

ENVIRONMENTAL PRACTICES AND AGILITY OF FOOD AND BEVERAGES MANUFACTURING FIRMS IN RIVERS STATE, NIGERIA

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ABSTRACT

This study examined the relationship between environmental practices and agility of food and beverages manufacturing firms in Rivers State, Nigeria. Environmental practices, which include waste reduction, pollution control, and resource efficiency, are becoming essential components of modern manufacturing due to increasing ecological awareness and regulatory demands. Organizational agility—the ability of a firm to adapt quickly to changes—is a critical success factor in dynamic and environmentally sensitive markets. Drawing on the Dynamic Capabilities Theory, the study explored how environmental practices influence key dimensions of agility: flexibility, innovation, and responsiveness. A correlational research design was employed, and data were collected from 90 respondents across 45 manufacturing firms using structured questionnaires. The findings revealed strong and statistically significant positive correlations between environmental practices and all three dimensions of agility: flexibility ($r = .845$), innovation ($r = .715$), and responsiveness ($r = .639$). These results suggest that firms integrating sustainability into their operations are better positioned to adjust to external changes, foster innovation, and meet market demands. The study concludes that environmental commitment is not only a path to regulatory compliance and reputation enhancement but also a strategic tool for improving organizational agility. It recommends investments in green technologies, incentive-based regulatory frameworks, and employee training as ways to strengthen sustainable business practices and adaptive capacity.

Keywords: Environmental practices, organizational agility, flexibility, innovation, responsiveness, manufacturing firms.

INTRODUCTION

Environmental practices and organizational agility are increasingly interconnected in the operations of manufacturing firms, particularly in the food and beverages sector in Rivers State, Nigeria. Environmental practices involve the deliberate efforts of organizations to reduce their ecological footprint through activities such as waste minimization, pollution control, energy efficiency, and sustainable resource use (Daily & Huang, 2001). These practices not only address environmental concerns but also enhance operational efficiency and reputation. In the competitive landscape of the food and beverage industry, where consumers are increasingly aware of environmental issues, firms that adopt sound environmental practices can gain a significant market advantage. According to Hart (1995), organizations that integrate environmental practices into their core operations can build unique capabilities that enhance their adaptability and competitiveness. In Rivers State, where environmental degradation due to industrial activities is a growing concern, the implementation of environmentally responsible practices is not only a regulatory requirement but also a social obligation that directly impacts the legitimacy and market sustainability of manufacturing firms.

Organizational agility refers to a firm's ability to rapidly sense and respond to changes in the internal and external environment. In the context of food and beverage manufacturing firms in Rivers State, agility means quickly adjusting production processes, supply chains, and strategies in response to environmental challenges, such as changes in environmental regulations, resource scarcity, or community activism. Environmental practices can serve as a catalyst for agility by encouraging firms to build flexible systems and innovative solutions that anticipate and respond to environmental demands. As stated by Teece, Peteraf, and Leih (2016), dynamic capabilities, such as organizational agility, are strengthened when firms adopt sustainable and adaptive practices. Manufacturing firms that invest in green technologies, energy-efficient machinery, and environmentally-friendly supply chains are better positioned to navigate disruptions and meet stakeholder expectations. Bansal and Roth (2000) also observed that organizations that proactively integrate environmental considerations into strategic planning are more agile in seizing opportunities and managing risks, which is essential for long-term success in dynamic and resource-sensitive regions like Rivers State.

Purpose of the Study

The purpose of the study was to examine the relationship between environmental practices and agility of food and beverages manufacturing firms in Rivers State, Nigeria. Specifically, the study sought to:

1. Examine the relationship between environmental practices and flexibility of food and beverages manufacturing firms in Rivers State, Nigeria.
2. Determine the relationship between environmental practices and innovation of food and beverages manufacturing firms in Rivers State, Nigeria.
3. Ascertain the relationship between environmental practices and responsiveness of food and beverages manufacturing firms in Rivers State, Nigeria.

Conceptual Framework

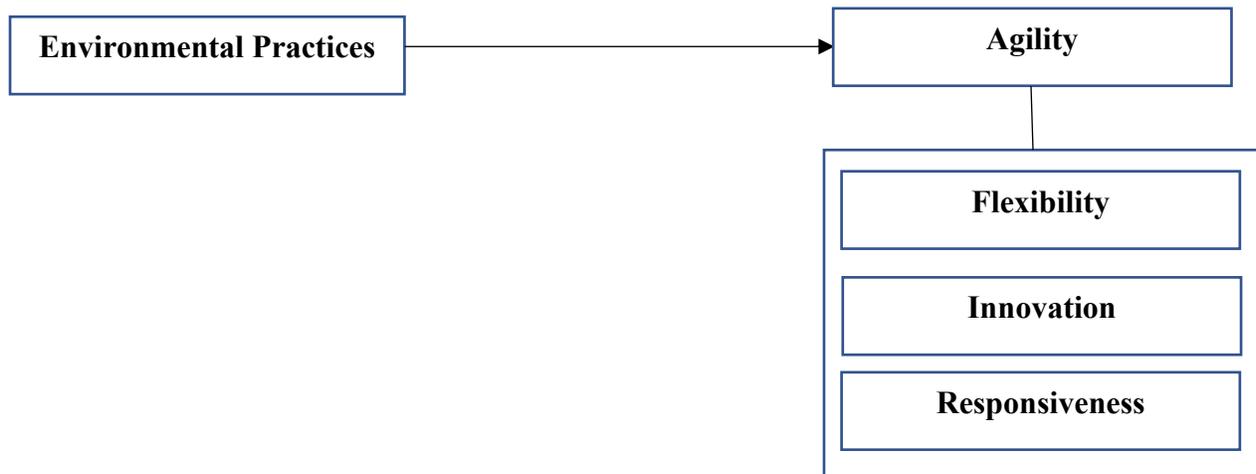


Figure 1: Conceptual framework on the relationship between environmental practices and agility

Source: Dwsk Research

Research Questions

The following research questions guided the study

1. What is the relationship between environmental practices and flexibility of food and beverages manufacturing firms in Rivers State, Nigeria?
2. What is the relationship between environmental practices and innovation of food and beverages manufacturing firms in Rivers State, Nigeria?
3. What is the relationship between environmental practices and responsiveness of food and beverages manufacturing firms in Rivers State, Nigeria?

Research Hypotheses

H0₁: There is no significance relationship between environmental practices and flexibility of food and beverages manufacturing firms in Rivers State, Nigeria.

H0₂: There is no significance relationship between environmental practices and innovation of food and beverages manufacturing firms in Rivers State, Nigeria.

H0₃: There is no significance relationship between environmental practices and responsiveness of food and beverages manufacturing firms in Rivers State, Nigeria.

LITERATURE REVIEW

Theoretical Foundation

Dynamic Capabilities Theory

The Dynamic Capabilities Theory is a strategic management framework that explains how organizations develop, adapt, and reconfigure their resources to sustain competitive advantage in

rapidly changing environments. Introduced by Teece, Pisano, and Shuen (1997), the theory emphasizes that firms must possess the ability to integrate, build, and reconfigure internal and external competencies to respond to shifting market conditions. In the food and beverage manufacturing sector, where sustainability challenges and market demands are constantly evolving, firms require dynamic capabilities to balance operational efficiency with environmental and economic sustainability. Dynamic capabilities refer to an organization's ability to sense, seize, and transform opportunities (Teece, 2007). Sensing involves identifying emerging trends, threats, and opportunities in the external environment; seizing requires mobilizing resources to capitalize on these opportunities; and transforming involves continuously adjusting business processes and structures to maintain competitiveness. According to Wang and Ahmed (2007), dynamic capabilities comprise three essential elements: adaptive capability, absorptive capability, and innovative capability. Adaptive capability allows firms to respond effectively to external changes, absorptive capability ensures they can assimilate and apply new knowledge, and innovative capability drives continuous improvement. These elements enable firms to navigate industry shifts, integrate sustainability initiatives, and enhance operational agility.

The impact of dynamic capabilities is evident in their ability to enhance firm resilience, promote innovation, and drive long-term performance. Teece (2018) asserts that organizations with strong dynamic capabilities are better positioned to embrace digital transformation, adopt sustainable business models, and improve their market responsiveness. In the food and beverage manufacturing industry, such capabilities empower firms to implement green production techniques, optimize supply chains, and develop eco-friendly products (Helfat & Peteraf, 2009). Additionally, firms with superior dynamic capabilities can better navigate regulatory changes, ensuring compliance with environmental laws while maintaining profitability. By fostering continuous learning and strategic renewal, dynamic capabilities help businesses mitigate risks associated with market uncertainties and technological disruptions.

Conceptual Review

Concept of Environmental Practices

Environmental practices refer to the strategies, actions, and policies adopted by individuals, organizations, and governments to minimize the negative impact of human activities on the environment and to promote sustainability. These practices encompass a wide range of activities, including waste management, pollution control, resource conservation, and sustainable production. According to Daily and Huang (2001), environmental practices are organizational routines and initiatives that aim to reduce environmental harm while aligning with strategic business goals. These practices can be either proactive, such as investing in green technologies, or reactive, such as responding to environmental regulations and public pressure. Hart (1995) emphasized that environmental practices are critical components of a firm's resource-based view, where ecological sustainability becomes a source of competitive advantage. Organizations that adopt effective environmental practices often witness enhanced operational efficiency, cost savings, improved public image, and compliance with environmental laws (Porter & van der Linde, 1995). The concept of environmental practices is rooted in the broader understanding of corporate environmental responsibility, which integrates ecological concerns into organizational decision-making. As noted by Shrivastava (1995), environmental practices represent a shift from traditional industrial operations towards environmentally conscious business models. These

practices may involve implementing energy-saving measures, reducing greenhouse gas emissions, recycling materials, and integrating life-cycle assessments into product design and development.

Agility

This study focused on three dimensions of organizational agility, namely flexibility, innovation and responsiveness.

Flexibility

Flexibility is a fundamental concept in organizational studies, business management, and industrial operations, playing a crucial role in enabling firms to adapt to dynamic environments. It refers to the ability of an organization, system, or process to respond effectively to changes in internal and external conditions without compromising efficiency or performance (Upton, 1994). In the context of manufacturing firms, particularly in the food and beverage sector, flexibility ensures swift adaptation to fluctuations in demand, regulatory changes, supply chain disruptions, and evolving consumer preferences (Gerwin, 1993). Conceptually, flexibility serves both as a strategic capability—allowing firms to realign resources, restructure operations, and enter new markets—and as an operational necessity that enhances supply chain resilience, workforce efficiency, and product adaptability (Tushman & O'Reilly, 1996; Narasimhan et al., 2006).

Innovation

Innovation is a critical driver of organizational success, particularly in dynamic and competitive industries such as food and beverage manufacturing. It refers to the process of introducing new ideas, methods, products, or business models that enhance efficiency, competitiveness, and customer satisfaction (Schumpeter, 1934). As markets evolve and consumer preferences shift, firms that emphasize innovation are better positioned to improve product quality, respond proactively to industry changes, and secure long-term sustainability (Drucker, 1985).

Responsiveness

Responsiveness is a vital organizational capability that allows firms to swiftly detect and adapt to changes in their internal and external environments. Defined as the ability to sense, interpret, and act on changes effectively and within appropriate timeframes, responsiveness is essential in competitive sectors like food and beverage manufacturing, where firms must quickly align with evolving consumer demands, regulatory updates, and supply chain shifts (Holweg, 2005; Christopher & Towill, 2001). It is closely tied to agility and resilience, involving rapid decision-making, adaptive execution, and alignment with both immediate needs and long-term goals (Gunasekaran et al., 2008). In this sector, responsiveness might involve modifying production lines for new products, responding to health trends, or navigating raw material shortages (Lee, 2004). Scholars like Holweg (2005), Christopher and Towill (2001), and Teece et al. (2016) describe responsiveness as a strategic and operational trait that supports speed, precision, and flexibility.

Empirical Review

Ekanem et al. (2023): In their study titled "Green Operation Practice and Organizational Performance in Selected Manufacturing Firms in Akwa Ibom State, Nigeria," Ekanem and colleagues aimed to determine the impact of green operations on organizational performance. Utilizing a survey research design, they collected data from selected manufacturing companies in Akwa Ibom State. The findings revealed a positive correlation between the adoption of green operational practices and enhanced organizational performance. The study concluded that integrating environmental considerations into operations leads to improved efficiency and competitiveness. The authors recommended that manufacturing firms should intensify their green operation practices to boost performance.

Arokodare and Asikhia (2020): The study "Corporate Agility, Sustainability, and Long-Run Survival in a Disruptive Environment" investigated the connection between business agility and organizational success. The researchers employed a survey design, collecting data from manufacturing firms in Nigeria to assess how agility contributes to long-term survival amidst disruptions. They found that corporate agility positively impacts organizational performance, especially when aligned with sustainability initiatives. The study concluded that agile firms are better equipped to navigate disruptive environments and achieve long-term success. Recommendations included fostering a culture of agility and sustainability to enhance resilience.

METHODOLOGY

The design for this study was a correlational research design method; this is because it simply solicits the opinion of the respondents and its convenience for easy analysis, also help testing relationship between two and more variables. The population of the study consisted of forty-five manufacturing firms (food and beverages firm, consumer goods and industrial goods sectors) in Rivers State, according to (Rivers State Yellowpage 2024). The study take a census of 2 respondents from each of the food and beverages firms, therefore, the study sample was 90 respondents from the study population.

To determine the strength and direction of the relationship between the variables, the inferential statistical analyses was employed using Pearson Product Correlation. It is appropriate for analysis because all variables in this study measured in interval scale. This help us to establish the nature of association between the examined variables.

DATA ANALYSIS AND FINDINGS

Bi-variate Analysis

Table 1: Correlations for the relationship between environmental practices and flexibility of manufacturing firms (food and beverages) in Rivers State

		Environmental Practices	Flexibility
Environmental Practices	Pearson Correlation	1	.845
	Sig. (2-tailed)		.000
	N	80	80
Flexibility	Pearson Correlation	.845	1
	Sig. (2-tailed)	.000	
	N	80	80

Correlation is significant at the 0.01 level (2-tailed).

Source: Research Data 2025, (SPSS output version 21.0)

Table 1 shows the correlation between environmental practices and flexibility among food and beverage manufacturing firms in Rivers State. The Pearson correlation coefficient of 0.845 indicates a very strong positive relationship between environmental practices and flexibility. This means that firms that engage more actively in environmental practices tend to be significantly more flexible in their operations. The relationship is statistically significant at the 0.01 level (2-tailed), as indicated by the p-value of .000, confirming the reliability of this association based on the sample size of 80 respondents.

Table 2: Correlations for the relationship between environmental practices and innovation of manufacturing firms (food and beverages) in Rivers State

		Environmental Practices	Innovation
Environmental Practices	Pearson Correlation	1	.715
	Sig. (2-tailed)		.000
	N	80	80
Innovation	Pearson Correlation	.715	1
	Sig. (2-tailed)	.000	
	N	80	80

Correlation is significant at the 0.01 level (2-tailed).

Source: Research Data 2025, (SPSS output version 21.0)

Table 2, the correlation between environmental practices and innovation shows a Pearson coefficient of 0.715, signifying a strong positive relationship. This result implies that firms adopting sound environmental practices are also likely to be more innovative in their production and operations. Again, the correlation is statistically significant at the 0.01 level, with a p-value of .000, suggesting that the relationship is not due to chance. The consistency of the high correlation values across both flexibility and innovation highlights the essential role of environmental commitment in fostering operational adaptability and creative advancements in the manufacturing sector.

Table 3: Correlations for the relationship between environmental practices and responsiveness of manufacturing firms (food and beverages) in Rivers State

		Environment al Practices	Responsiveness
Environmental Practices	Pearson	1	.639
	Correlation		
	Sig. (2-tailed)		.000
	N	80	80
Responsiveness	Pearson	.639	1
	Correlation		
	Sig. (2-tailed)	.000	
	N	80	80

Correlation is significant at the 0.01 level (2-tailed).

Source: Research Data 2025, (SPSS output version 21.0)

Table 3 further supports these findings by revealing a moderately strong positive correlation of 0.639 between environmental practices and responsiveness. This implies that manufacturing firms that emphasize environmentally responsible practices also demonstrate enhanced responsiveness, particularly in adapting to changes in production demands or environmental conditions. Like the other relationships, this correlation is statistically significant at the 0.01 level, with a p-value of .000. Overall, the data suggest that environmental practices are not only crucial for sustainability but also significantly influence a firm's agility, creativity, and responsiveness in the competitive manufacturing landscape of Rivers State.

DISCUSSION OF FINDINGS

The findings from Table 1 indicate a very strong and statistically significant positive relationship between environmental practices and flexibility among food and beverage manufacturing firms in Rivers State ($r = .845$, $p < .01$). This suggests that firms that actively adopt environmentally sustainable practices are more capable of adjusting and reconfiguring their operational processes to meet changing internal and external demands. This result aligns with the study of Hart (1995), who emphasized that proactive environmental strategies enhance a firm's resource-based capabilities, including operational flexibility. Similarly, Daily and Huang (2001) found that environmental management practices positively influence organizational efficiency and responsiveness, reinforcing the idea that firms that prioritize sustainability are better equipped to respond to disruptions or innovations. In the context of Rivers State, where environmental issues such as pollution and regulatory pressure are prevalent, this correlation indicates that flexible firms tend to be those that have embedded environmental practices into their core operations.

Furthermore, the strong positive correlations observed in Tables 2 and 3 – between environmental practices and innovation ($r = .715$), and environmental practices and responsiveness ($r = .639$) – complement the findings in Table 1 and reinforce the view that environmental commitment is a critical driver of organizational agility. Bansal and Roth (2000) noted that firms pursuing environmental initiatives are more likely to innovate, both in processes and products, to reduce environmental impact while remaining competitive. Teece et al. (2016) also stressed that dynamic

capabilities such as responsiveness and innovation are enhanced through sustainable strategies that encourage learning and adaptation. These results suggest that food and beverage manufacturing firms in Rivers State that prioritize environmental practices are not only more flexible but also more innovative and responsive to environmental changes, stakeholder expectations, and market dynamics. This multi-dimensional agility positions such firms for greater long-term competitiveness and sustainability in a region facing significant environmental and industrial challenges.

CONCLUSION AND RECOMMENDATIONS

Based on the findings, it can be concluded that environmental practices play a significant role in enhancing the organizational agility of food and beverage manufacturing firms in Rivers State. The strong and statistically significant correlations between environmental practices and dimensions of agility—such as flexibility, innovation, and responsiveness—demonstrate that firms committed to sustainability are better equipped to adapt to environmental changes, innovate in their operations, and respond swiftly to market demands. These findings align with existing scholarly evidence that environmental responsibility fosters dynamic capabilities and operational efficiency. Therefore, adopting robust environmental practices not only supports ecological goals but also strengthens a firm's competitive position and long-term resilience in a rapidly changing industrial environment. The following recommendation were therefore made in this study:

1. Manufacturing firms should invest in environmental technologies and sustainable production processes to enhance flexibility and operational efficiency.
2. Regulatory agencies and industry bodies in Rivers State should create incentives and recognition programs to encourage firms to integrate environmental practices into their strategic planning.
3. Firms should provide regular training and capacity-building programs for staff on green practices and innovation to boost responsiveness and adaptability in line with global sustainability trends.

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