SUSTAINABILITY PERFORMANCE IN THE NIGERIAN TABLE WATER INDUSTRY: KEY DETERMINANTS AND POLICY IMPLICATIONS

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Abstract
This study examined the determinants of sustainability performance in table water firms. A cross-sectional survey research design was employed. The study population included all registered table water firms with the National Agency for Food and Drug Administration and Control (NAFDAC) in Delta and Edo States. A total of 247 valid and usable questionnaires were collected. Descriptive statistics were utilized to assess respondents' perceptions of the variables of interest, while Pearson correlation coefficients and multiple regression analysis were employed to establish the relationships between the research variables. The findings revealed that sustainable product development, manufacturing processes, packaging, and waste management significantly and positively influence sustainability performance. It is recommended that governments develop policy frameworks to support sustainability and create a conducive environment for the sustainable production and consumption of table water by establishing standards and providing incentives for firms to adopt sustainable practices in their operations.

Keywords: NAFDAC, Nigeria, Performance, Sustainability, Table water.

Introduction

Water is an essential substance required by humans, animals, and plants for survival (Adekunle & Dakare, 2020). However, ensuring the availability of safe drinking water remains a global challenge due to the presence of microorganisms and biological contaminants, which can cause waterborne infections such as typhoid fever, diarrhea, hepatitis E, and cholera, affecting hundreds of thousands of individuals (Rath, 2021). In Nigeria and other developing nations, the lack of access to piped water has driven residents to seek alternative drinking water sources (Bakker et al., 2008; Vedachalam et al., 2017). One such alternative, promoted by governments, large businesses, and small and medium-scale enterprises, is table water. This includes branded sachets (commonly known as pure water in Nigeria), disposable plastic bottles, and large refillable containers (Adekunle & Omoregie, 2022; Vedachalam et al., 2017).

The significant proliferation of table water factories in Nigeria and other Sub-Saharan African countries can be attributed primarily to local water scarcity, urbanization, and poverty, with underlying factors including failures in local, national, and global governance (Omole et al., 2015). Stoler (2017) posits that local governments have failed to implement effective urban planning strategies that would enable adequate financing and development of water and sanitation infrastructure. Additionally, national or federal governments in Africa are criticized for mismanaging water supplies and neglecting existing infrastructure. This governmental inadequacy in providing safe and clean drinking water has paved the way for profit-driven firms to produce and sell table water, thereby addressing the unmet demand for drinking water in many Nigerian locales. According to Ikon et al. (2017), producing and distributing table water is a more cost-effective method of providing drinking water in Nigeria. The African table water industry has

grown significantly due to advancements in water filtration and packaging technologies. As noted by Vedachalam et al. (2017), West Africa, particularly Nigeria, and Ghana, has been pivotal in the development and expansion of the sachet water sector. Empirical studies by Micah and Alabi (2017) and Stoler (2013) have shown that table water has gained widespread acceptance among the public.

There is a pressing need for empirical research to evaluate the sustainability of the processes involved in the production, distribution, and consumption of drinking water, particularly in Nigeria. The existing body of literature predominantly focuses on the environmental impact of drinking sachet water in Nigeria (Ajala et al., 2020; Dumbili & Henderson, 2020) and the microbiological and physicochemical properties of these products (Ikon et al., 2017; Okoye et al., 2022). However, a comprehensive and thorough assessment of the production processes within Nigeria's table water industry is crucial to align with the Sustainable Development Goals (SDGs), which aim to ensure universal access to water and sanitation services. This study seeks to address this research gap by identifying and analyzing four key factors contributing to the sustainability performance of table water production and consumption in Nigeria: sustainable product development, sustainable manufacturing processes, sustainable packaging, and sustainable waste management.

Literature Review

Overview of Table Water Sector in Nigeria

Table water was introduced to the Nigerian market in the 1990s, with regulatory oversight commencing in 2000 by the National Agency for Food and Drug Administration and Control (NAFDAC) (Meeta, 2015). Before registration, NAFDAC imposed stringent criteria and quality standards on table water companies. In 2000, NAFDAC licensed 134 firms that produced sachet and bottled water meeting these regulations (Onemano & Otun, 2013). Consequently, the number of registered table water firms in Nigeria increased significantly. The Agency registered 436 firms in 2001 and 998 in 2002 (Akunyili, 2003). By 2014, the number of table water enterprises had risen from 134 in 2000 to 18,750 (Nature Cares Resource Center, 2014). Between January and August 2021, NAFDAC registered 2,153 table water enterprises (Ezeh, 2021).

The Nigerian table water sector faces numerous challenges, including the presence of untrained and unauthorized producers, unreliable electricity supply, excessive taxation, and overlapping governmental responsibilities at various levels (Ezeh, 2021). Despite these challenges, the sector remains committed to providing safe packaged water to Nigerians, particularly in areas where drinking water interventions are needed. The sector has significantly contributed to the country's economy by offering safe and affordable drinking water and creating employment opportunities. For instance, in 2021, the president of the Association of Table Water Producers (ATWAP) stated that the Association has over 16,000 members nationwide, with each member employing an average of thirty people directly and indirectly along the water production value chain, which includes distribution, retailing, and waste management. Additionally, the sector generates revenue for both business owners and the government through earnings and taxes (Adekunle & Omoregie, 2022).

Sustainability Performance

Sustainability emerged from a series of meetings and studies in the 1970s and 1980s, primarily driven by environmental catastrophes, disasters, and concerns about chemical pollution and resource depletion (Gupta et al., 2015). The concept of sustainability pertains to how corporations can demonstrate corporate responsibility by addressing fundamental global environmental issues (Abdullah et al., 2017). Roxas and Chadee (2012) argue that the corporate sector must navigate the tensions between economic imperatives and environmental goals, acting as a catalyst for reforming business operations to reduce environmental harm.

Elkington (1994) introduced the concept of "sustainability" as a comprehensive business approach that integrates environmental, social, and economic considerations. Companies must make significant adjustments to the triple bottom-line dimensions to achieve sustainable success (Elkington, 1998). This study focuses on analyzing sustainability performance indicators, including environmental, social, and economic performance assessments.

Environmental Performance: This involves the responsible and efficient use of resources to preserve the environment for future generations (Salwa et al., 2017). It encompasses factors such

as the quantity and quality of natural resources, environmental preservation, addressing global warming, ecological concerns, waste management, reducing energy and resource consumption, promoting alternative energy production, and improving pollution and emissions management. Nguyen et al. (2021) defined environmental performance as effectively managing a company's environmental issues related to its operations, products, and services. These issues include material usage, energy consumption, water utilization, waste management, and industrial emissions handling. Salwa et al. (2017) emphasize that a company's environmental performance significantly relies on using clean and sustainable energy resources to decrease CO_2 emissions, which contribute to global warming, acid rain, air pollution, adverse human health effects, and ecological imbalances.

Social Performance: Yusuf et al. (2013) define social performance as an organization's tangible successes in improving and sustaining quality of life while considering environmental factors. It reflects how well a firm fulfills its social responsibilities by translating its social mission into concrete achievements aligned with societal objectives (Razaee, 2017). Social performance assessment involves evaluating the impact of an organization's decisions and activities on society, including contributions to sustainable development, community health and well-being, stakeholder satisfaction, legal compliance, and organizational integration (Salwa et al., 2017). In the context of table water, social performance pertains to the industry's actions affecting society, including employees, communities, and customers. It involves promoting social well-being, fostering positive stakeholder relationships, and addressing social issues related to table water production and consumption.

Economic Performance: Singh et al. (2016) describe economic performance factors as including manufacturing cost, quality, responsiveness, and adaptability. Economic performance refers to the financial benefits that accrue to the entire firm, often associated with reducing industrial expenses (Eltayeb et al., 2011). Companies that focus on improving environmental performance by reducing undesirable outputs such as CO2 emissions, pollutants, and waste generated during manufacturing can enhance their economic performance (Wagner, 2005; Salwa et al., 2017). In the table water sector, the economic performance includes evaluating the financial viability, efficiency, and profitability of industry operations and practices while considering their sustainability contributions. The production cost of table water is one aspect of economic performance, with companies striving to optimize manufacturing processes to reduce costs and increase profitability through efficient resource use, improved supply chain management, and cost-effective water purification and packaging technologies.

Determinants of Sustainability Performance

Scholars such as Salwa et al. (2017), Habidin et al. (2017), and Adekunle and Dakare (2020) have identified several factors influencing the sustainability performance of business enterprises. This section identifies and discusses four factors pertinent to the table water sector:

Sustainable Product Development: Poyner and Simon (1995) describe sustainable product development as designing a product that addresses all environmental consequences throughout its lifespan, considering criteria such as function, quality, cost, and aesthetics. Sustainable product development in table water enterprises involves creating and enhancing products with a focus on environmental, social, and economic sustainability. This includes incorporating sustainable practices throughout the product lifecycle, from raw material procurement to packaging, manufacturing, distribution, and disposal. Kara et al. (2014) report a growing global demand for sustainable products as consumers become more environmentally conscious. Pullmann (2012) observed an increasing trend of consumers purchasing eco-friendly and high-quality items. Consumers expect manufacturers to provide transparency, robust environmental records, clarity on product risks, and information on the environmental impact of their business activities. In Nigeria, table water products come in various sizes and shapes, including sachets (known as pure water sachets), disposable plastic bottles, and large refillable containers, with sachet water commonly packaged in 50cl or 60cl volumes and bottled water available in 50cl, 75cl, 100cl, and 150cl sizes.

Sustainable Manufacturing Process: Manufacturing processes have a significant environmental impact due to high energy usage

and waste generation. To address this, industrial processes should be designed and operated to minimize waste, eliminate hazardous chemicals, conserve resources and energy, and reduce physical dangers (Duflou et al., 2012; Jovane et al., 2009). An efficient manufacturing process aims to reduce energy consumption, CO2 emissions, waste production, resource recovery, and material usage (Despeisse et al., 2012). Effective energy management is crucial for achieving manufacturing sustainability. Companies can reduce production costs, enhance operational flexibility, and improve product quality while lowering energy consumption and CO2 emissions by implementing efficient energy management strategies (Christoffersen et al., 2006; Schonsleben, 2007). Habidin et al. (2017) highlight the importance of early assessment of manufacturing processes, focusing on efficient resource use, effective management control, and product quality to successfully implement sustainable manufacturing practices.

Sustainable Packaging: Packaging plays a critical role in defining a brand and establishing its identity. It allows manufacturers to differentiate their products from competitors and ensures the safe transportation of items along the supply chain, ensuring they reach the end consumer in excellent condition (Lindh et al., 2016). Various factors influence package design, including the product's vulnerability to damage, potential hazards, expected preservation period, and promotional function (Agbonifoh et al., 2007). There has been substantial interest in developing sustainable packaging, leading to initiatives aimed at enhancing packaging sustainability. For example, the Sustainable Packaging Alliance in Australia supports networking and events for packaging industry stakeholders (Sustainable Packaging Alliance, 2005). Similarly, the Sustainable Packaging Coalition in the United States publishes guidelines for sustainable packaging (Sustainable Packaging Coalition, 2006). In the context of table water, sustainable packaging involves using materials that do not contaminate the product's contents and clearly displaying comprehensive information on the packaging, such as the manufacturer, batch number, production date, and expiration date.

Sustainable Waste Management: A sustainable manufacturing firm should adopt a framework that addresses environmental, economic, and social challenges by implementing resource conservation and recovery activities (Lambrechts & van Liedekerke, 2014). Sustainable waste management can be achieved by focusing on infrastructure development, service provision, and behavioural change while considering political, economic, social, technological, legal, and environmental factors (Zhang et al., 2011). Inadequate data on solid waste generation has led to insufficient waste management planning, resulting in waste dumping on Nigeria's highways, streams, bushes, and open spaces (Ogbonna et al., 2007). This is particularly problematic with non-biodegradable empty water sachets, which have severe environmental consequences (Meeta, 2015). The increasing production and consumption of sachet water have led to the indiscriminate disposal of empty sachets, posing environmental risks. These sachets, made of synthetic polythene, do not degrade or corrode and release harmful carbon, nitrogen, and sulfur oxides when burned (Meeta, 2015). In Nigeria, empty sachets are rarely separated before disposal and are often mixed with other decomposable and non-decomposable waste materials.

Theoretical Underpinning

The stakeholder theory serves as the theoretical foundation for this research. According to Freeman (1984), it is the dominant theory of sustainability. Razaee (2017) opines that stakeholders have reciprocal interactions with a company, both contributing to and being impacted by the firm's activities (as stakeholders). Stakeholder theory broadens the organizational viewpoint to encompass a larger societal context and the interdependence of organizations and their societal environment (Horisch et al., 2014). According to this philosophy, organizations should strive to produce value for all stakeholders (Freeman, 2010).

Similarly, sustainability considers social and ecological elements, as well as the interdependence of companies and their societal and natural contexts. As a result, the concept of sustainability compels businesses to make major contributions to the long-term growth of the economy (Schaltegger & Burritt, 2005, p. 195). The triple bottom line (3BL) concept provides a framework for organizations to seek sustainability by incorporating environmental, economic, and social elements (Gimenez & Tachizawa, 2012). Elkington (1999) evaluates each facet of the 3BL

based on its influence on company profitability, social well-being, and environmental protection. The 3BL idea highlights that organizations should examine their environmental and social performance and their economic value (Gimenez & Tachizawa, 2012; De Medeiros et al., 2014).

Stakeholder theory is crucial to the long-term viability of table water in Nigeria because it provides a framework for understanding and managing the interactions between table water firms and their many stakeholders. Employees, local communities, government agencies, suppliers, and other organizations affecting or influencing the table water sector are all considered stakeholders in the perspective of sustainability. Stakeholder theory emphasizes value creation for all stakeholders rather than only maximizing short-term profit. In the case of Nigerian table water, this includes economic, social, and environmental values. Therefore, table water firms need to integrate sustainability strategies such as resource conservation, waste reduction, community participation, and responsible sourcing into their operations by considering the different interests of stakeholders and contributing to the industry's overall sustainability.

Methodology

The study used a cross-sectional survey research approach to collect data from table water company owners or managers in Delta and Edo States. The study used a random sample of 247 validly retrieved and usable questionnaires. The owners or managers of the selected table water companies completed the questionnaires. When the owners or managers were unable to complete the questionnaire owing to their hectic schedules, competent employees inside the company were delegated the task.

The measuring scale used in the study was derived from prior research on the subject matter. The scale for measuring sustainable product development was taken from Salwa et al. (2017), with a reliability score of 0.921. Similarly, the scales for assessing sustainable packaging and waste management were adapted from Garcia-Area et al. (2014) and Zhang et al. (2011), respectively, with reliability values of 0.870 and 0.841. Adekunle and Dakare's (2020) scale was used to assess sustainability performance comprising environmental, social, and economic performance with reliability scores of 0.763, 0.829, and 0.605, respectively. The items on the scales were designed in a Likert-scale manner, allowing respondents to express their level of agreement or disagreement with each statement.

Sustainable product development (SUPD) is measured as the assessment of the effect of table water products at all stages of their lifespan, focusing on quality (Adekunle & Dakare, 2020; Payner & Simon, 1995). The sustainable manufacturing process (SUMP) is measured as the steps table water raw materials go through to become a finished product. Sustainable packaging (SUPK) is measured by evaluating the use of energy-efficient materials and designs in the packaging of table water products (Adekunle & Dakare, 2020). Sustainable waste management (SUWM) is measured by analyzing the ecologically responsible collection, transportation, processing, treatment, and disposal of table water waste (Adekunle & Dakare, 2020). Finally, sustainability performance (SPERF) measured table water firms' performance in environmental, social, and economic aspects of sustainability.

Descriptive analysis was performed on the data, which included computing means, standard deviations, skewness, and kurtosis. Furthermore, correlation and regression analyses were used to analyze the relationship between sustainability performance and its determining factors. All statistical analyses were performed using the Statistical Package for Social Sciences (SPSS version 24) at a significance level of 5%.

Results and Discussions

The outcomes of the data analyses are presented and discussed in this section

Table 1: Respondents' demographics

Variable	Category	Frequency (%)
Gender	Male	169 (68.4%)
	Female	78 (31.6%)
Age of respondents	20years and below	11 (4.5%)
	21-30years	80 (32.4%)
	31-40years	110 (44.5%)
	41-50years	32 (13%)
	Above 50years	14 (5.7%)
Education qualification	SSCE/GCE	10 (4%)
	NCE/Diploma/OND	75 (30.4%)
	HND/First Degree	88 (35.6%)
	Postgraduate	74 (30%)

Variable	Category	Frequency (%)
Work experience	Below 1year	3 (1.2%)
	1-3years	24 (9.7%)
	4-6years	52 (21.1%)
	7-10years	110 (44.5%)
	Above 10years	58 (23.5%)

Table 1 shows that 169(68.4%) of respondents were male while females were 78 (31.6%). This indicates that males make up the majority of table water company owners or significant workers. In terms of age distribution, respondents between the ages of 31 and 40 made up the largest group. It accounts for 110 (44.5%) of the total respondents. Respondents between the ages of 21 and 30 made up the next largest group, accounting for 80 (32.4%) of the sample. A lesser number, 32 (13%), were between the ages of 41 and 50. Only 14 (5.7%) of the respondents were above the age of 50, while, 11 (4.5%) were 20 years and below. In terms of educational credentials, 10 (4%) of them had SSCE/GCEs, whereas 75 (30.4%) had NCE/Diploma/ONDs. A first degree (HND/B.Sc/B.Eng) was held by the majority of respondents 88 (35.6%). Furthermore, 75 (30%) of respondents had postgraduate credentials, showing that the sample had a high level of education. In terms of table water industry experience, the majority of respondents, 110 (44.5%), had worked in the sector for seven to ten years. Another considerable proportion, 58 (23.5%), had more than 10 years of experience. Approximately 32% of all respondents have worked in the table water sector for fewer than six years. This shows that the respondents who completed the research instruments are well-versed in the operations of the table water industry.

Table 2: Descriptive statistics of variables

Variables	Statistics			
	Mean	**Std. Dev.**	**Skewness**	**Kurtosis**
Sustainable product development (SUPD)	3.209	0.486	0.069	3.275
Sustainable manufacturing process (SUMP)	3.254	0.495	-0.416	3.882
Sustainable packaging (SUPK)	3.742	0.685	-0.830	4.804
Sustainable waste management (SUWM)	3.690	0.644	-0.576	3.331
Environmental performance (ENPF)	3.594	0.667	-0.563	3.233
Economic performance (ECPF)	4.032	0.556	-0.673	3.735
Social performance (SOPF)	3.781	0.668	-0.927	4.412
Sustainability performance (SPERF)	3.802	0.538	-0.685	3.589

The mean and standard deviation sustainability performance are 3.802 and 0.538, respectively. The mean for SUPD, SUMP, SUPK, SUWM, ENPF, ECPF and SOPFare 3.209, 3.254, 3.742, 3.690, 3.594, 4.032 and 3.781, respectively. A normality test was performed on the dataset to determine its normalcy using skewness and kurtosis. The absolute values of skewness varied from 0.069 to 0.927 at the construct level, while kurtosis ranged from 3.233 to 4.804. These values were determined to be smaller than Kline's (2011) criteria of 3.0 for skewness and 8.0 for kurtosis.

Table 3: Correlation coefficients of variables

Variables	SPERF	SUPD	SUMP	SUPK	SUWM
Sustainability performance (SPERF)	1				
Sustainable product development (SUPD)	0.347**	1			
Sustainable manufacturing process (SUMP)	0.491**	0.269**	1		
Sustainable packaging (SUPK)	0.585**	0.312**	0.534**	1	
Sustainable waste management (SUWM)	0.736**	0.350**	0.487**	0.638**	1

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

Table 3 shows that sustainability performance is positively and significantly related to SUPD ($r = 0.347$, $p < 0.01$), SUMP ($r = 0.491$, $p < 0.01$), SUPK ($r = 0.585$, $p < 0.01$), and SUWM ($r = 0.736$, $p < 0.0$). Pearson's correlation coefficient (r) should not exceed 0.80 as stipulated by Bryman and Cramer (1997).

Otherwise, independent variables with a correlation greater than 0.80 may be suspected of having multi-collinearity. Table 3 shows that none of the correlation coefficients are more than 0.80, ruling out any type of multi-collinearity in the model.

Table 4: Relationship between sustainability performance and its determinants

Variables	**Model I**	**Model II**	**Model III**	**Model IV**
	Environmental Performance (ENPF)	**Social Performance (SOPF)**	**Economic Performance (ECPF)**	**Sustainability Performance (SPERF)**
C	0.3158	0.7968	1.7886	0.0820
	(1.2992)	(2.9211)	(6.9423)	(1.6490)
	{0.1951}	{0.0038}	{0.0000}	{0.1004}
Sustainable Product Development (SUPD)	0.0993	0.0312	0.1155	0.9671
	(1.5649)	(0.4384)	(1.7182)	(5.0751)
	{0.1189}	{0.6615}	{0.0870}	{0.0000}
Sustainable Manufacturing Practices (SUMP)	0.0376	0.1561	0.2101	0.1346
	(0.5359)	(1.9805)	(2.8219)	(2.4447)
	{0.5926}	{0.0488}	{0.0052}	{0.0152}
Sustainable Packaging (SUPK)	0.1638	0.1293	0.0320	0.1084
	(2.8427)	(2.0002)	(0.5246)	(2.3997)
	{0.0049}	{0.0466}	{0.6003}	{0.0172}
Sustainable Waste Management (SUWM)	0.6026	0.5127	0.2899	0.4684
	(10.0239)	(7.6008)	(4.5497)	(9.9399)
	{0.0000}	{0.0000}	{0.0000}	{0.0000}
R-Squared	0.5564	0.4428	0.2820	0.5802
Adj. R-Squared	0.5491	0.4335	0.2702	0.5732
F-statistic	75.8878	48.0744	23.7673	83.6110
Prob (F-statistic)	0.0000	0.0000	0.0000	0.0000
Durbin-Watson stat	1.8410	1.6299	1.8225	1.7588
Number of Observations	247	247	247	247

Environmental Performance (ENPF): Table 4 [Model I] reveals that environmental performance is positively and significantly related to SUPK ($\beta = 0.1638$; $p = 0.0049$) and SUWM ($\beta = 0.6026$; $p = 0.0000$). However, the relationship between environmental performance and SUPD ($\beta = 0.0993$; $p = 0.1189$) and SUMP ($\beta = 0.0376$; $p = 0.596$) are not statistically significant at 5%. The coefficient of determination (R^2) value of 0.5564 shows that the independent variables jointly explain 55.64% of the variation in the environmental performance of table water companies. The F-statistic of 75.8878 is significant at $p < 0.01$, implying a statistically significant relationship between the dependent and the independent variables as a group. The Durbin-Watson statistic is 1.8410. The result rules out the presence of autocorrelation in the model.

Social Performance (SOPF): Table 4 [Model II] reveals that social performance is positively and significantly related to SUMP ($\beta = 0.1561$; $p = 0.0488$), SUPK ($\beta = 0.1293$; $p = 0.0466$) and SUWM ($\beta = 0.5127$; $p = 0.0000$). However, the relationship between social performance and SUPD ($\beta = 0.0312$; $p = 0.6615$) is not statistically significant at 5%. The coefficient of determination (R^2) value of 0.4335 shows that the independent variables jointly explain 43.35% of the variation in the social performance of table water companies. The F-statistic of 48.0744 is significant at $p < 0.01$, implying a statistically significant relationship between the dependent and the independent variables as a group. The Durbin-Watson statistic is 1.6299. The result rules out the presence of autocorrelation in the model.

Economic Performance (ECPF): Table 4 [Model III] reveals that economic performance is positively and significantly related to SUMP (β = 0.2101; p = 0.0052) and SUWM (β = 0.2899; p = 0.0000). However, the relationship between economic performance and SUPD (β = 0.1155; p = 0.0870) and SUPK (β = 0.0320; p = 0.6003) are not statistically significant at 5%. The coefficient of determination (R^2) value of 0.2820 shows that the independent variables jointly explain 28.2% of the variation in the economic performance of table water companies. The F-statistic of 23.7673 is significant at p < 0.01, implying a statistically significant relationship between the dependent and the independent variables as a group. The Durbin-Watson statistic is 1.8225. The result rules out the presence of autocorrelation in the model.

Sustainability Performance (SPERF): Table 4 [Model IV] reveals that sustainability performance is positively and significantly related to SUPD (β = 0.9671; p = 0.0000), SUMP (β = 0.1346; p = 0.0152), SUPK (β = 0.1084; p = 0.0172) and SUWM (β = 0.4684; p = 0.0000). The coefficient of determination (R^2) value of 0.5802 shows that the independent variables jointly explain 58.02% of the variation in the sustainability performance of table water companies. The F-statistic of 83.611 is significant at p < 0.01, implying a statistically significant relationship between the dependent and the independent variables as a group. The Durbin-Watson statistic is 1.7588. The result rules out the presence of autocorrelation in the model.

Discussions

This study found that sustainable product development positively and significantly impacts sustainability performance. This finding is consistent with a prior study by Salwa et al. (2017), which found that sustainable product design and development improves sustainability performance. Similarly, Eltayeb et al. (2011) found that eco-design, which includes sustainable product design and development, positively impacts businesses by creating intangible results such as product image, brand value, goodwill, and increased publicity. Tseng, Tan, and Siriban-Manalang (2013) observed that firms often focus on generating sustainable goods only when customers demand them. Governments must encourage businesses to invest in the creation of environmentally sustainable products.

Furthermore, the study revealed that sustainable manufacturing processes also have a positive and significant influence on the sustainability performance of table water enterprises' This outcome is in agreement with the findings of Salwa et al. (2017), who found that sustainable manufacturing processes had a substantial impact on all dimensions of sustainability. Similarly, Ramayah, Mohamad, Omar, Marimuthu, and Leen (2013) found a significant association between green manufacturing phases and manufacturing success, which included cost reduction, increased product quality, and improved delivery performance. These findings support the conclusions of this study, which found a substantial influence of sustainable manufacturing processes on sustainability performance in table water firms. A sustainable manufacturing process will result in improved sustainable performance, which will improve environmental performance and boost economic viability and manufacturers' social performance. Strict adherence to NAFDAC-mandated minimum good manufacturing practices for table water production will promote sustainability by increasing people's quality of life and protecting future generations from resource scarcity.

Thirdly, the study finds a positive and significant relationship between sustainable packaging and table water companies' sustainability performance (environmental, social, and economic). Packaging allows manufacturers to distinguish their products from those of competitors. As a result, packaging is an important strategic component for brand distinctiveness and identification. Lindh et al. (2016) opined that packaging plays a critical role in guaranteeing the safe transportation of goods along the supply chain to the end customer in excellent condition. Similarly, Nordin and Selke (2010) believe that the essential role of packaging is to safeguard its contents and has the most significant potential to contribute to or contradict environmental sustainability. Producers should be required to inscribe crucial information such as production and expiration dates on the packaging of their products to promote the sustainability of the table water sector. Importantly, regulatory authorities can require table water manufacturers to designate an expiry date that does not exceed four weeks from the day of production. This is because long-term storage of table water at room temperature has been shown to raise total heterotrophic bacteria to levels that can be

detrimental to human health (Oludairo & Aiyedun, 2016).

Finally, the study found that sustainable waste management significantly impacts the sustainability performance (environmental, social, and economic) of table water companies. Shankar and Khandelwal (2017) assert that waste has arisen as a key environmental issue due to natural resource depletion and climate change concerns. These reasons have emphasized the significance of sustainability in waste management, emphasizing resource optimization and recovery via integrated waste management systems. Effective waste control in the production and use of table water would improve the industry's sustainability. Waste regulatory bodies should step up their efforts to monitor table water producers and undertake sanitary inspections of their facilities regularly. Practices that ensure high sanitation within and around the manufacturing premises should be prioritized (Oludairo & Aiyedun, 2016).

Conclusion and Recommendations for Policy Implications

This study empirically evaluated the determinants of sustainability performance in the Nigerian table water sector. A total of 247 valid questionnaires were obtained from managers and/or experienced representatives of chosen table water companies in Delta and Edo states. The factors of sustainability performance investigated include sustainable product development, manufacturing process, packaging, and waste management. Based on the significant impact of the investigated determinants of sustainability performance as revealed in this study, it is germane to improve the sustainability performance of table water firms by emphasizing sustainable product development, manufacturing process, packaging, and waste management.

The study recommends the following for policy implications:

- Governments should develop policy frameworks that support sustainability and foster an atmosphere favorable to sustainable production and consumption by setting standards and providing incentives that encourage firms to adopt sustainable practices.
- Governments, in collaboration with table water producers, could raise awareness and educate the general public about the value and necessity of sustainability. This may be accomplished through public awareness campaigns, workshops, training programs, and collaborations with educational institutions. Major stakeholders in the industry, such as producers of table water, consumers of the products, and appropriate regulatory authorities or agencies, should collaborate to develop effective waste management strategies. Table water producers should take on more responsibility for supporting the industry's sustainability through the use of ecologically friendly packaging materials and proper waste management.

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