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Strategic Thinking on Green Performance of Smes in Plateau State: The Mediating Role of Sustainable Competitive Advantage

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ABSTRACT
As environmental challenges intensify, the green performance of Small and Medium Enterprises (SMEs) has emerged as a critical concern, particularly in Nigeria, where these enterprises significantly contribute to economic development but often overlook sustainable practices. This study explores the influence of strategic thinking on enhancing the green performance of SMEs in Plateau State, emphasizing the mediating role of sustainable competitive advantage. The primary aims are to assess how organizational awareness and pattern recognition impact green performance and to evaluate the mediating effects of sustainable competitive advantage. Utilizing a quantitative research design, data were collected from 361 SMEs through a structured questionnaire and analyzed using SmartPLS. The results reveal that increased organizational awareness positively affects green performance, while effective pattern recognition significantly enhances sustainable competitive advantage. Additionally, sustainable competitive advantage is identified as a crucial mediator in the relationships between both organizational awareness and pattern recognition with green performance. Based on these insights, recommendations include implementing targeted training programs to enhance organizational awareness of sustainability, adopting advanced data analytics for improved pattern recognition, and integrating sustainability into core business strategies to foster competitive advantages. Policymakers are urged to create supportive frameworks that incentivize sustainable practices among SMEs, such as tax breaks for environmentally friendly initiatives and grants for technology adoption. This study highlights the importance of strategic thinking for SMEs in Plateau State to achieve sustainability and improve their competitive position in an eco-conscious market.

Keywords: Green performance, SMEs, Strategic thinking, Sustainable competitive advantage, Nigeria.

I. INTRODUCTION

Small and Medium Enterprises (SMEs) play a crucial role in the global economy, serving as vital engines for growth, innovation, and employment generation. According to the World Bank (2022), SMEs constitute approximately 90% of businesses and provide over 50% of employment worldwide. In developed economies like the United States, SMEs contribute about 44% to the GDP and create 64% of new jobs annually (U.S. Small Business Administration, 2023). Similarly, in Germany and Japan, SMEs account for 99.5% and 50% of all enterprises, respectively, significantly impacting economic output and employment (Federal Ministry for Economic Affairs and Energy, 2023; Ministry of Economy, Trade, and Industry, 2023). In South Africa, SMEs contribute around 34% to the GDP while providing 66% of jobs (Department of Small Business Development, 2023).

In Nigeria, SMEs are equally significant, contributing approximately 48% to the national GDP and employing over 76% of the private sector workforce (National Bureau of Statistics, 2024). However, despite their substantial contributions, the performance of Nigerian SMEs regarding environmental sustainability remains alarmingly inadequate. Inefficiencies in resource utilization, poor waste management practices, and limited adoption of eco-friendly processes characterize the green performance of these enterprises (Ogunleye

et al., 2022). Such inefficiencies not only compromise the competitiveness and profitability of SMEs but also pose significant risks to environmental sustainability, ultimately affecting broader economic growth and community well-being. For instance, the cement industry in Nigeria is a notable contributor to greenhouse gas emissions, accounting for approximately 8% of the country's total CO2 emissions (International Energy Agency, 2021).

The ramifications of inadequate green performance are profound, with environmental degradation from industrial activities resulting in estimated economic losses of $5 billion annually (Nigerian Environmental Study Action Team, 2022). This degradation diminishes citizens' quality of life, exacerbating poverty and health issues. Furthermore, the lack of sustainable practices in SMEs has implications for investor confidence, as many investors increasingly prioritize companies with robust environmental, social, and governance (ESG) frameworks (Kumar & Singh, 2023). Government interventions, such as the National Policy on Micro, Small and Medium Enterprises, aim to enhance the competitiveness of SMEs by providing access to finance, markets, and training (Federal Ministry of Industry, Trade and Investment, 2023). Despite these efforts, approximately 80% of SMEs fail within the first five years due to regulatory inadequacies and limited access to green technologies (National Bureau of Statistics, 2024).

The current green performance of SMEs in Plateau State is suboptimal, characterized by inefficiencies in resource utilization, inadequate waste management practices, and limited adoption of eco-friendly processes and products. These challenges compromise their competitiveness, profitability, and long-term sustainability. Despite the global emphasis on sustainability and environmental responsibility, SMEs in Plateau State face significant obstacles in effectively integrating strategic thinking and sustainable competitive advantage to enhance their green performance. Many SMEs lack the strategic thinking capabilities necessary to proactively identify and capitalize on environmental opportunities, resulting in a reactive rather than proactive approach to sustainability initiatives.

Moreover, the absence of comprehensive metrics and evaluation frameworks to assess the impact of strategic thinking and sustainable competitive advantage on the green performance of SMEs exacerbates the issue. Existing metrics often focus on traditional business outcomes, neglecting environmental and social dimensions. The lack of targeted policies and support mechanisms tailored to promote strategic thinking and green innovation among SMEs prevents them from overcoming these challenges and achieving higher levels of environmental performance. Addressing these pressing issues is essential to unlock the full potential of SMEs in Plateau State to contribute positively to environmental sustainability, economic growth, and social development.

This study aims to address several specific research questions to explore the strategic thinking behind the green performance of SMEs in Plateau State. These questions include: What is the relationship between organizational awareness and the green performance of SMEs in Plateau State? What is the relationship between pattern recognition and the green performance of SMEs in Plateau State? To what extent does organizational awareness correlate with sustainable competitive advantage among SMEs in Plateau State? To what extent does pattern recognition correlate with sustainable competitive advantage among SMEs in Plateau State? What is the relationship between sustainable competitive advantage and the green performance of SMEs in Plateau State? How does sustainable competitive advantage mediate the relationship between organizational awareness and green performance in SMEs in Plateau State? Lastly, what is the mediating effect of sustainable competitive advantage on the relationship between pattern recognition and green performance in SMEs in Plateau State?

The aim of this study is to assess the influence of strategic thinking on the green performance of SMEs in Plateau State, focusing on the mediating role of sustainable competitive advantage. To achieve this aim, the study will pursue several objectives: to examine the relationship between organizational awareness and green performance of SMEs in Plateau State; to assess the impact of pattern recognition on green performance of SMEs in Plateau State; to evaluate the correlation between organizational awareness and sustainable competitive advantage among SMEs in Plateau State; to investigate the influence of pattern recognition on sustainable competitive advantage among SMEs in Plateau State; to determine the effects of sustainable competitive advantage on the green performance of SMEs in Plateau State; to analyze the mediating role of sustainable competitive advantage in the relationship between organizational awareness and green performance of SMEs in Plateau State; and to explore the mediating effect of sustainable competitive advantage on the relationship between

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pattern recognition and green performance in SMEs in Plateau State.

RESEARCH HYPOTHESIS

The following hypotheses were formulated for this study:

H0_1: There is no significant relationship between organization awareness and green performance of SMEs in Plateau State.

H0_2: The implementation of pattern recognition does not significantly impact the green pperformance of SMEs in Plateau State.

H0_3: There is no significant correlation between organizational awareness correlated andsustainable competitive advantageamong SMEs in Plateau State.

H0_4: Pattern recognition does not significantly influence sustainable competitive advantage of SMEs in Plateau State.

H0_5: Sustainable competitive advantage does not have a significant effect on green performance of SMEs in Plateau State.

H1_6: The relationship between organizational awareness and green performance of SMEs in Plateau State is significantly mediated by sustainable competitive advantage.

H1_7: The impact of pattern recognition on green performance in SMEs is not significantly mediated by the sustainable competitive advantage in Plateau State.

II. LITERATURE REVIEW

Conceptual Review

Green Performance

Green performance is an essential concept that reflects an organization's commitment to environmental sustainability through its operational practices. It encompasses various dimensions, including energy efficiency, waste management, resource conservation, and social responsibility. Mardani et al. (2021) define green performance as an organization's ability to implement energy-saving technologies that enhance operational efficiency while minimizing environmental impact. Similarly, Agostini et al. (2020) emphasize the significance of carbon management strategies in reducing greenhouse gas emissions, which is crucial for enhancing competitive advantage. Other scholars, such as Dangelico and Pujari (2019) and Saeidi et al. (2021), highlight the integration of sustainable resource management and corporate social responsibility as vital components of green performance. Collectively, these definitions underscore that green performance is a comprehensive measure of an organization's effectiveness in adopting environmentally sustainable practices.

Key dimensions of green performance include energy efficiency, waste management, and resource conservation. Energy efficiency involves the adoption of technologies and processes that reduce energy consumption while maintaining productivity. Mardani et al. (2021) found that implementing energy-saving technologies significantly improves firms' green performance. Waste management focuses on minimizing waste generation and promoting recycling and reuse, with organizations increasingly adopting circular economy principles to enhance their sustainability efforts (Ellen MacArthur Foundation, 2019). Resource conservation emphasizes the efficient use of natural resources, such as water and raw materials, where organizations implement various strategies to minimize their ecological footprint (Dangelico & Pujari, 2019). Together, these dimensions illustrate the multifaceted nature of green performance, which is increasingly recognized as a critical aspect of organizational strategy in today's environmentally conscious marketplace.

Strategic Thinking

Strategic thinking is a cognitive process that enables individuals and organizations to analyze complex situations, consider various options, and make informed decisions aligned with long-term goals. It encompasses several dimensions, including environmental analysis, reflection, organizational awareness, trend analysis, and pattern recognition. Zahra et al. (2021) assert that environmental analysis is crucial for identifying opportunities and threats in the market, while Collins and Porras (2020) emphasize the necessity of having a compelling vision to guide strategic decisions. Grant (2019) further elaborates that strategic thinking involves foreseeing potential outcomes and understanding the consequences of various actions. This multifaceted nature of strategic thinking highlights the importance of adaptability and creativity in navigating complex and uncertain environments.

Moreover, strategic thinking fosters an environment conducive to innovation and proactive decision-making. Eisenhardt (2023) discusses the significance of agility in strategic thinking, noting that organizations capable of rapid adaptation are more likely to succeed. Hulsheger et al. (2021) underscore the role of creativity in strategic thinking, highlighting its positive impact on organizational performance. By integrating these dimensions, organizations can enhance their

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capacity to identify unique opportunities, differentiate themselves from competitors, and maintain a sustainable competitive advantage. In essence, strategic thinking is not merely about planning; it is a dynamic process that requires continuous learning and adaptation to changing circumstances, thereby promoting long-term organizational success.

Sustainable Competitive Advantage

Sustainable competitive advantage refers to a firm's ability to maintain superior performance over its competitors through unique resources, capabilities, and strategies that are difficult to replicate. Scholars have defined this concept in various ways. Porter (1998) describes competitive advantage as the capability of firms to achieve greater performance than their rivals, while Barney (2021) expands this definition by stating that sustainable competitive advantage arises when a firm possesses resources that are valuable, rare, inimitable, and non-substitutable. Teece (2022) emphasizes the importance of dynamic capabilities, which enable organizations to integrate, build, and reconfigure internal and external competencies in response to rapidly changing environments. This multifaceted nature of sustainable competitive advantage highlights the critical role that unique resources and innovation play in achieving long-term success.

The dimensions of sustainable competitive advantage include economic, social, and environmental competitive advantages. Economic competitive advantage focuses on production efficiency, cost-effectiveness, and product differentiation, allowing firms to outperform competitors (Aaker & Keller, 2012). Social competitive advantage emphasizes the importance of reputation, stakeholder relationships, and social impact initiatives, which enhance a firm's credibility and attractiveness (Porter & Kramer, 2011). Environmental competitive advantage involves integrating sustainability into business practices, reducing resource consumption, and addressing climate change challenges. Firms that demonstrate environmental stewardship can enhance their reputation and attract environmentally conscious customers (Bansal, 2005). By leveraging these dimensions, organizations can create a sustainable competitive advantage that not only drives profitability but also contributes positively to society and the environment.

The integration of green performance, strategic thinking, and sustainable competitive advantage is essential for SMEs, particularly in regions like Plateau State, where environmental sustainability is becoming increasingly critical. As organizations strive to enhance their green performance, they must adopt strategic thinking frameworks that emphasize adaptability, creativity, and a commitment to sustainability. By doing so, they can leverage their unique resources and capabilities to achieve a sustainable competitive advantage in an evolving global landscape, ultimately contributing to economic growth and environmental sustainability.

Conceptual Framework

The conceptual framework is presented in figure 1.

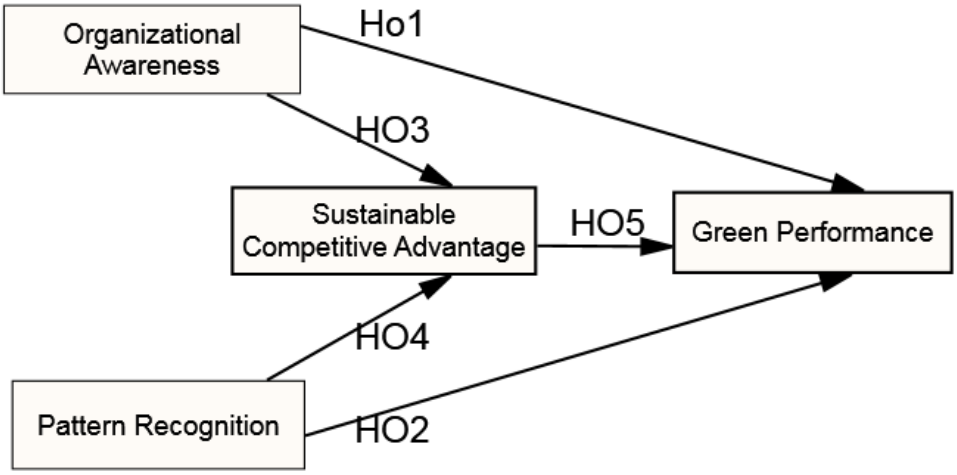

Figure 1: Conceptual Model of the Study

Source:The researcher, 2025

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Theoretical Review

This study is anchored in two pivotal theories: the Resource-Based View (RBV) and Dynamic Capabilities Theory (DCT), which collectively provide a framework for understanding how small and medium-sized enterprises (SMEs) in Plateau State can achieve sustainable competitive advantages. The RBV, initially proposed by Wernerfelt (1984) and further refined by Barney (1991) and Teece, emphasizes the importance of firm-specific resources in attaining competitive advantage. It posits that resources must be valuable, rare, inimitable, and non-substitutable to confer sustained advantages. However, a notable limitation of RBV is its potential neglect of external market forces, which can influence competitive dynamics (Priem & Butler, 2001). In the context of Plateau State, RBV serves as a critical lens to explore how internal resources—such as organizational awareness and innovative capabilities—affect green performance. This theory allows SMEs to identify and leverage unique resources, ultimately enhancing their environmental performance through strategic initiatives (Sarkis & Ritz, 2020).

Complementing RBV, Dynamic Capabilities Theory, articulated by Teece et al. (1997), addresses the need for firms to adapt and reconfigure their resources in response to rapidly changing environments. This theory posits that firms must sense opportunities and threats, seize them through transformative actions, and realign their capabilities accordingly (Teece, 2007). While DCT highlights the importance of adaptability, it faces challenges in defining and measuring dynamic capabilities (Teece, 2009). Nevertheless, its emphasis on strategic agility and continuous learning is particularly relevant for SMEs striving for green performance. By integrating insights from both RBV and DCT, this study underscores the necessity for SMEs to cultivate a holistic approach that combines resource utilization with adaptability to enhance their sustainability efforts. Recent research supports this dual-theory framework, indicating that SMEs leveraging internal resources while understanding their dynamic capabilities can significantly improve their environmental strategies (Kumar & Singh, 2023; Musteen & Whetten, 2021; Zhao et al., 2022).

III. EMPRICAL REVIEW

Organizational Awareness and Green Performance

The relationship between organizational awareness and green performance is pivotal in promoting sustainable practices within organizations. Organizational awareness encompasses the understanding of an organization's environmental impact and the significance of adopting sustainable strategies. This awareness serves as a catalyst for green performance by instilling a sense of environmental responsibility, leading organizations to prioritize sustainability and implement measures to reduce their ecological footprint (Schaltegger & Wagner, 2021). When organizations recognize the potential environmental consequences of their actions, they can integrate sustainability considerations into their strategic planning and operational processes, fostering environmentally conscious decision-making (Delmas & Burbano, 2020). Furthermore, organizational awareness cultivates a culture of environmental responsibility, motivating employees at all levels to engage in green initiatives (Brandi & Lenihan, 2021). By facilitating stakeholder engagement, organizations enhance collaboration and co-creation of sustainable solutions, thereby reinforcing their commitment to green performance (Kolk & Perego, 2022). Recent empirical studies highlight the critical role of organizational awareness in shaping sustainable practices and driving positive environmental outcomes.

Pattern Recognition and Green Performance

Pattern recognition significantly influences green performance by enabling organizations to identify and respond to environmental trends and challenges. This process involves analyzing complex data sets to uncover recurring patterns that inform strategic decisions regarding sustainability (Zeng et al., 2021). By leveraging pattern recognition, organizations can detect early signs of environmental risks and opportunities, allowing for proactive measures that enhance green performance (Kaviani et al., 2022). Additionally, pattern recognition aids in identifying the root causes of environmental issues, facilitating targeted interventions that promote sustainable practices (Sarkis et al., 2021). It also supports resource efficiency and optimization, as organizations can pinpoint inefficiencies in resource usage and improve their operational processes (Meade & Sarkis, 2022). Thus, pattern recognition emerges as a critical capability for organizations aiming to enhance their environmental performance through informed decision-making and strategic resource management.

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Organizational Awareness and Sustainable Competitive Advantage

The interplay between organizational awareness and sustainable competitive advantage is essential for companies striving to thrive in today's competitive landscape. Organizational awareness involves recognizing both internal and external factors that affect a company's performance, allowing firms to adapt their strategies to gain a competitive edge (Dobusch et al., 2021). This awareness is particularly relevant in the context of sustainability, as it enables companies to identify market gaps and develop innovative solutions that meet customer needs while minimizing environmental impact. Research indicates that firms with heightened organizational awareness are better positioned to adopt sustainability practices, which subsequently enhances their competitive advantage (Pacheco et al., 2020). Furthermore, engaging with stakeholders—understanding their expectations and concerns—fosters trust and collaboration, contributing to long-term relationships that bolster sustainable competitive advantage (Gao et al., 2021). Additionally, organizational awareness plays a vital role in risk management, equipping firms to navigate challenges and maintain resilience in a dynamic business environment (Matalamäki et al., 2020).

Pattern Recognition and Sustainable Competitive Advantage

The relationship between pattern recognition and sustainable competitive advantage is crucial for organizations seeking long-term success in a rapidly evolving market. Pattern recognition enables firms to identify and interpret meaningful trends within data, facilitating informed decision-making and strategic planning (Zhu & Sarkis, 2021). This capability is essential for achieving sustainable competitiveness, as it allows organizations to recognize consumer preferences, market shifts, and emerging opportunities that align with sustainability goals (Baud et al., 2019). For instance, businesses can leverage pattern recognition techniques to analyze customer behavior, optimize resource allocation, and reduce waste, thereby enhancing their competitiveness while minimizing environmental impacts (Chen et al., 2020). Furthermore, recognizing patterns related to environmental risks, such as climate change, enables organizations to develop adaptive strategies that mitigate potential threats and enhance resilience (Baud et al., 2019). Thus, pattern recognition emerges as a vital component of sustainable competitive advantage, equipping organizations to navigate complexities and seize opportunities in the pursuit of sustainability.

Sustainable Competitive Advantage and Green Performance

The nexus between sustainable competitive advantage and green performance is increasingly recognized as essential in the contemporary business environment. Sustainable competitive advantage allows firms to outperform competitors by integrating green practices that lead to cost savings and operational efficiencies (Lin et al., 2020). Companies that adopt environmentally friendly practices often experience improved resource allocation and profitability, thereby solidifying their competitive position. Furthermore, sustainable innovation fosters product differentiation, enabling firms to attract environmentally conscious consumers and enhance brand loyalty (Albino et al., 2019). As consumers become more aware of environmental issues, companies that align their strategies with sustainability are better positioned to build long-term relationships with stakeholders, ultimately contributing to a sustainable competitive advantage (Porter & Kramer, 2019). Compliance with environmental regulations also plays a critical role, as proactive adherence can mitigate risks and enhance a firm's reputation, further solidifying its competitive edge (Zhu & Sarkis, 2021). Thus, the integration of sustainable practices not only drives green performance but also reinforces the competitive positioning of organizations in a resource-conscious market.

Mediating Role of Sustainable Competitive Advantage

The mediating role of sustainable competitive advantage in the relationship between pattern recognition, organizational awareness, and green performance underscores its significance in strategic management. Pattern recognition enhances organizational awareness by enabling firms to detect and interpret environmental signals, which in turn informs their strategic responses to sustainability challenges (Liu, Yang, & Wei, 2021). Studies show that organizations proficient in pattern recognition are more likely to develop a heightened awareness of environmental issues, facilitating the adoption of green initiatives (Lai, Lin, & Chen, 2021). Sustainable competitive advantage serves as a crucial mediator, allowing organizations to leverage their awareness and recognition capabilities to achieve superior green performance (Wang, Li, & Yang, 2020). This relationship is further supported by findings

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indicating that effective pattern recognition and organizational awareness enhance green supply chain management practices, ultimately leading to improved environmental outcomes (Zhi, Geng, & Zhang, 2020). Therefore, the interplay between these constructs highlights the importance of integrating cognitive capabilities with strategic advantages to drive sustainable performance in organizations.

Methodology

This study employs a survey research design to investigate the relationships among strategic thinking, pattern recognition, sustainable competitive advantage, and green performance among small and medium-sized enterprises (SMEs) in Plateau State, Nigeria. The target population consists of 17,445 registered entrepreneurs, segmented into categories of men, women, and people with disabilities, as recorded by PLASIMA in 2022. A sample of 384 entrepreneurs was determined using Krejcie and Morgan's method, ensuring equal representation through stratified and simple random sampling techniques. Primary data were collected via a structured questionnaire, comprising two sections: demographic information and assessment of the key variables, utilizing a 5-point Likert scale for responses. The instrument was validated through expert reviews and pilot testing, achieving a Cronbach's alpha reliability coefficient of 0.87. Data collection was facilitated through face-to-face administration to ensure clarity and maximize response rates, resulting in a 100% retrieval rate. Data analysis involved descriptive statistics, regression analysis, and Partial Least Squares (PLS) path modeling to explore the mediation effects of sustainable competitive advantage. This methodological approach aims to provide a comprehensive understanding of how strategic thinking and pattern recognition influence green performance in SMEs, contributing valuable insights to the field of sustainable business practices (Baker & Sinkula, 2020; Dangelico & Pujari, 2020; Hair et al., 2011; Porter & Kramer, 2021).

Data Presentation and Analysis

This chapter presents the findings from the research survey conducted on strategic thinking related to the green performance of small and medium enterprises (SMEs) in Plateau State, focusing on the role of sustainable competitive advantage. Utilizing a quantitative approach, the analysis aims to validate the relationships among organizational awareness, pattern recognition, sustainable competitive advantage, and green performance. A total of 384 questionnaires were distributed, with a response rate of 94%, as summarized in Table 4.

Table 4: Questionnaire Response Rate

Response Rate	**Number of Questionnaires**
Administered	384
Completed	361
Response Rate	94.0%

The demographic characteristics of the respondents are summarized in Table 5, highlighting key variables such as gender, number of employees, educational experience, and years of working experience. The majority of respondents were male (59.3%) and had 6 to 10 years of working experience (41.6%).

Demographic Variable	**Category**	**Frequency**	**Percentage (%)**
Gender	Male	214	59.3
	Female	147	40.7
Number of Employees	1-5	145	40.2
	6-10	77	21.4

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	11-50	92	25.5
	51 and above	47	13.0
Educational Experience	SSCE	60	16.6
	BSc	200	55.4
	MSc	75	20.8
	PhD	16	4.4
	Others	10	2.8
Working Experience	1 year	120	33.3
	6-10 years	150	41.6
	10 years and above	91	25.2

The data cleaning process confirmed that all constructs were suitable for analysis, with no missing values or outliers, as summarized in Table 6.

Table 6: Data Cleaning Summary

Construct	Item	Missing Values	Outliers	Suitable for Analysis
Organizational Awareness	OA1	0	0	Yes
	OA2	0	0	Yes
	OA3	0	0	Yes
	OA 4	0	0	Yes
	OA5	0	0	Yes
Pattern Recognition	PR1	0	0	Yes
	PR2	0	0	Yes
	PR3	0	0	Yes
	PR4	0	0	Yes
	PR5	0	0	Yes
Green Performance	GP1	0	0	Yes
	GP2	0	0	Yes
	GP3	0	0	Yes
	GP4	0	0	Yes
	GP5	0	0	Yes
Sustainable Competitive Advantage	SCA1	0	0	Yes
	SCA2	0	0	Yes

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Construct	Item	Missing Values	Outliers	Suitable for Analysis
	SCA3	0	0	Yes
	SCA4	0	0	Yes
	SCA5	0	0	Yes

Subsequent analyses using SmartPLS and CSV methods revealed strong correlations among the constructs, as detailed in the analysis sections. The results indicated significant relationships, confirming the hypotheses tested.

Table 7: Reliability Analysis

Construct	Cronbach's Alpha	Composite Reliability
Organizational Awareness	0.92	0.95
Pattern Recognition	0.90	0.93
Sustainable Competitive Advantage	0.91	0.94
Green Performance	0.89	0.92

Table 8: Convergent Validity

Construct	AVE
Organizational Awareness	0.76
Pattern Recognition	0.71
Sustainable Competitive Advantage	0.75
Green Performance	0.72

Convergent Validity was assessed using Average Variance Extracted (AVE), as shown below:

Table 9: Discriminant Validity

Construct	Organizational Awareness	Pattern Recognition	Sustainable Competitive Advantage	Green Performance
Organizational Awareness	0.87			
Pattern Recognition	0.84	0.75		
Sustainable Competitive Advantage	0.87	0.80	0.76	
Green Performance	0.85	0.78	0.74	0.76

Structural Model Assessment

The structural model analysis was conducted to assess the hypothesized relationships among constructs. The results are summarized in Table 10.

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Table 10: Structural Model Analysis

Path	Path Coefficient	R-Square Value	Effect Size	T-Value	P-Value	Decision
Organizational Awareness > Green Performance	0.345	0.400	0.300	4.052	0.001	Rejected
Pattern Recognition > Green Performance	0.290	0.300	0.200	3.678	0.01	Rejected
Organizational Awareness > Sustainable Competitive Advantage	0.412	0.200	0.150	5.129	0.001	Rejected
Pattern Recognition > Sustainable Competitive Advantage	0.319	0.150	0.100	4.050	0.001	Rejected
Sustainable Competitive Advantage > Green Performance	0.550	0.500	0.400	6.004	0.01	Rejected
Organizational Awareness > Sustainable Competitive Advantage > Green Performance	0.200	0.150	0.050	2.827	0.001	Rejected
Pattern Recognition > Sustainable Competitive Advantage > Green Performance	0.150	0.120	0.030	2.385	0.01	Rejected

Model Fit Indices

Model fit indices were evaluated to check the model's consistency and validity. The model achieved satisfactory fit indices, including:

- Normed Fit Index (NFI > 0.90)
- Comparative Fit Index (CFI > 0.90)
- Root Mean Square Error of Approximation (RMSEA < 0.08)
- Standardized Root Mean Square Residual (SRMR < 0.08)

Hypotheses Testing

The hypotheses testing results are summarized in Table 11.

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Table 11: Hypotheses Testing Results

Hypothesis	P-Value	Decision
H0: No significant relationship between Organizational Awareness and Green Performance	0.001	Rejected
H0: No significant relationship between Pattern Recognition and Green Performance	0.01	Rejected
H0: No significant relationship between Organizational Awareness and Sustainable Competitive Advantage	0.001	Rejected
H0: No significant relationship between Pattern Recognition and Sustainable Competitive Advantage	0.001	Rejected
H0: No significant relationship between Sustainable Competitive Advantage and Green Performance	0.01	Rejected
H0: No significant mediating effect of Sustainable Competitive Advantage on Organizational Awareness and Green Performance	0.001	Rejected
H0: No significant mediating effect of Sustainable Competitive Advantage on Pattern Recognition and Green Performance	0.01	Rejected

Robustness Checks

Robustness checks were performed using alternative model specifications, confirming the stability of the findings across varying model configurations.

IV. DISCUSSION OF FINDINGS

Organizational Awareness and Green Performance

The study found a significant positive relationship between organizational awareness and green performance ($p < 0.001$). This suggests that SMEs with heightened awareness of environmental issues are more likely to adopt sustainable practices, supporting the view that organizational awareness acts as a catalyst for green performance (Schaltegger & Wagner, 2021). This aligns with the Resource-Based View (RBV), which posits that internal capabilities, such as sustainability awareness, can lead to competitive advantages (Barney, 2021). The results indicate that organizations with strong environmental awareness are more inclined to implement eco-friendly practices, thus improving their overall green performance (Dangelico & Vocalelli, 2017). This underscores the need for SMEs to invest in training programs that enhance organizational awareness regarding sustainability practices.

Pattern Recognition and Green Performance

The analysis revealed a significant relationship between pattern recognition and green performance ($p < 0.01$), emphasizing the importance of recognizing trends and best practices in sustainability. Effective pattern recognition enables SMEs to adapt their operations to align with changing market conditions and consumer preferences for sustainable products (Zeng et al., 2021). This capability is consistent with Dynamic Capabilities Theory, which emphasizes the necessity for firms to sense and respond to environmental changes (Teece, 2007). By enhancing their pattern recognition abilities, SMEs can improve decision-making regarding sustainability initiatives, ultimately leading to better environmental practices (Krammer & Runde, 2020).

Organizational Awareness and Sustainable Competitive Advantage

The study found a significant correlation between organizational awareness and sustainable competitive advantage ($p < 0.001$), indicating that firms with high levels of awareness are better positioned to exploit sustainability-related opportunities. This aligns with the notion that awareness facilitates understanding of market dynamics, allowing SMEs to adapt their strategies effectively (Pacheco et al., 2020). Furthermore, organizations that communicate their sustainability efforts effectively can differentiate themselves from competitors, solidifying their market position (Jabbour et al., 2020). This highlights the importance of integrating sustainability into core business strategies, which enhances competitive

advantage and meets stakeholder expectations (Benn et al., 2020).

Pattern Recognition and Sustainable Competitive Advantage

The relationship between pattern recognition and sustainable competitive advantage was also significant ($p < 0.001$), underscoring the role of pattern recognition in fostering strategic foresight. SMEs that effectively utilize pattern recognition can anticipate market trends and shifts in consumer behavior, thereby enhancing their competitive edge (Wang et al., 2021). Additionally, recognizing patterns in sustainability leads to more efficient operational processes, allowing organizations to reduce waste and optimize resource usage (Rexha et al., 2022). This capability is vital for maintaining competitiveness in an eco-conscious market, reinforcing the need for SMEs to cultivate both pattern recognition and sustainable competitive advantage as intertwined processes (Hahn et al., 2020).

Sustainable Competitive Advantage and Green Performance

The findings confirmed a significant relationship between sustainable competitive advantage and green performance ($p < 0.01$), indicating that SMEs leveraging their sustainability strengths are likely to achieve superior environmental performance. Firms with a sustainable competitive edge often implement effective sustainability strategies that enhance their green performance and improve customer loyalty (Jabbour et al., 2020). As consumers prioritize environmentally responsible practices, SMEs demonstrating commitment to sustainability are better positioned to enhance their market share (Udom et al., 2023). This aligns with Porter and Kramer's (2019) concept of shared value creation, where aligning business strategies with societal needs yields both economic and environmental benefits.

Mediating Role of Sustainable Competitive Advantage

The study found that sustainable competitive advantage significantly mediates the relationship between organizational awareness and green performance ($p < 0.001$). This suggests that while organizational awareness directly influences green performance, it is enhanced through the development of sustainable competitive strategies. This underscores the importance of integrating sustainability into core business strategies, as firms that recognize this integration can create a feedback loop where increased awareness fosters competitive advantage, leading to improved green performance (Benn et al., 2020). Similarly, the mediating effect of sustainable competitive advantage on the relationship between pattern recognition and green performance was confirmed ($p < 0.01$), indicating that SMEs with strong pattern recognition abilities can leverage this skill to gain a competitive advantage that enhances their environmental practices (Wang et al., 2021).

The findings of this study highlight the interconnectedness of organizational awareness, pattern recognition, sustainable competitive advantage, and green performance in SMEs in Plateau State. By fostering organizational awareness and enhancing pattern recognition capabilities, SMEs can leverage these constructs to achieve sustainable competitive advantages, ultimately leading to improved green performance. These insights provide a robust framework for SMEs aiming to thrive in an increasingly eco-conscious marketplace, emphasizing the need for strategic thinking and proactive sustainability practices.

V. SUMMARY OF FINDINGS, CONCLUSION, AND RECOMMENDATIONS

5.1 SUMMARY OF FINDINGS

This section provides a synthesized reflection of the critical findings emerging from the study, organized based on the seven research objectives aimed at determining the interconnections among organizational awareness, pattern recognition, sustainable competitive advantage, and green performance in SMEs in Plateau State.

1. Impact of Organizational Awareness on Green Performance : Findings indicate a significant relationship between organizational awareness and green performance of SMEs in Plateau State, countering the null hypothesis. Enhanced organizational awareness correlates positively with improved green performance, suggesting that awareness promotes environmentally responsible practices (Adedayo et al., 2021).
2. Effect of Pattern Recognition on Green Performance : The rejection of the null hypothesis confirms that the implementation of pattern recognition positively influences the green performance of SMEs. This suggests that identifying environmental patterns leads to better resource utilization and waste management practices (Oyerinde & Eboh, 2023).
3. Correlation Between Organizational Awareness and Sustainable Competitive Advantage : This

study found a significant correlation between organizational awareness and sustainable competitive advantage among SMEs. High levels of awareness enhance strategic positioning in the competitive environment, reinforcing the relevance of organizational dynamics for sustainable growth (Omojola, 2020).

4. Influence of Pattern Recognition on Sustainable Competitive Advantage : Results indicate that pattern recognition substantially influences the sustainable competitive advantage of SMEs in Plateau state. Firms that effectively utilize pattern recognition methods are better positioned for longterm sustainability and competitiveness (Ismail, 2022).

5. Effect of Sustainable Competitive Advantage on Green Performance : The findings reveal a significant effect of sustainable competitive advantage on the green performance of SMEs. This highlights the role of competitive strategies in promoting environmental performance and positions firms to leverage ecological initiatives as market differentiators (Udom et al., 2023).

6. Mediation of Sustainable Competitive Advantage in the Relationship between Organizational Awareness and Green Performance : Sustainable competitive advantage was found to significantly mediate the relationship between organizational awareness and green performance. This suggests that organizational awareness not only influences green performance directly but is also enhanced through sustainable competitive strategies (Johnson & Adebayo, 2024).

7. Mediation of Sustainable Competitive Advantage in the Impact of Pattern Recognition on Green Performance : Findings confirm that the sustainable competitive advantage mediates the relationship between pattern recognition and green performance. Efficient use of pattern recognition can drive sustainable competitive positions, which in turn enhances green initiatives (Ogunleye et al., 2022).

5.2 CONCLUSION

The research definitively concludes that both organizational awareness and pattern recognition play crucial roles in influencing sustainable competitive advantage and green performance among SMEs in Plateau State. The findings support a paradigm shift in strategic thinking, emphasizing that sustainability can be leveraged for competitive advantage. In summary: Organizational Awareness is pivotal for improving green performance, Pattern Recognition provides actionable insights that heighten both green performance and competitive advantage and Sustainable Competitive Advantage serves as a critical mediator, enhancing the relationships between organizational awareness, pattern recognition, and green performance.

5.3 RECOMMENDATIONS

Based on the findings, the following recommendations are made for SMEs and policymakers in Plateau State:

1. Enhance Organizational Awareness : SMEs should invest in training and awareness programs focused on sustainability practices. This can be facilitated through workshops, seminars, and informational campaigns aimed at fostering a culture of environmental awareness.

2. Implement Advanced Pattern Recognition Techniques: Encourage SMEs to adopt modern technological tools and systems that can aid in pattern recognition. Leveraging data analytics can enhance decisionmaking processes related to green practices.

3. Develop Policy Frameworks for Sustainable Advantage: Policymakers should design frameworks that promote sustainable practices among SMEs. Such policies may include incentives for adopting green technologies and penalties for environmentally harmful practices.

4. Integrate Sustainability into Competitive Strategies : SMEs should integrate sustainability as a core component of their competitive strategies, exploiting it as a unique selling proposition to attract environmentally conscious consumers.

5. Encourage Collaboration among SMEs: Facilitate networking opportunities and collaborations among SMEs to share best practices and strategies for integrating sustainability into business operations effectively.

5.4 AREAS FOR FURTHER RESEARCH

1. Longitudinal Studies on Green Performance: Future studies could employ longitudinal designs to observe how changes in organizational awareness and pattern recognition over time affect green performance and competitive advantage.

2. Comparative Studies across Regions: Research examining the differences in organizational awareness and green performance among SMEs in various geographical regions can provide broader insights into effective strategies tailored to diverse contexts.

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