

DATA ANALYTICS AND COMPETITIVENESS OF SMALL AND MEDIUM SCALE ENTERPRISES IN FCT, ABUJA-NIGERIA

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<https://doi.org/10.70118/ajbam-01-2025-104>

ABSTRACT

Small and medium-scale enterprises play a crucial role in fostering economic development, innovation, and employment generation in Nigeria. In Abuja, SMEs significantly contribute to local economic growth and provide livelihoods for many individuals. However, their ability to compete in an increasingly digitalized and dynamic marketplace remains a major challenge. This study examined data analytics and competitiveness of SMEs in FCT, Abuja. The study adopted a descriptive research design in which simple random Sampling was used to obtain data from the respondents with the questionnaire administered to the employees and managers from SMEs across six area councils: Abuja Municipal, Gwagwalada, Kuje, Bwari, Abaji, and Kwali, with a population of 553 selected employees and managers from SMEs across six area councils: Abuja Municipal, Gwagwalada, Kuje, Bwari, Abaji, and Kwali were targeted. Cluster Sampling was used while sample size (232) was used with a 20% margin of safety added to the sample size making it 278. The data were analyzed using inferential statistics and regression analysis at a 5% level of significance to test the formulated hypotheses in line with the objectives of the study. The findings revealed the adoption of data analytics tools significantly affects the operational efficiency and market responsiveness of SMEs in FCT, Abuja. The research concludes that the adoption of data analytics tools significantly affects the operational efficiency and market responsiveness of SMEs in FCT, Abuja. The study recommended that SMEs in FCT, Abuja, should prioritize investment in modern data analytics tools to enhance decision-making, improve efficiency, and gain a competitive advantage.

Keywords: Data, Analytics, Competitiveness, Operational, Efficiency, SMEs

INTRODUCTION

In today's global economy, the integration of data analytics tools and data-driven decision-making has emerged as a key factor in enhancing business competitiveness, particularly for Small and Medium Enterprises (SMEs). These tools enable businesses to derive meaningful insights from large volumes of data, leading to more informed decision-making and improved operational performance (Davenport & Harris, 2007). McAfee and Brynjolfsson (2012) emphasize that businesses leveraging data analytics experience notable gains in efficiency, such as cost reduction,

supply chain optimization, and increased productivity. Furthermore, data-driven strategies enhance market adaptability by helping businesses swiftly respond to evolving market trends, customer preferences, and competitive dynamics (LaValle et al., 2011). SMEs that embrace data analytics are better equipped to compete with larger corporations, foster innovation, and achieve sustainable growth (George et al., 2014).

In Africa, the adoption of data analytics among SMEs is gradually increasing, albeit at a slower pace due to constraints such as limited

technological access, high costs, and a shortage of skilled personnel (Asongu & Nwachukwu, 2018). Despite these obstacles, studies suggest that African SMEs utilizing data analytics are witnessing improvements in efficiency and responsiveness. For instance, research by Mutuku and Mahihu (2020) in Kenya found that SMEs using data analytics were able to enhance inventory management and lower operational expenses, ultimately boosting profitability. Similarly, in South Africa, SMEs that incorporated data-driven decision-making reported faster market responses and higher customer satisfaction (Ngwenya & Aigbavboa, 2021). These findings highlight the potential of data analytics in strengthening SME competitiveness across Africa.

In Nigeria, SMEs significantly contribute to economic growth, employment, and innovation. However, many face persistent challenges such as inadequate infrastructure, restricted access to financing, and limited digital adoption (Oyelaran-Oyeyinka, 2020). The application of data analytics remains relatively low among Nigerian SMEs, particularly in regions like the Federal Capital Territory (FCT), Abuja. Nonetheless, awareness of its advantages is growing. Adeleke and Suraju (2021) found that SMEs utilizing data analytics tools streamlined operations, minimized waste, and improved efficiency. Similarly, research by Oluwafemi and Oladele (2022) revealed that SMEs embracing data-driven decision-making demonstrated greater adaptability to customer needs and competitive pressures. These insights indicate that data analytics could serve as a transformative tool for Nigerian SMEs operating in competitive environments such as Abuja.

Within the FCT, Abuja, SMEs function in a highly competitive space characterized by rapid urbanization, a diverse consumer base, and the presence of larger firms. The adoption of data analytics can enhance operational efficiency by enabling SMEs to refine processes such as inventory control, supply chain coordination, and resource allocation (Adeleke & Suraju, 2021). For example, an SME in Abuja utilizing tools like Microsoft Power BI or Tableau can detect inefficiencies and implement cost-effective

solutions. Additionally, data-driven approaches provide real-time insights into customer behavior, market trends, and competitor actions (Oluwafemi & Oladele, 2022). This enables SMEs to modify strategies, introduce new products, or explore new markets, thereby improving their competitiveness. However, adoption remains limited due to financial constraints, low awareness, and a lack of technical skills (Adeleke & Suraju, 2021). Addressing these barriers is essential to fully harnessing the benefits of data analytics for SMEs in Abuja.

SMEs play a crucial role in fostering economic development, innovation, and employment generation in Nigeria. In Abuja, SMEs significantly contribute to local economic growth and provide livelihoods for many individuals. However, their ability to compete in an increasingly digitalized and dynamic marketplace remains a major challenge. This study examines how adopting data analytics and data-driven decision-making can improve SME competitiveness in FCT, Abuja, particularly by enhancing operational efficiency and market responsiveness. Investigating this issue is essential, given the unique challenges SMEs in Abuja face, including limited technological access, high operating costs, and poor adaptability to market fluctuations (Oyelaran-Oyeyinka, 2020). Many SMEs continue to rely on traditional, intuition-based decision-making, which is often inefficient and fails to address the complexities of modern business environments (Davenport & Harris, 2007). The limited use of data-driven strategies restricts their capacity to compete effectively with larger firms and adjust to changing customer demands.

Existing research highlights the substantial impact of data analytics on SME performance. Studies conducted in Kenya and South Africa have demonstrated that SMEs employing data analytics have achieved enhanced efficiency and market responsiveness (Mutuku & Mahihu, 2020; Ngwenya & Aigbavboa, 2021). In Nigeria, research by Adeleke and Suraju (2021) found that SMEs adopting data-driven strategies significantly reduced operational costs and improved customer satisfaction. Similarly,

Oluwafemi and Oladele (2022) emphasized the role of data analytics in boosting SME competitiveness in Abuja, particularly by facilitating faster decision-making and improved resource management. These studies indicate that data analytics can address critical SME challenges, including inefficiency, slow market adaptation, and limited access to real-time insights.

Despite its advantages, the adoption of data analytics among SMEs in Abuja remains minimal due to several constraints. Firstly, financial limitations prevent many SMEs from investing in sophisticated analytics tools (Asongu & Nwachukwu, 2018). Secondly, a skills gap persists, as many business owners and employees lack the necessary expertise to effectively utilize these tools (Oyelaran-Oyeyinka, 2020). Additionally, inadequate infrastructure, including unreliable internet access and power supply, further hampers the adoption of data-driven strategies (Adeleke & Suraju, 2021). These barriers highlight the need for targeted interventions to promote data analytics adoption among SMEs in Abuja.

To address these challenges, this study proposes a multi-dimensional approach to encourage data analytics adoption among SMEs in FCT, Abuja. Firstly, SMEs should leverage affordable and user-friendly analytics tools, such as Google Analytics and Microsoft Power BI, which require minimal technical knowledge. Secondly, capacity-building initiatives should be introduced to train SME owners and employees in data analytics and data-driven decision-making. Thirdly, collaboration between government and private sector stakeholders should focus on improving infrastructure, such as internet connectivity and power supply, to support digital transformation. Lastly, SMEs can start with small-scale analytics applications, such as customer analysis or inventory management, before expanding their data analytics capabilities. By addressing these barriers and harnessing data analytics, SMEs in Abuja can significantly boost their competitiveness, contribute to economic growth, and sustain long-term business success. The main objective was to examine Data

analytics and the competitiveness of SMEs in FCT, Abuja.

- i. To examine how the adoption of data analytics tools improves the operational efficiency of SMEs in FCT, Abuja.
- ii. To analyze how data-driven decision-making enhances the market responsiveness of SMEs in FCT, Abuja.

LITERATURE REVIEW

Concepts of Data Analytics

Data analytics is the process of examining, refining, transforming, and interpreting raw data to uncover valuable insights, recognize patterns, and facilitate informed decision-making. This process relies on statistical, computational, and analytical methods to evaluate both structured and unstructured data, helping organizations make data-driven choices (Davenport & Harris, 2007).

There are different types of data analytics, including descriptive analytics, which provides summaries of past data to assess historical performance; diagnostic analytics, which investigates reasons behind past outcomes; predictive analytics, which applies statistical models and machine learning techniques to anticipate future trends; and prescriptive analytics, which offers data-based recommendations for decision-making (Sharda et al., 2020).

The integration of data analytics tools such as Microsoft Power BI, Tableau, and Google Analytics has become increasingly vital for businesses, especially Small and Medium Enterprises (SMEs). These tools provide meaningful insights that enhance operational efficiency, customer experience, and market responsiveness (McAfee & Brynjolfsson, 2012). For SMEs, data analytics supports process optimization, cost reduction, and adaptability to dynamic market conditions, ultimately improving competitiveness (George et al., 2014). For instance, SMEs can leverage data analytics to understand customer preferences, enhance supply chain efficiency, and identify new business

opportunities, making it an essential component for sustainable growth in today's data-driven environment (Ghasemaghaei et al., 2018).

Data Analytics Tools

Data analytics tools refer to software solutions and platforms that facilitate the collection, processing, analysis, and visualization of data to aid decision-making and generate actionable insights (Nnaji et al., 2024). These tools help organizations convert raw data into valuable information by employing statistical, computational, and machine-learning techniques (Sharda et al., 2020). There are different categories of data analytics tools, including business intelligence (BI) tools such as Microsoft Power BI and Tableau, which specialize in data visualization and reporting; predictive analytics tools like IBM SPSS and SAS, which utilize statistical models to anticipate future trends; and data mining tools such as RapidMiner and KNIME, which identify patterns within extensive datasets (Davenport & Harris, 2007).

Additionally, web analytics tools like Google Analytics monitor user interactions on websites, while customer relationship management (CRM) platforms such as Salesforce incorporate analytics to enhance customer insights and engagement (McAfee & Brynjolfsson, 2012). For Small and Medium Enterprises (SMEs), these tools offer cost-effective solutions that enhance operational efficiency, improve customer experiences, and boost market adaptability (Ghasemaghaei et al., 2018). By adopting data analytics tools, SMEs can make informed business decisions, minimize inefficiencies, and strengthen their competitive advantage in the marketplace (George et al., 2014).

Data-driven decision-making

Data-driven decision-making (DM) is a structured approach that relies on data collection, analysis, and interpretation to support business strategies and improve organizational outcomes. This process involves gathering relevant information, extracting meaningful insights through analytical techniques, and utilizing these insights to make informed decisions (Szukits & Móricz, 2023). Integrating business analytics into decision-making fosters a data-centric culture,

ensuring that organizations leverage data effectively at various levels of operations. The successful adoption of DDDM depends on multiple factors, such as technological capabilities, organizational culture, and the accuracy of available data (Johnson, 2024). Furthermore, the efficiency of DDDM largely hinges on data quality and an organization's analytical expertise, as these factors are essential for transforming raw data into strategic insights that drive business success (Gathani et al., 2022).

Competitiveness

Competitiveness refers to the capacity of a nation, region, or organization to create an environment that fosters greater value creation for its businesses and enhances the prosperity of its population. This concept is influenced by factors such as productivity, innovation, and the efficient use of resources (Aisha & Abdullahi, 2024; Lawal & Abdullahi, 2024). At the national level, competitiveness involves establishing conditions that allow businesses to thrive in the global marketplace, driving economic growth and improving living standards.

According to the World Economic Forum (2015), competitiveness is defined as the combination of institutions, policies, and factors that determine a country's productivity, which ultimately shapes its economic prosperity. Recent research underscores the importance of innovation strategies in boosting firm competitiveness, demonstrating a strong link between innovative practices and enhanced market positioning (Innovation strategy and firm competitiveness: a systematic literature review, 2023). The Global Competitiveness Report further identifies twelve key pillars of competitiveness, such as infrastructure, macroeconomic stability, health, education, and market size, which collectively provide a framework for understanding the drivers of competitiveness across economies.

Operational Efficiency

Operational efficiency is the ability of an organization to deliver products or services cost-effectively without compromising quality. It focuses on optimizing the use of resources such as materials, labour, and technology to maximize output and minimize waste (Lawal & Abdullahi,

2024; Nnajofo et al., 2024). High operational efficiency allows firms to lower production costs, increase productivity, and improve their competitive standing. For example, the adoption of Lean Six Sigma methodologies has been proven to enhance financial performance by streamlining processes and reducing inefficiencies (Impact of Operational Excellence Frameworks on Sustainable Performance, 2024). Additionally, operational efficiency is a key element of an organization's core competitiveness, encompassing performance in production, management, and resource allocation (Research on the Relationship between Operational Efficiency and ESG, 2024). By continuously improving these areas, organizations can achieve sustainable growth and maintain a competitive advantage in their markets.

Market Responsiveness

Market responsiveness refers to an organization's ability to quickly and effectively adapt to changes in market conditions, customer preferences, and competitive landscapes. This capability requires ongoing monitoring of market trends and the ability to adjust strategies, products, and services to meet evolving demands. A high level of market responsiveness enables firms to improve customer satisfaction, build loyalty, and enhance overall business performance. For instance, research by Sharma et al. (2022) found that responsiveness in the retail sector significantly impacts customer satisfaction, which in turn influences repeat purchases and referrals. Furthermore, market responsiveness acts as a bridge between market orientation and business performance, emphasizing its role in transforming market insights into actionable strategies that drive organizational success (Conference Proceedings, 2024).

Theoretical Framework

This study is grounded in two fundamental theories: the Resource-Based View (RBV) Theory and the Diffusion of Innovations (DOI) Theory. These theoretical perspectives offer a strong framework for examining how the implementation of data analytics tools and data-driven decision-making contributes to enhancing

the competitiveness of SMEs in the Federal Capital Territory (FCT), Abuja.

Resource-Based View (RBV) Theory

The Resource-Based View (RBV) Theory, introduced by Barney (1991), suggests that firms can achieve sustainable competitive advantage by utilizing unique, valuable, and difficult-to-imitate resources. In this study, data analytics tools are viewed as strategic resources that enable small and medium-sized enterprises (SMEs) to optimize their operations, enhance decision-making processes, and improve market responsiveness. According to RBV, the effective use of these tools can lead to greater operational efficiency and market responsiveness, both of which are essential for competitiveness (Barney, 1991). For SMEs in the Federal Capital Territory (FCT), Abuja, adopting data analytics tools presents an opportunity to convert raw data into actionable insights, thereby gaining a competitive edge in a rapidly changing market.

However, the RBV theory has its limitations. One key assumption is that resources are static and easily identifiable, which may not hold in practice. The value of resources like data analytics tools can vary over time due to factors such as technological advancements, shifts in market conditions, or changes within the organization. Additionally, SMEs often face resource constraints, including limited financial and technical capabilities, which can restrict their ability to fully exploit data analytics tools as strategic assets (Kraaijenbrink et al., 2010). Despite these challenges, the RBV theory remains a useful framework for understanding how SMEs can leverage data analytics tools to build and sustain a competitive advantage.

Diffusion of Innovations (DOI) Theory

The Diffusion of Innovations (DOI) Theory, introduced by Rogers (2003), explores how new technologies and innovations are adopted and spread across populations or organizations. The theory outlines five key factors that shape the adoption process: relative advantage, compatibility, complexity, trialability, and observability. In this study, the DOI framework is used to examine how small and medium-sized enterprises (SMEs) in the Federal Capital

Territory (FCT), Abuja, adopt data analytics tools and data-driven decision-making practices. For example, relative advantage refers to the perceived benefits of data analytics tools in enhancing operational efficiency and market responsiveness, while compatibility assesses how well these tools integrate with the existing workflows and culture of SMEs. Complexity evaluates the level of difficulty in implementing and using data analytics tools, whereas trialability allows SMEs to test these tools on a small scale before committing to full adoption. Lastly, observability emphasizes the visibility of the positive outcomes achieved by other SMEs using data analytics tools, which can encourage adoption (Rogers, 2003).

However, the DOI theory has certain limitations. One of its key assumptions is that adoption follows a linear process, which may not always reflect reality. In practice, the adoption of innovations like data analytics tools can be influenced by external factors such as market competition, government policies, and resource limitations, which the theory does not fully address (Greenhalgh et al., 2004). Additionally, the theory may not adequately account for the specific challenges faced by SMEs in resource-constrained environments, such as limited technical expertise and financial capacity. Despite these limitations, the DOI theory remains a useful framework for understanding the factors that drive the adoption and implementation of data analytics tools in SMEs.

The combination of the Resource-Based View (RBV) Theory and the Diffusion of Innovations (DOI) Theory provides a comprehensive theoretical foundation for this study. The RBV theory focuses on the strategic importance of data analytics tools as valuable resources that can help firms achieve a sustainable competitive advantage. On the other hand, the DOI theory sheds light on the adoption process and the factors that influence the uptake of such innovations. By integrating these two perspectives, the study establishes a strong framework for understanding how small and medium-sized enterprises (SMEs) in the Federal Capital Territory (FCT), Abuja, can utilize data analytics tools and data-driven

decision-making to improve their competitiveness.

Empirical Review

Siregar et al. (2024) conducted a study on the implementation of data science to enhance efficiency and productivity across various sectors, including business, government, and healthcare. The study adopted a descriptive research design to analyze current data science trends in the era of Big Data. The sample size consisted of research reports, scientific articles, books, statistical data, and online sources, selected through a documentary study as the sampling technique. The study utilized secondary data sources, including published research and statistical databases, which were collected using documentary study methods. Data were analyzed using descriptive statistical and qualitative analysis techniques, providing insights into the foundational principles of data science, including data collection, cleaning, analysis, visualization, and modeling. The findings highlighted the transformative applications of data science in business, economics, healthcare, education, and technology, particularly in optimizing operations, increasing sales, and enhancing customer experiences in companies like Amazon, Netflix, Walmart, and Uber. However, the study also identified challenges such as data limitations, security concerns, biases, and integrity issues. The authors emphasized the crucial role of data scientists in overcoming these obstacles and leveraging data science for improved decision-making and organizational performance. As an exploratory study, it provided a broad perspective on data science applications and suggested areas for future research to address existing challenges and optimize Big Data utilization.

Christopher and Nelson (2024) conducted a study on the impact of big data analytics on operational efficiency and decision-making within organizations. The study adopted a quantitative research design, surveying 150 organizations across various industries that had implemented big data analytics solutions. The population size included organizations utilizing big data analytics, while the sample size comprised 150 organizations. Data were collected from primary sources using survey methods, and analysis was

conducted using statistical techniques to determine relationships between variables. The findings indicated that most organizations experienced enhanced business intelligence, improved predictive modeling, and data-driven decision-making as a result of big data analytics implementation. The study further revealed a strong association between enhanced business intelligence and improved predictive modeling, suggesting that organizations with better insights were more likely to achieve greater forecasting capabilities. Additionally, investment in analytics technology, employee training, and a supportive organizational culture were identified as key predictors of improved predictive modeling. Despite these benefits, organizations faced challenges such as managing large datasets, integrating analytics into existing systems, and finding skilled personnel. The study highlights the importance of strategic investments and organizational readiness in maximizing the benefits of big data analytics.

Hwang (2024) conducted a study on the use of big data analytics in enhancing operational efficiency in manufacturing in the United Kingdom. The study employed a mixed-methods research design, integrating quantitative and qualitative methodologies to provide a comprehensive understanding of big data analytics' effects on operational efficiency. The population size consisted of manufacturing organizations in the United Kingdom, with a sample size of 300 organizations, selected through stratified random sampling. Data were collected from both primary and secondary sources, utilizing surveys and interviews as the primary methods of data collection. The data were analyzed using statistical techniques for quantitative data and thematic analysis for qualitative data. The findings revealed that big data analytics positively impacts operational efficiency, demonstrating its potential to enhance industrial performance and drive operational excellence. However, the study identified key challenges, including data privacy and security concerns, resistance to cultural change, data complexity, high investment costs, and obstacles related to data integration. Additionally, the research highlighted successful case studies of manufacturing firms that effectively integrated

big data analytics into their operations, showcasing best practices that contribute to improved efficiency. The study underscores the importance of strategic planning and investment in overcoming challenges and fully leveraging big data analytics for operational success.

Ojo and Kiobel (2024) conducted a study on the impact of business analytics on healthcare operations: A statistical perspective in Ohio, USA. The study employed a qualitative research design, relying on an in-depth literature review to evaluate how advanced analytical tools enhance healthcare outcomes, improve decision-making, and optimize operational efficiency, as the study focused on existing research and real-world case studies, rather than primary data collection. The sampling technique involved purposive selection of relevant studies and case examples. Data were collected from secondary sources, including peer-reviewed articles, industry reports, and documented case studies. The method of data analysis was thematic analysis, identifying key trends, benefits, and challenges associated with implementing business analytics in healthcare. The findings indicated that business analytics significantly improves personalized patient care, enables predictive modeling, and streamlines healthcare operations, leading to more informed decision-making and efficient resource utilization. However, challenges such as data integration difficulties, patient privacy concerns, and resistance to a data-driven culture within healthcare institutions were identified as barriers to widespread adoption, its limitations include a lack of empirical data and a need for future studies to assess long-term impacts and ethical implications of these technologies in healthcare delivery.

Prakash (2024) conducted a study on Data-Driven Management: The Impact of Big Data Analytics on Organizational Performance. The study employed a conceptual research design, focusing on developing a comprehensive methodology for leveraging big data analytics to enhance organizational performance. Data were collected from secondary sources, including existing literature, case studies, and industry reports. The method of data analysis involved thematic analysis, synthesizing key principles

and best practices in big data analytics implementation. The findings emphasized the importance of a robust data governance framework, integrating policies, processes, and technologies to ensure data security, integrity, and accessibility. The study highlighted the role of AI-driven anomaly detection for encryption and access control, enabling both protection and efficient utilization of data. Additionally, it underscored the significance of an integrated data ecosystem, incorporating real-time operational data, customer interactions, and unstructured information. A major component of the methodology was the implementation of advanced predictive analytics using machine learning, allowing organizations to anticipate market trends, customer behavior, and risks with high accuracy. This approach facilitates proactive decision-making, resource optimization, and product innovation, leading to a sustainable competitive advantage. However, the study's limitations include a lack of empirical validation and real-world case applications, necessitating further research to test and refine the proposed framework in practical business environments.

Sylvestre (2024) conducted a study on The Role of Data-Driven Decision-Making (DDDM) in Shaping Business Strategies, emphasizing the shift from intuition-based to evidence-based approaches. The study employed a qualitative research design, utilizing an interpretive paradigm to explore how business practitioners make strategic decisions based on data insights. Data were collected from primary sources through qualitative interviews and discussions, focusing on cause-and-effect relationships in decision-making. Thematic analysis was used to analyze the collected data, identifying key patterns and trends in data-driven strategy formulation. The findings highlighted the importance of data quality, big data analytics integration, and balancing human intuition with data insights. The study also identified challenges in implementing DDDM, including technological, ethical, and organizational barriers, but emphasized benefits such as enhanced operational efficiency, improved risk management, and increased innovation. Future trends, particularly the role of analytics in corporate governance and strategic planning,

were also discussed. However, the study was limited by its qualitative scope, which may reduce generalizability to broader business sectors, and lacked quantitative validation, calling for further research to strengthen empirical evidence.

Lisbet et al. (2024) conducted a study on The Nexus Between Data-Driven Decision-Making, Market Responsiveness, and Strategic Alliances in Fostering Business Growth Among Start-Up Companies, utilizing a quantitative research design. Data were collected through surveys distributed to start-up firms, though the population size, sample size, and sampling technique were not specified. The study employed Partial Least Squares Structural Equation Modeling (PLS-SEM) for data analysis, revealing that data-driven decision-making significantly influences business growth, with market responsiveness acting as a mediator and strategic alliances serving as a moderator in this relationship. The study emphasizes the importance of leveraging data analytics for market responsiveness and strategic partnerships to optimize growth outcomes. However, limitations were not specified.

Shahid and Sheikh (2021) conducted a study on How Big Data Drives and Impacts Innovation, Competitive Advantage, Productivity, and Decision Support, employing a comprehensive literature review as the research design. The study utilized secondary sources from scholarly literature and case studies as its data collection method, but population size, sample size, and sampling technique were not specified. The study developed a conceptual model based on an extensive literature review to identify the relationship between big data analytics, innovation, competitive advantage, productivity, and decision support. Findings indicate a gap in existing frameworks regarding the integration of big data into business and management functions, with limited literature available on specific steps businesses should take to fully integrate big data analytics into decision-making frameworks. The study's limitation lies in its reliance on secondary sources, lacking empirical validation through primary data collection.

Study Gap

While the reviewed studies offered valuable insights into the role of data analytics, big data, and data-driven decision-making in improving operational efficiency, market responsiveness, and organizational performance, several gaps remained that this study aimed to address. First, much of the existing research focused on large organizations or specific sectors such as healthcare, manufacturing, and technology, with limited attention given to Small and Medium Enterprises (SMEs) in developing economies like Nigeria (Siregar et al., 2024; Hwang, 2024). This represented a significant gap, as SMEs face unique challenges, including limited resources, technical expertise, and infrastructure, which were not thoroughly explored in the current literature. Second, while studies such as Christopher and Nelson (2024) and Sylvestre (2024) emphasized the benefits of data-driven decision-making, they often overlooked the specific barriers SMEs encounter in adopting these technologies, such as high costs, data privacy concerns, and resistance to cultural change. Third, although some studies, like Lisbet et al. (2024), examined the relationship between data-driven decision-making and business growth, they lacked a detailed analysis of how these factors interact in the context of SMEs operating in a rapidly urbanizing and competitive environment like the Federal Capital Territory (FCT), Abuja. Finally, while Prakash (2024) and Shahid and Sheikh (2021) highlighted the importance of data governance and integration, there was limited empirical evidence on how SMEs could practically implement these frameworks given their resource constraints.

However, this study looked at data analytics and competitiveness with a specific emphasis on SMES in FCT, Abuja. The study bridges the gap by addressing data analytics ingredients such as the adoption of data analytics tools and data-driven decision-making and their impact which were proxies by operational efficiency and market responsiveness.

METHODOLOGY

The methodology section describes a structured approach to examining the impact of data analytics tools and data-driven decision-making on the competitiveness of Small and Medium Enterprises (SMEs) in the Federal Capital Territory (FCT), Abuja. The study adopts a survey research design, a quantitative method well-suited for gathering large-scale data from a geographically dispersed population (Creswell & Creswell, 2018). The target population includes 553 selected employees and managers from SMEs across six area councils: Abuja Municipal, Gwagwalada, Kuje, Bwari, Abaji, and Kwali, representing diverse sectors such as retail, hospitality, agriculture, and services. Using Yamane's formula (Yamane, 1967), the sample size was calculated as 232, which was increased by 20% to 278 to account for potential non-responses (Hulley et al., 2013). A cluster sampling technique was applied, with the six area councils serving as clusters to ensure geographical representation.

Primary data were collected through a structured questionnaire, distributed both online and in person, focusing on key variables such as data analytics tools, data-driven decision-making, operational efficiency, and market responsiveness. Data analysis was performed using SPSS version 27.0, employing descriptive statistics (e.g., mean, standard deviation, frequency distributions) and inferential statistics (e.g., regression analysis) to explore relationships between variables. To ensure instrument validity, a pilot study was conducted with 30 respondents, confirming the clarity and comprehensibility of the questionnaire. Reliability was assessed using Cronbach's alpha, with all constructs achieving values above 0.70, indicating strong internal consistency (Hair et al., 2013). Specifically, the Cronbach's alpha scores were 0.80 for data analytics, 0.71 for competitiveness, 0.74 for data analytics tools, 0.70 for data-driven decision-making, 0.74 for operational efficiency, and 0.76 for market responsiveness, demonstrating the reliability of the research instrument.

RESULTS AND FINDINGS

This seminar work explores the relationship between data analytics and the competitiveness of SMEs in FCT, Abuja. To ensure the success and

validity of the research, a survey method was employed. The results presented in this chapter are derived from the tests outlined in Chapter Three and were analyzed using SPSS version 27.0 statistical software.

Response Rate.

Questionnaire Distributed	276
Returned Questionnaire	264
Percentage of returned Questionnaire	96%
Unreturned Questionnaire	12
Percentage of not returned Questionnaire	4%

Source: Field Survey, (2025)

Out of 276 distributed questionnaires, 264 were returned, yielding a high response rate of 96%, while 12 (4%) were not returned. This strong engagement reflects participants' interest in the study, though the non-response rate suggests potential improvements in survey distribution or design. Understanding the reasons for non-response could enhance participation in future research.

Test of Hypotheses

Testing of Hypothesis One

(H01): The adoption of data analytics tools has no significant impact on the operational efficiency of SMEs in FCT, Abuja.

Table 1 Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.746 ^a	.556	.554	.34570
a. Predictors: (Constant), ADAT				

Source: SPSS Output Version 27.0

Table 1 presents the model summary, which evaluates the strength of the relationship between the predictor variable (ADAT) and the dependent variable. The R-value of 0.746 indicates a strong positive correlation, suggesting that the independent variable significantly explains variations in the dependent variable. The R Square (0.556) implies that approximately 55.6% of the variation in the dependent variable is accounted for by ADAT. The Adjusted R Square

(0.554) is slightly lower, reflecting a minimal adjustment for the number of predictors in the model. The standard error of the estimate (0.34570) represents the average deviation of observed values from the predicted values, indicating the model's accuracy. Based on the decision rule, if R Square is above 0.5, the model is considered a good fit, suggesting that ADAT is a significant predictor of the dependent variable

Table 2 ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	39.175	1	39.175	327.792	.000 ^b
	Residual	31.312	262	.120		

	Total	70.487	263			
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a. Dependent Variable: OE

b. Predictors: (Constant), ADAT

Source: SPSS Output Version 27.0

Table 2 presents the ANOVA results, which assessed the overall significance of the regression model. The F-statistic value of 327.792 was considerably high, indicating that the model explained a significant portion of the variation in the dependent variable (OE). The p-value (Sig.) of 0.000 was less than the conventional threshold of 0.05, confirming that the predictor variable

(ADAT) had a statistically significant impact on the dependent variable. The decision rule stated that if the p-value was below 0.05, the null hypothesis (which assumed no significant relationship) should be rejected. Therefore, the regression model was statistically significant, meaning that ADAT was a meaningful predictor of OE.

Table 3 Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.377	.147		9.344	.000
	ADAT	.675	.037	.746	18.105	.000

a. Dependent Variable: OE

Source: SPSS Output Version 27.0

Table 3 presents the coefficients of the regression model, which determined the impact of the predictor variable (ADAT) on the dependent variable (OE). The unstandardized coefficient (B) for ADAT was 0.675, indicating that for every unit increase in ADAT, OE increased by 0.675 units. The standardized coefficient (Beta) of 0.746 suggested a strong positive relationship between ADAT and OE. The t-statistic value of 18.105 was significantly high, and the p-value (Sig.) of 0.000 was below the 0.05 threshold. According to the decision rule, if the p-value was less than 0.05, the null hypothesis should be rejected, confirming that ADAT had a

statistically significant effect on OE. Additionally, the constant value of 1.377 represented the predicted OE value when ADAT was zero. These results indicated that ADAT was a strong predictor of OE.

Testing of Hypothesis Two

(H02): Data-driven decision-making has no significant impact on the market responsiveness of SMEs in FCT, Abuja.

Table 4 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.675 ^a	.456	.454	.39187

a. Predictors: (Constant), DDDM

Source: SPSS Output Version 27.0

Table 4 presented the model summary, which assessed the strength of the relationship between the predictor variable (DM) and the dependent

variable. The R-value of 0.675 indicated a moderately strong positive correlation, suggesting that DM had a considerable impact on

the dependent variable. The R Square value of 0.456 implied that 45.6% of the variation in the dependent variable was explained by DSM. The Adjusted R Square (0.454) was slightly lower, accounting for the number of predictors in the model and ensuring a more accurate estimate of the explained variance. The standard error of the estimate (0.39187) represented the average deviation of observed values from predicted

values, indicating the model's predictive accuracy. According to the decision rule, if the R Square value exceeded 0.5, the model was considered a strong fit; however, with an R Square of 0.456, the model had a moderate fit, suggesting that while DM was a significant predictor, other factors also influenced the dependent variable.

Table 5 ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	33.683	1	33.683	219.343	.000 ^b
	Residual	40.233	262	.154		
	Total	73.916	263			

a. Dependent Variable: MR.

b. Predictors: (Constant), DDDM

Source: SPSS Output Version 27.0

Table 5 presents the ANOVA results, which evaluated the overall significance of the regression model. The F-statistic value of 219.343 was considerably high, indicating that the model effectively explained a significant portion of the variation in the dependent variable (MR). The p-value (Sig.) of 0.000 was below the conventional significance level of 0.05,

confirming that the predictor variable (DM) had a statistically significant impact on MR. According to the decision rule, if the p-value was less than 0.05, the null hypothesis, which assumed no significant relationship between DM and MR, should be rejected. Therefore, the regression model was statistically significant, demonstrating that DM was a meaningful predictor of MR

Table 6 Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.939	.161		12.013	.000
	DDDM	.591	.040	.675	14.810	.000

a. Dependent Variable: MR.

Source: SPSS Output Version 27.0

Table 6 presented the coefficients of the regression model, which measured the impact of the predictor variable (DM) on the dependent variable (MR). The unstandardized coefficient (B) for DDDM was 0.591, indicating that for every unit increase in DDDM, MR increased by 0.591 units. The standardized coefficient (Beta) of 0.675 suggested a moderately strong positive relationship between DM and MR. The t-statistic value of 14.810 was significantly high, and the p-value (Sig.) of 0.000 was below the 0.05 threshold. According to the decision rule, if the p-

value was less than 0.05, the null hypothesis should be rejected, confirming that DM had a statistically significant effect on MR. Additionally, the constant value of 1.939 represented the predicted MR value when DM was zero. These results indicated that DM was a strong predictor of MR.

Discussion of Findings

The study revealed that the adoption of data analytics tools significantly impacts the operational efficiency and market responsiveness

of SMEs in FCT, Abuja. This implies that integrating data analytics enhances decision-making, resource allocation, and overall business performance, enabling SMEs to optimize operations, reduce inefficiencies, and improve productivity. By leveraging data-driven insights, businesses can streamline processes, enhance customer satisfaction, and achieve sustainable growth, ultimately gaining a competitive advantage. Furthermore, the findings indicate that investment in digital tools and data-driven strategies should be prioritized to maximize operational efficiency and long-term profitability. This aligns with the studies of Siregar, Aprijal, Siahaan, and Iqbal (2024) as well as Christopher and Nelson (2024), whose findings highlighted the transformative applications of data science across various industries, including business, healthcare, education, and technology. Their research demonstrated how companies such as Amazon, Netflix, Walmart, and Uber have successfully implemented big data analytics to optimize operations, increase sales, and enhance customer experiences, leading to improved business intelligence, predictive modeling, and decision-making capabilities. Theoretically, these findings align with the Resource-Based View (RBV) Theory, which posits that firms can achieve competitive advantage by leveraging unique internal resources, such as data analytics capabilities.

Additionally, the study revealed that data-driven decision-making has a significant impact on market responsiveness, enabling SMEs to adapt swiftly to market changes, customer demands, and competitive pressures. By utilizing analytics, businesses can identify emerging trends, optimize product offerings, and refine their strategies in real-time to better meet market needs. The findings suggest that SMEs that embrace data-driven approaches exhibit greater agility and adaptability, positioning themselves for long-term success. Moreover, the significant impact of data-driven decision-making underscores the need for SMEs to invest in digital tools, analytical capabilities, and data governance frameworks to enhance responsiveness, improve customer satisfaction, and maintain a competitive edge in an increasingly dynamic business environment.

This is in line with the research of Prakash (2024) and Sylvestre (2024), which emphasized the importance of robust data governance frameworks integrating policies, processes, and technologies to ensure data security, integrity, and accessibility. Their findings also highlighted the role of high-quality data, big data analytics integration, and the balance between human intuition and data-driven insights in strategic decision-making. Theoretically, these findings align with the Diffusion of Innovations (DOI) Theory, which explains how new technologies, such as data analytics, are adopted over time, influencing business innovation, efficiency, and competitive positioning.

CONCLUSION AND RECOMMENDATIONS

The study concluded that the adoption of data analytics tools significantly impacts the operational efficiency and market responsiveness of SMEs in FCT, Abuja. Data-driven decision-making enhances business operations by improving efficiency, reducing costs, and optimizing resource utilization, enabling SMEs to streamline processes, enhance customer satisfaction, and remain competitive in a rapidly evolving business environment. Additionally, the study revealed that data analytics enables SMEs to quickly adapt to market changes, respond effectively to customer demands, and leverage real-time insights to improve product offerings, optimize pricing strategies, and enhance customer engagement. These findings underscore the critical role of technology adoption in fostering business agility, improving strategic decision-making, and ensuring sustainable growth and competitiveness in the SME sector.

Based on the conclusion the following recommendation was made:

- i. SMEs in FCT, Abuja, should prioritize investment in modern data analytics tools to enhance decision-making, improve efficiency, and gain a competitive advantage.

- ii. SMEs in FCT, Abuja should undergo training on data-driven decision-making processes to maximize the benefits of analytics in enhancing market responsiveness.

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