signals that were processed in network-based systems provided data and the data collection and analysis were treated as signal-processing steps, event recognition processes, and model building. It was discovered that audio analytics effectiveness was heavily reliant on structured preprocessing and event-recognition pipelines and suggested combined methods that would leverage machine learning and signal processing. Its drawback was that it did not study the results of performance at firms. Regarding Guinness Nigeria Plc, it explained that audio analytics would not be beneficial unless the company can transform the raw sound input into a structured business signal in a trustworthy manner.

Chakravarty (2024) studied speech recognition using deep learning models with the goal of quantifying the energy usage of GPUs and the impact of noise and quantisation on edge deployment. The research lacked country restriction and was designed as an experiment with the NVIDIA Jetson Orin Nano. There was no usual human population, sample size or survey sampling process. The clean and noisy speech datasets were used to draw data and the analysis was performed using word-error rate, transcription speed, energy

consumption, memory requirement, and quantisation levels like FP32, FP16, and INT8. It was discovered in the study that the transition between FP32 and FP16 reduced the energy consumption of transcription by approximately half with minimal performance loss, and larger models did not necessarily indicate improved noise resilience. It suggested context-sensitive optimisation of on-device speech systems. Its weakness was that it was a speech-recognition engineering study and not an enterprise analytics study. In this research, the paper refined the real-world aspect that the audio analytics in Guinness Nigeria Plc would not only have to be precise, but also affordable and implementable in the realistic environment of operation.

Study Gaps

An observable gap was created by the literature reviewed when placed in the context of this study. A lot of the existing literature had been carried out in technologically advanced or global environments and little empirical evidence on the emerging economies like Nigeria was given. As an example, the research on text analytics and machine learning was mostly global and model-driven (Asudani et al., 2023; Wu et al., 2025), and the research on video analytics did not contextualise the findings in the African markets (Xu et al., 2022; Li et al., 2024). This formed a geographical divide in that, the unique institutional, economic and infrastructural realities affecting multinational companies in Nigeria including Guinness Nigeria Plc was under explored.

There was also some methodological gap since most of the reviewed studies used technical, experimental or review based designs unlike empirical research on organisations. Some of them were based on simulations or benchmark datasets or system architectures without actual organisational populations or primary data sources (Khadka & Ghimire, 2024; Mou and Milanova, 2024). This restricted their capacity to clarify the transferring of the analytics capabilities to actual firm performance. Moreover, there was a population difference, in that the studies were not concerned with the employees, managers, or operational units in the firms, hence neglecting the human and organisational aspects in which analytics are applied.

More importantly, a gap in variables was detected, since the previous research focused on text, video, and audio analytics as independent technical units, but they were not used as a coherent large-scale analytics system in relation to performance outcomes. As an example, the research in audio analytics focused on classification performance and signal processing (Gourisaria et al., 2024; Hassan et al., 2024), whereas the research in text analytics did not relate to organisational performance (Siino et al., 2023). Contrastingly, this paper filled these gaps by taking an integrated approach that looked at text, video, and audio analytics as a dimension of big data analytics and its direct connection to the performance of Guinness Nigeria Plc in the Nigerian context.

Methodology

The research design used in the study was a cross-sectional survey research design, which was deemed relevant in the study as it enabled the researchers to obtain data concerning the respondents at a specific time, as well as explore the connection between big data analytics and organisational performance in Guinness Nigeria Plc. This design was appropriate to the study because it allowed the evaluation of current situations without controlling variables and offered a feasible approach to obtaining perceptions of employees in various units of operation. The study population included employees at the Guinness plants at Benin City, Lagos and three regional divisions in Nigeria, which is a country with more than 200 million people distributed across 36 states, indicating the extensive area of coverage of the firm. From a total workforce of 839 employees, the sample size was determined using the Krejcie and Morgan (1970) formula, where $n = (\chi^2 \times N \times P(1-P)) / (d^2(N-1) + \chi^2 P(1-P))$; assuming $\chi^2 = 3.841$, $N = 839$, $P = 0.5$, and $d = 0.05$, the calculated sample size was approximately 269. A safety margin of 20 percent was also applied to enhance representativeness as well as to correct non-response, making up the total population of $269 + (0.20 \times 269 = 53.8 \approx 54)$ to equal 323 respondents, which was estimated to be 323 respondents. This change was appropriate because more reliable data was obtained and the chances of inadequate responses were minimized.

The researcher used a cluster sampling method, which was suitable, considering the geographical spread of the operations of Guinness Nigeria Plc. Naturally the organisation was organised into clusters according to location and regional divisions, and in such a manner the effective data collection was possible and at the same time all the areas of operations were represented adequately. The study utilised primary data and data were gathered by way of a structured questionnaire that was devised to capture the response on the dimensions of big data analytics namely text, video, and audio analytics and organisational performance. Cronbach alpha was used to determine the reliability of the instrument and it was established that there was internal consistency between the variables in the questionnaire, whereas content validity was determined by matching the questionnaire items with the known constructs in literature.

Table1: Reliability Statistics

Variable	Cronbach's Alpha
Text Analytics	0.82
Video Analytics	0.85
Audio Analytics	0.80
Performance	0.88

The data were analysed using regression analysis with the aid of SPSS version 27 to determine the effect of each dimension of big data analytics on organisational performance. The regression models were specified as follows: for hypothesis one, $OP = \beta_0 + \beta_1 TA + \epsilon$; for hypothesis two, $OP = \beta_0 + \beta_2 VA + \epsilon$; and for hypothesis three, $OP = \beta_0 + \beta_3 AA$

+ ϵ , where OP represented organisational performance, TA represented text analytics, VA represented video analytics, AA represented audio analytics, β_0 was the intercept, β_1 – β_3 were the coefficients, and ϵ was the error term. These models enabled the study to test the individual effects of each analytics dimension on the performance of Guinness Nigeria Plc.

Results and Discussion

Table 2: Administered Questionnaire

Copies of Questionnaire Administered	323
Copies of Questionnaire Returned	287
Percentage of Copies of Questionnaire Returned	88.9%
Copies of Questionnaire Not Returned	36
Percentage of Copies of Questionnaire Not Returned	11.1%

Source: *Field Survey, 2025*

Table 2 showed that 287 out of 323 copies of the questionnaire sent out were returned and this gave a response rate of 88.9 and 36 (11.1) not returned. This response rate was an indicator of high level of participation by the respondents and it made the data collected by the study very credible and reliable. It also meant that the sample was sufficiently representative of the target population and therefore minimized the chances of non-response bias. The questionnaires returned were therefore found to be adequate to undergo statistical analysis and make valid conclusions about the effect of big data analytics on the performance of Guinness Nigeria Plc.

Table 3: Demographic Characteristics of Respondents

Characteristics	Respondents' Categories	Frequencies	Percentages (%)
Respondents' Sex	Male	139	48.43
	Female	148	51.57
	Total	287	100.00
Age Brackets	Below 30 years	41	14.29
	31–40 years	94	32.75
	41–50 years	59	20.56
	Above 50 years	93	32.40
	Total	287	100.00
Academic Qualifications	OND, NCE, Equivalents and Below	41	14.29
	First Degree and Equivalent	109	37.99
	Postgraduate Diploma	33	11.50
	Postgraduate Degree	104	36.22
	Total	287	100.00

Working Experiences	Below 5 years	38	13.24
	6–10 years	53	18.47
	11–15 years	68	23.69
	16–20 years	33	11.50
	Above 20 years	95	33.10
	Total	287	100.00
Locations/Units	Headquarter	38	13.24
	Benin Plant	46	16.02
	Lagos Division	34	11.85
	North Division	41	14.29
	Central Division	46	16.02
	Others	82	28.57
	Total	287	100.00

Source: Field Survey, 2025

Table 3 indicated that the respondents had a relatively equal gender distribution with 51.57 percent of women and 48.43 percent males implying that the respondents represented various views of both sexes. The age group showed that a substantial percentage of the respondents were in the range of 31–40 years (32.75) and above 50 years (32.40) which showed a combination of both mid-career group and the highly experienced group. Regarding education levels, the majority of the respondents had either a first degree (37.99) or a postgraduate degree (36.22), which demonstrates a highly educated labour force, which was able to give informed answers. The work experience distribution also revealed that many respondents had more than 20 years' work experience (33.10%), as well as 11–15 years (23.69) indicating extensive organisational knowledge. Moreover, the respondents were sampled in different operational units, i.e., headquarters, plant and regional divisions, which guaranteed sufficient representation of the different locations. All in all, these features meant that the data were collected among a well-informed, experienced, and heterogeneous population of employees, which enhanced the validity and generalisability of findings of the study.

Test of Hypotheses

Test of Hypothesis 1

H_{01} : Text analytics has no significant effect on the performance of Guinness Nigeria Plc.

$$OP = \beta_0 + \beta_1 TA + \varepsilon \dots\dots\dots 1$$

Table 4: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.761 ^a	.579	.578	.512
a. Predictors: (Constant), TA				

Source: SPSS Output Version 27.0

Table 4 revealed that correlation coefficient ($R = 0.761$) was positive and strong and the R square (0.579) value indicated that text analytics was able to explain approximately 57.9 percent of the variation in the performance of Guinness Nigeria Plc. The adjusted R square of 0.578 was strong evidence that the model was robust and low standard error of 0.512 indicated a fairly acceptable degree of prediction accuracy. This meant that the text analytics was a significant predictor of organisational performance in the company.

Table 5: ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	102.540	1	102.540	389.886	.000 ^b
	Residual	74.940	285	.263		
	Total	177.480	286			
a. Dependent Variable: OP						
b. Predictors: (Constant), TA						

Table 5 indicated that the regression model was statistically significant because F-value of 389.886 and the level of significance of 0.000 was less than the level of significance of 0.05. This meant that the model was fitting to the data and that text analytics played a major role in predicting differences in organisational performance. This meant that the observed relationship was not accidental thus confirming the applicability of text analytics in determining performance results.

Table 6: Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.120	.172		6.512	.000
	TA	.678	.034	.761	19.747	.000
a. Dependent Variable: OP						

Source: SPSS Output Version 27.0

Table 6 indicated that text analytics had a positive and statistically significant effect on organisational performance, as shown by the coefficient ($\beta = 0.678$) and a significance value of 0.000. The t-value of 19.747 further confirmed the strength of this relationship. This meant that a unit increase in text analytics led to a corresponding increase in organisational performance. Consequently, the null hypothesis was rejected, implying that text analytics significantly affected the performance of Guinness Nigeria Plc.

Test of Hypothesis 2

H₀₂: Video analytics has no significant effect on the performance of Guinness Nigeria Plc.

$$OP = \beta_0 + \beta_2 VA + \epsilon \dots\dots\dots 2$$

Table 7: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.742 ^a	.551	.550	.528

a. Predictors: (Constant), VA

Source: SPSS Output Version 27.0

Table 7 indicated that the correlation coefficient ($R = 0.742$) reflected a strong positive relationship between video analytics and organisational performance. The R square value of 0.551 showed that 55.1% of the variation in the performance of Guinness Nigeria Plc was explained by video analytics, while the adjusted R square of 0.550 confirmed the stability of the model. The standard error of 0.528 suggested an acceptable level of prediction accuracy. This implied that video analytics served as a meaningful predictor of organisational performance.

Table 8: ANOVA^a

Model		Sum Squares	df	Mean Square	F	Sig.
1	Regression	98.400	1	98.400	351.178	.000 ^b
	Residual	80.200	285	.281		
	Total	178.600	286			

a. Dependent Variable: OP

b. Predictors: (Constant), VA

Table 8 indicated that the regression model was statistically significant because the F-value of 351.178 was less than the cut-off level of 0.05, and the significance level of 0.000 was also less than the cut-off level of 0.05. This was a sign that the model was fitting and that video analytics contributed greatly to the change in organisational performance. What this meant is that the relationship between video analytics and performance was consistent and not by chance.

Table 9: Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.056	.168		6.286	.000
	VA	.704	.037	.742	18.799	.000

a. Dependent Variable: OP

Source: SPSS Output Version 27.0

Table 9 revealed that video analytics had a positive and statistically significant effect on organisational performance, as indicated by the coefficient ($\beta = 0.704$) and a significance value of 0.000. The t-value of 18.799 further confirmed the strength of this effect. This meant that an increase in video analytics led to a corresponding increase in organisational

performance. Therefore, the null hypothesis was rejected, implying that video analytics significantly influenced the performance of Guinness Nigeria Plc.

Test of Hypothesis 3

H_{03} : Audio analytics has no significant effect on the performance of Guinness Nigeria Plc.

$$OP = \beta_0 + \beta_3 AA + \epsilon \dots\dots\dots 3$$

Table 10: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.721 ^a	.520	.518	.541
a. Predictors: (Constant), AA				

Source: SPSS Output Version 27.0

Table 10 showed that the correlation coefficient ($R = 0.721$) indicated a strong positive relationship between audio analytics and organisational performance. The R square value of 0.520 implied that 52.0% of the variation in the performance of Guinness Nigeria Plc was explained by audio analytics, while the adjusted R square of 0.518 confirmed the consistency of the model. The standard error of 0.541 suggested a reasonable level of prediction accuracy. This implied that audio analytics was a significant predictor of organisational performance.

Table 11: ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	92.610	1	92.400	316.490	.000 ^b
	Residual	85.320	285	.298		
	Total	177.930	286			
a. Dependent Variable: OP						
b. Predictors: (Constant), AA						

Table 11 showed that the regression model was statistically significant, as the F-value of 316.490 and significant level of 0.000, which was below the 0.05 mark, are statistically significant. This showed that the model was a good fit to the data and that audio analytics played an important role in explaining the differences in organisational performance. This implied that the relationship experienced was not chance.

Table 12: Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.084	.173		6.263	.000
	AA	.683	.038	.721	17.787	.000
a. Dependent Variable: OP						

Source: SPSS Output Version 27.0

Table 12 revealed that audio analytics had a positive and statistically significant effect on organisational performance, as shown by the coefficient ($\beta = 0.683$) and a significance value of 0.000. The t-value of 17.787 further confirmed the strength of this relationship. This indicated that an increase in audio analytics led to a corresponding increase in organisational performance. Consequently, the null hypothesis was rejected, implying that audio analytics significantly affected the performance of Guinness Nigeria Plc.

Discussions of Findings

The results on Ho1 indicated that text analytics positively and significantly influenced the performance of the Guinness Nigeria Plc that the null hypothesis was rejected. This was consistent with previous empirical research that indicated that the processing of textual information like customer reviews, reports and communications improved the decision-making and firm performance. In particular, Raman et al. (2022) have discovered that text-based sentiment analysis can be used to forecast the performance of the company, whereas Lee et al. (2018) have identified the correlation between text patterns in business and financial results. Equally, Asudani et al. (2023) and Wu et al. (2025) highlighted the fact that the developments in natural language processing enhanced the capacity of companies to generate actionable insights out of text. Nevertheless, other researches were more prudent in their views. Camacho-Collados and Pilehvar (2017) and Mahendra et al. (2021) have claimed that the performance of text analytics heavily relied on preprocessing methods and contextual interpretation, indicating that the results of the data preparation process could be undermined. This was in part contrary to the impact that was evident in this study which states that organisational context, like organised data systems in Guinness Nigeria Plc, could increase effectiveness. The results were in line with the Resource-Based View, which suggests that valuable and highly exploited resources like analytics capabilities could be used to generate high-performance.

On Ho2, the findings indicated that video analytics significantly positively influenced the performance of an organisation, which led to the null hypothesis being rejected. The empirical studies supported this finding by noting that video analytics play an important role in enhancing operational efficiency and decision-making. Xu et al. (2022) and Zhang et al. (2022) showed that video analytics increased real-time monitoring and responsiveness to operations, and Sinyavskaya (2023) also showed that video systems enhanced the efficiency of the warehouse. Correspondingly, Khadka and Ghimire (2024) and Li et al. (2024) demonstrated that scalable and edge-based video analytics enhanced the performance and responsiveness of the system. These results strengthened the notion that video analytics could be used to facilitate performance by improving visibility and process optimisation. Nevertheless, certain previous studies, including Cumming and Johan (2015), opined that the economic advantage of video surveillance may not necessarily be directly converted into quantifiable firm performance, especially in situations where there was a high cost of implementation. This showed that there was some empirical tension albeit the

current study showed that the effect was strong and positive in the presence of Guinness Nigeria Plc. The findings also favoured the Resource-Based View, in that the video analytics were one of the strategic capabilities, which, when well implemented, facilitated organisational competitiveness.

In the case of Ho₃, the results showed that audio analytics produced a strong positive impact on organisational performance that led to a rejection of the null hypothesis. This finding was in accordance with the literature that had underscored the increasing relevance of audio data in organisational analysis and decision-making. Hildebrand et al. (2020) and Yang et al. (2024) have discovered that voice analytics could generate great information about customer behaviour and effectiveness in communication, which could lead to the improvement of the performance of firms. Moreover, recent surveys in audio classification and signal processing, including Mou and Milanova (2024) and Gourisaria et al. (2024), revealed that the development of audio analytics technologies enhanced their performance in accuracy and usability in practical applications. Nonetheless, other researchers indicated shortcomings especially on noise sensitivity and the problem of contextual interpretation (Chakravarty, 2024; Poroshenko and Kovalanko, 2024). Such restrictions implied that audio analytics effectiveness could be different according to environmental and system design factors. Nonetheless, the positive correlation recorded in the present study was overwhelmingly positive, which indicated that Guinness Nigeria Plc had successfully used audio analytics in its business environment. The result also corresponded to the Resource-Based View because audio analytics was an invaluable and non-replicable resource that could be used to improve organisation performance when implemented accordingly.

On the whole, although certain empirical studies have pointed out technical and contextual constraints of text, video and audio analytics, the results of this study were all showing strong positive performance impact. This implied that, in instances where such analytics tools were well implemented in an organisational context, especially in a multinational company such as Guinness Nigeria Plc, they may act as strategic resources that generate performance implications, as the assumptions of the Resource-Based View.

Conclusion and Recommendation

The paper came to a conclusion that the effects of big data analytics on the performance of Guinness Nigeria Plc were significant since all the three dimensions, namely text, video, and audio analytics, proved to have strong positive and statistically significant impacts on the organisational performance. The results indicated that the capability to derive and implement insights of varied data sources improved decision-making, efficiency, and sensitivity of the operations to the market changes in the firm. Practically, the findings showed that big data analytics acted as a strategic asset in the organisation, which empowers the assumption of the Resource-Based View that internal capabilities are competitive advantage and performance drivers. In general, the research has determined that the combination of various analytics dimensions instead of dependence on one type of

data is a stronger channel of enhancing organisational performance in the complex and competitive world like Nigeria.

1. Guinness Nigeria Plc needs to invest in state-of-the-art natural linguistic processes specific to the Nigerian market to enhance the text analytics accuracy, especially through the use of the local languages, informal expressions and sentiment patterns of customers based on social media and distributor feedback channels.
2. The firm ought to install real-time video analytics in their warehouses and retail distribution locations to track product movements, identify the inefficiencies in their supply chains and optimise the store layouts, where they should consider integrating the systems into the current operational dashboards to allow managers to take immediate action.
3. Guinness Nigeria Plc ought to integrate organized audio analytics in its customer service and marketing departments such as voice recognition and sentiment detecting tools to measure customer interrelations and advertisement performance, and should adjust noise-filtering systems to local environmental factors.

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