GJAF GOUNI Global Journal of Accounting and Finance
[GOUNI-GJAF]
RESEARCH ARTICLE
Open Access · Peer Reviewed

Effect of Triple Bottom Line Reporting on the Financial Performance of Brewery Firms in Nigeria: A Panel Analysis

Running title: Triple Bottom Line Reporting and Financial Performance of Brewery Firms in Nigeria

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PUBLICATION METADATA	
Issue	Vol 1 No 1
Pages	110-124
Published Online	14th Aug, 2026

ABSTRACT

This study examines the effect of triple bottom line reporting on the financial performance of brewery firms in Nigeria. Economic Disclosure Index, Environmental Disclosure Index, and Social Disclosure Index are used as proxies for triple bottom line reporting, while Return on Assets (ROA) is employed as the measure of financial performance. The uniqueness of the study lies in the inclusion of Governance Disclosure Index as a control variable. The study adopts an ex-post facto research design, and panel data were obtained from four brewery firms listed on the Nigerian Exchange Group over the period 2016–2025. Data were sourced from audited annual reports of the selected firms. Panel regression techniques were employed for data analysis, while the Hausman test guided the choice of the fixed effects estimation technique. The empirical results reveal that Economic and Environmental Disclosure Indices have negative and statistically insignificant effects on ROA. In contrast, Social and Governance Disclosure Indices exhibit positive and statistically significant effects on ROA. Consequent to these findings, regulatory authorities, policymakers, and corporate managers should enhance the quality of economic disclosures, promote environmentally sustainable practices, strengthen corporate social responsibility initiatives, and enforce effective corporate governance practices to improve investor confidence, stakeholder trust, and the overall performance of brewery firms in Nigeria. The study recommends that brewery firms enhance the quality, relevance, and strategic application of economic disclosures; adopt cost-effective and integrated environmental sustainability practices; intensify social responsibility disclosures and initiatives; and strengthen corporate governance mechanisms through improved transparency, accountability, board independence, and strict regulatory compliance.

Keywords: Triple Bottom Line; Economic Disclosure; Environmental Disclosure; Social Disclosure; Governance Disclosure; Financial Performance

Subject Categories: Sustainability Accounting; Corporate Governance; Financial Performance

1. INTRODUCTION

1.1 Background to the Study

Brewing firms belong to a category of companies characterized by high environmental sensitivity due to their significant reliance on natural resources such as water, energy, and agricultural inputs. Their production processes generate environmental externalities, including wastewater discharge, carbon emissions, and solid waste, which raise sustainability concerns. These environmental spillovers have intensified global demand for corporate transparency and accountability, leading to increased adoption of triple bottom line (TBL) disclosure as a mechanism for reporting firms' commitment to environmental stewardship and social responsibility (KPMG, 2022; Organization for Economic Co-operation and Development [OECD], 2023).

Firms operating in environmentally sensitive industries are more likely to disclose sustainability-related information to mitigate stakeholder pressure, maintain legitimacy, and enhance corporate reputation. This aligns with legitimacy and stakeholder theories, which suggest that organizations disclose environmental and social information to align with societal expectations and secure continued access to resources (Freeman, 2020; Hahn & Kühnen, 2013). Empirical evidence indicates that firms with higher environmental exposure tend to provide more extensive sustainability disclosures to reduce public criticism, meet stakeholder expectations, and attract investment capital (PwC, 2023; World Bank, 2023).

The increasing global awareness of environmental sustainability has also led to the emergence of international frameworks and standards guiding corporate disclosures on environmental and social performance. Frameworks such as the Global Reporting Initiative (GRI) and Environmental, Social, and Governance (ESG) standards have strengthened corporate accountability and encouraged firms to integrate sustainability into their reporting systems (Global Reporting Initiative [GRI], 2022). These frameworks emphasize that corporate performance should not be evaluated solely based on financial outcomes but also on environmental and social impacts.

In the brewing industry, sustainability issues have become a central concern for management due to the sector's environmental footprint. Brewing activities involve intensive water usage, energy consumption, and waste generation, necessitating effective management of environmental resources and social responsibilities. Failure to address these sustainability issues can negatively affect corporate image, stakeholder trust, and overall firm performance (OECD, 2023). Consequently, firms are increasingly expected to demonstrate proactive efforts in mitigating the environmental and social impacts of their operations.

The concept of Triple Bottom Line (TBL), introduced by John Elkington, provides a comprehensive framework for assessing corporate performance across three dimensions: economic (profit), social (people), and environmental (planet) (Elkington, 1997). The TBL framework expands the traditional financial reporting model by incorporating non-financial indicators that reflect a firm's broader impact on society and the environment. This approach is consistent with contemporary sustainability practices, which emphasize long-term value creation rather than short-term profit maximization (Eccles et al., 2020). The economic dimension of TBL focuses on profitability and value creation for stakeholders, while the social dimension emphasizes corporate social responsibility, employee welfare, and community engagement. The environmental dimension addresses issues such as resource conservation, pollution control, and climate change mitigation. Collectively, these dimensions provide a holistic view of corporate performance and sustainability.

Despite the growing adoption of TBL practices globally, empirical evidence on their impact on firm performance remains inconclusive. Some studies report positive relationships between sustainability disclosure and financial performance, while others find insignificant or negative effects due to the costs involved (Asongu & Odhiambo, 2022; Friede et al., 2015; updated syntheses in PwC, 2023). These inconsistencies highlight the need for further empirical investigation, particularly in the Nigerian brewing sector. Therefore, this study seeks to examine the effect of triple bottom line reporting on the performance of brewery firms in Nigeria, with a view to establishing the consistency of empirical evidence in this area.

1.2 Statement of the Problem

The global shift toward sustainable development has redefined corporate performance evaluation by emphasizing the integration of economic, social, and environmental considerations. The triple bottom line (TBL) framework underscores the importance of measuring corporate success beyond financial performance to include social and environmental impacts (Elkington, 1997; GRI, 2022).

Despite the recognized importance of TBL disclosures, many firms, particularly in developing economies, continue to prioritize short-term profitability and shareholder wealth maximization over sustainability objectives. This tendency is driven by operational cost pressures, weak regulatory enforcement, and limited awareness of the long-term benefits of sustainability practices (OECD, 2023; PwC, 2023). As a result, firms often underinvest in environmental and social initiatives, thereby compromising sustainable development.

In the brewing industry, the environmental and social impacts of production activities necessitate proactive sustainability management. However, failure to adequately address these issues can lead to reputational damage, regulatory penalties, and declining financial performance. While TBL disclosure is expected to enhance transparency and accountability, its actual impact on firm performance remains uncertain. Existing empirical studies on TBL disclosure and firm performance have produced mixed and inconclusive results. While some studies suggest that triple bottom line disclosures improve financial performance and stakeholder confidence, others report insignificant or negative relationships due to the costs associated with implementing such practices (Eccles et al., 2020; Asongu & Odhiambo, 2022). This inconsistency creates uncertainty for managers and policymakers regarding the economic implications of TBL practices.

This study also controls for governance disclosure (GDI) to provide more reliable estimates, addressing omitted variable bias by controlling for governance disclosure—a factor that has been largely ignored in prior studies examining the TBL and performance relationship in Nigeria. Therefore, this study seeks to fill these gaps by examining the effect of triple bottom line reporting on the performance of brewery firms in Nigeria.

1.3 Objectives of the Study

The broad objective of this study is to examine the effect of triple bottom line reporting on the financial performance of brewery firms in Nigeria. This study specifically seeks to:

a) Evaluate the effect of economic disclosure indexes on return on assets of brewery firms in Nigeria.

b) Determine the effect of environmental disclosure indexes on return on assets of brewery firms in Nigeria.

c) Ascertain the effect of social disclosure indexes on return on assets of brewery firms in Nigeria.

1.4 Research Questions

The following research questions are addressed in this study:

a) To what extent does the economic disclosure index influence the return on assets of brewery firms in Nigeria?

b) To what extent does the environmental disclosure index affect the return on assets of brewery firms in Nigeria?

c) What is the effect of the social disclosure index on the return on assets of listed brewery firms in Nigeria?

1.5 Research Hypotheses

Based on the specific objectives, the following null hypotheses were formulated:

H_{01}: Economic disclosure index has no significant effect on the return on assets of brewery firms in Nigeria.

H_{02}: Environmental disclosure index has no significant effect on the return on assets of brewery firms in Nigeria.

H_{03}: Social disclosure index has no significant effect on the return on assets of brewery firms in Nigeria.

2. LITERATURE REVIEW

2.1 Conceptual Review

2.1.1 Triple Bottom Line Reporting

The Triple Bottom Line (TBL) framework, pioneered by John Elkington, represents a paradigm shift from traditional financial reporting to a multidimensional assessment of organizational performance. Initially conceptualized in the 1990s, TBL emphasizes that firms should measure success not only by financial returns but also by their social and environmental impacts (Elkington, 1998, 2004). In recent years, this framework has gained renewed relevance as global sustainability challenges such as climate change, social inequality, and resource depletion intensify.

Contemporary developments show that TBL reporting is increasingly embedded within global sustainability and ESG (Environmental, Social, and Governance) reporting frameworks. Institutions such as the Global Reporting Initiative and the IFRS Foundation have introduced updated standards (GRI, 2024; IFRS S1 and S2, 2025) to improve consistency, comparability, and decision-usefulness of sustainability disclosures. Empirical evidence from recent global surveys indicates that over 90% of large multinational corporations now publish sustainability or integrated reports incorporating TBL elements (KPMG, 2024).

People (Social Dimension)

The “people” component of TBL focuses on the organization's social responsibility toward employees, customers, and the broader community. This includes fair labor practices, occupational health and safety, diversity and inclusion, human rights compliance, and community engagement. Recent literature (PwC, 2025; World Economic Forum, 2024) highlights that organizations with strong social performance demonstrate enhanced employee productivity, reduced turnover, and stronger stakeholder trust.

In developing economies such as Nigeria, TBL reporting has increasingly been linked to corporate social responsibility (CSR) initiatives, including community development projects, education support, and healthcare investments. Recent African-based studies (Adegboye et al., 2024; Okafor & Eze, 2025) reveal that firms practicing robust social disclosure tend to achieve improved corporate reputation and legitimacy, particularly in extractive and financial sectors. However, challenges persist in measuring social impact due to its qualitative and context-specific nature.

Planet (Environmental Dimension)

The environmental dimension of TBL emphasizes sustainable resource utilization and ecological responsibility. Firms are expected to reduce greenhouse gas emissions, adopt renewable energy sources, minimize waste, and implement circular economy principles. Recent advancements in sustainability reporting have led to the widespread adoption of climate-related disclosures aligned with international standards.

The IFRS Foundation (2025) introduced sustainability disclosure standards that require firms to report climate-related risks and opportunities, thereby strengthening the environmental pillar of TBL. Additionally, the World Economic Forum (2024) underscores the importance of integrating environmental metrics into core business strategy rather than treating them as peripheral disclosures. Empirical studies (Deloitte, 2025; KPMG, 2024) suggest a positive relationship between environmental performance and financial outcomes, particularly in industries where regulatory pressure and stakeholder scrutiny are high. In Nigeria, environmental reporting remains relatively underdeveloped, although sectors such as oil and gas are increasingly adopting environmental impact assessments and sustainability disclosures (Okafor & Eze, 2025).

Profit (Economic Dimension)

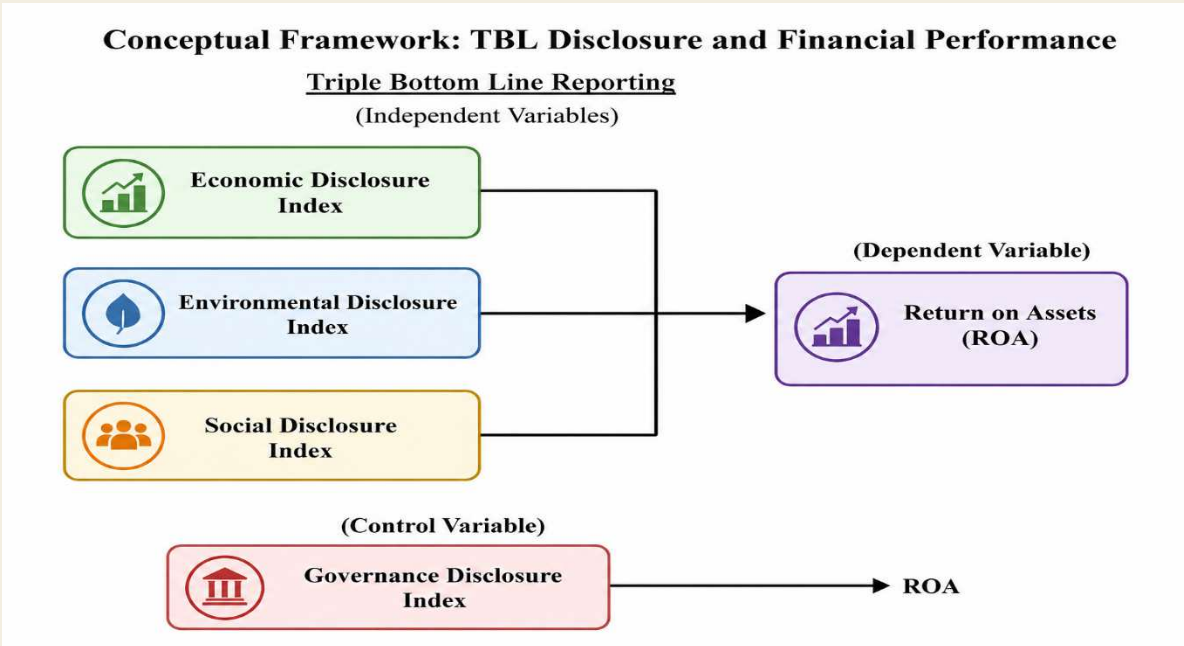
The economic dimension of TBL extends beyond traditional profit measurement to include the broader economic value generated for stakeholders. This includes job creation, infrastructure development, tax contributions, and support for local supply chains. Unlike conventional accounting profit, TBL emphasizes shared value creation, where economic success is achieved alongside social and environmental sustainability. Recent literature highlights that integrating sustainability into financial strategy enhances long-term resilience and investor confidence (PwC, 2025; KPMG, 2024). Investors are increasingly incorporating ESG metrics into decision-making, thereby reinforcing the importance of TBL reporting. Furthermore, digital transformation and data analytics are improving the measurement and reporting of economic impacts, enabling more comprehensive TBL assessments (Deloitte, 2025).

Triple Bottom Line reporting has evolved into a critical framework for evaluating organizational performance in a sustainability-driven global economy. While challenges remain, particularly in standardization and social impact measurement, recent advancements in reporting standards and empirical research demonstrate its growing relevance. Organizations that effectively implement TBL reporting are better positioned to achieve sustainable growth, enhance stakeholder trust, and contribute meaningfully to economic, social, and environmental development.

2.1.2 Financial Performance

The performance of a company is often ultimately reflected in corporate profits. Financial performance can be measured using accounting-based or stock market-based measures. Accounting-based measures reflect past performance of the firm, whereas stock market-based measures reflect future expectations of shareholders (Peloza, 2009). Yusuff, Emmanuel, Akpa, and Odumegwu (2020), in their empirical study, reported that TBL reporting enhances the financial performance of companies. However, Weerarathna, Lokeshwara, Sandali, Chandula, and Nirman (2021) documented that corporate sustainability reporting has no connection with financial performance. Malarvizhi and Ranjani (2016) pointed out that accounting-based measures are more likely to capture unsystematic risk, which is unique to the firm, since activities undertaken by firms that lead to high or low perceived corporate social responsibility might be mostly unsystematic. This study employs return on assets (ROA) to measure the financial performance of brewery firms listed on the Nigerian Exchange, in line with previous studies (Agu & Amedu, 2018; Nwaiwu & Oluka, 2018; Naima, 2020).

FIGURE 1. *Conceptual Framework — TBL Disclosure and Financial Performance*



2.2 Theoretical Framework

Several theories exist in sustainability and triple bottom line reporting, such as stakeholder theory, legitimacy theory, agency theory, and triple bottom line theory, but this study is anchored on legitimacy theory. The origins of legitimacy theory are commonly traced to the seminal work of Dowling and Pfeffer (1975), who conceptualized legitimacy as a condition whereby organizations seek to operate within the bounds and norms of their respective societies. The theory posits that organizations continuously strive to ensure that their activities are perceived as congruent with prevailing social values, expectations, and norms. As societal expectations are dynamic and evolve over time, firms must remain adaptive, aligning their practices with emerging ethical, environmental, and social considerations (Islam & Deegan, 2007; Deegan, 2019; Suchman, 1995).

Legitimacy is further defined as a generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within a socially constructed system of norms, values, beliefs, and definitions, as articulated by Suchman (1995). Contemporary literature extends this view by emphasizing that legitimacy is not static but continuously negotiated between organizations and their stakeholders, particularly in the context of sustainability reporting and corporate social responsibility disclosures (Cho et al., 2021; O'Dwyer, 2023).

Fundamentally, legitimacy theory underscores that a firm's survival and continued access to resources depend on its ability to meet societal expectations. Organizations that fail to align with these expectations risk legitimacy gaps, which may lead to reputational damage, regulatory pressures, or loss of stakeholder support. Consequently, firms increasingly adopt disclosure strategies such as environmental, social, and governance (ESG) reporting to demonstrate conformity with societal norms and maintain legitimacy in a rapidly changing institutional environment.

2.3 Empirical Review

A sector-focused study by Okoye et al. (2024) investigated the effect of sustainability accounting disclosures on the financial performance of brewery firms in Nigeria, using an ex-post facto research design and regression analysis. The findings reveal that environmental disclosure exerts a positive and statistically significant effect on net profit margin, while economic and social disclosures show positive but statistically insignificant relationships with financial performance. The study concludes that environmental sustainability practices, such as waste management, pollution control, and energy efficiency, are more strongly aligned with profitability in the brewery sector than other TBL dimensions.

Similarly, Nnamani et al. (2025) examined sustainability reporting and firm performance among listed consumer goods firms in Nigeria. Using panel data analysis, the study reports that TBL components collectively have a positive association with financial performance indicators such as return on assets (ROA) and return on equity (ROE). However, when disaggregated, environmental disclosures remain the most statistically significant predictor, while social disclosures exhibit weak or insignificant effects. The authors attribute this to the long-term and often intangible nature of social investments.

In a related study, Asuquo et al. (2025) assessed the impact of sustainability reporting on firm value and profitability in Nigeria. Employing multiple regression techniques, the study finds that while overall sustainability disclosure improves firm value, only environmental disclosure shows a consistently significant effect on profitability measures. Economic disclosures were positive but insignificant, suggesting that traditional financial reporting may already capture much of the economic dimension of TBL.

Further extending the discourse, Olayinka and Adegboye (2026) explored the role of environmental, social, and governance (ESG) disclosures on firm performance in Nigeria's industrial sector. Their findings indicate that governance disclosures are emerging as a significant determinant of financial performance, particularly in firms with strong institutional frameworks. However, within brewery firms, governance variables are still found to exert weak or insignificant effects, indicating that their financial relevance may still be evolving in this subsector.

In another related study, Bature et al. (2026) examined the effect of sustainability disclosure on the financial performance of listed oil and gas marketing firms in Nigeria. Data for the study were analyzed using STATA 13 statistical software, generating coefficients, Z-values, and p-values from three regression models investigating the relationship between sustainability disclosure (SUSD) and three financial metrics. The results showed a significant positive association between sustainability disclosure and both NPM and ROA.

Daferighe and Udukeke (2024) evaluated the application of the triple bottom line reporting model by oil, gas, and plastic production firms and its effects on infrastructural development in the Niger Delta region of Nigeria from 2011 to 2023. An ex-post facto research design and content analysis were adopted, while secondary data were extracted from the annual reports and accounts of the sampled companies and analyzed using EViews 10.0 statistical software. The study utilized descriptive statistics and inferential statistics via Pearson correlation and Panel Least Square (PLS) regression analysis. Findings from the empirical analysis showed that economic, social, and environmental bottom line reporting have a significant and positive effect on infrastructural development.

2.4 Gap in Literature

The empirical literature suggests that while TBL reporting positively influences financial performance, the magnitude and significance of its impact vary across its components. Environmental disclosure consistently demonstrates a strong and significant relationship with financial performance, whereas social and economic disclosures tend to exhibit weaker or statistically insignificant effects. Governance disclosure, though increasingly relevant, shows inconsistent results within the brewery sector.

Despite these insights, notable gaps remain. There is limited availability of studies specifically focused on brewery firms using recent datasets, and few studies incorporate governance as a control variable alongside TBL components. This study addresses these gaps.

3. METHODOLOGY

The research design of this study is ex-post facto because the data used is historical in nature. The empirical research relies on panel data from a cross-sectional sample of four (4) selected listed brewery firms in Nigeria, for a period of 10 years from 2016–2025. The research examined the effect of Triple Bottom Line Reporting, surrogated by Economic Disclosure Index (EcDI), Environmental Disclosure Index (EnDI), and Social Disclosure Index (SDI), and a control variable, Governance Disclosure Index (GDI), on the financial performance measured by Return on Assets (ROA) of listed brewery firms in Nigeria. These companies were selected purposively based on their liquidity positions and asset base, as brought out in the Equity Research Report (2022).

The secondary data were obtained through the audited annual reports and accounts and annual sustainability reports of the quoted brewery firms in Nigeria. Content analysis was performed to determine the presence or absence of items mentioned in the Global Reporting Initiative Guidelines G4 (GRI G4) in respect of the Economic Sustainability Disclosure Index (EcDI), Environmental Sustainability Disclosure Index (EnDI), Social Sustainability Disclosure Index (SDI), and Governance Sustainability Disclosure Index (GDI) for the sampled firms. With content analysis, a score of one (1) is awarded if an item is reported; otherwise, a score of zero (0) is awarded. Consequently, a firm could score a minimum of 0 and a maximum of four, twelve, thirty, and seven (4, 12, 30, and 7) points on the economic, environmental, social, and governance categories respectively.

The formula used to calculate the index score is:

Index of GRI Disclosure Rate = Σk = 1 (items available) / N, where k = 0 for items not available, and N = total GRI disclosure requirements.

Both descriptive and inferential analyses were performed on the data. The hypotheses of the study were tested using panel regression analysis with the aid of EViews version 10. The interpretation of the regression results was based on the size of the estimated coefficients, the level of statistical significance, and the performance of the stochastic error term.

3.1 Model Specification

This study adapted the model used by Okoye, Oranefofor, and Agu (2024) in Nigeria, which was originally stated as follows:

$$NPM = \beta_0 + \beta_1 EnSDI + \beta_2 EcSDI + \beta_3 SSDI + \beta_4 GSDI + \varepsilon$$

Where: NPM = Net Profit Margin, derived as profit before tax to revenue of the firm; EnSDI = Economic Sustainability Disclosure Index; EcSDI = Environmental Sustainability Disclosure Index; SSDI = Social Sustainability Disclosure Index; GSDI = Governance Sustainability Disclosure Index; β_0 is the intercept of the population regression line; and ε is the error term.

The model was modified to suit and guide the purpose of this study. The model specified below estimates the functional correlation between the dependent and independent variables in this study, as follows:

$$Fin.\ Perf. = f\,(TBL) \quad \ldots (1)$$

$$ROA = \beta_0 + \beta_1 EnDI + \beta_2 EcDI + \beta_3 SDI + \beta_4 GDI + \varepsilon \quad \ldots (2)$$

Where: Fin. Perf. = Financial Performance, proxied by ROA (dependent variable); TBL = Triple Bottom Line Reporting; ROA = Return on Assets, obtained as the ratio of profit after tax to total assets of the selected firms; EnDI = Economic

Disclosure Index; EcDI = Environmental Disclosure Index; SDI = Social Disclosure Index; GDI = Governance Disclosure Index; β_0 is the intercept of the population regression line; and ε is the error term.

TABLE 1. *Operationalization of Model Variables*

TYPE OF VARIABLE	PROXY	MEASUREMENT	SOURCE
Dependent Variable	ROA	PAT / Total Assets	Annual report and accounts
Independent Variable	EcDI	GRI G4 Category I, Total Economic Disclosure Requirements (4 items)	Annual / Sustainability reports
Independent Variable	EnDI	GRI G4 Category II, Total Environmental Disclosure Requirements (12 items)	Annual / Sustainability reports
Independent Variable	SDI	GRI G4 Category III, Total Social Disclosure Requirements (30 items)	Annual / Sustainability reports
Control Variable	GDI	GRI G4 General Standard, Total Governance Disclosure Requirements (7 items)	Annual / Sustainability reports

Source: Researchers' compilation (2026).

Decision Rule: Accept H_0 if the p-value is greater than the 5% significance level; otherwise, reject H_0.

4. RESULTS AND ANALYSIS

4.1 Descriptive Statistics

TABLE 2. *Descriptive Statistics of Data*

STATISTIC	ROA	ECDI	ENDI	SDI	GDI
Mean	0.076488	0.931250	0.514588	0.402505	0.557140
Median	0.046620	1.000000	0.500000	0.400000	0.571400
Maximum	0.265165	1.000000	0.833300	0.666700	0.857100
Minimum	−0.009580	0.750000	0.083300	0.100000	0.142900
Std. Dev.	0.071091	0.113051	0.215898	0.142704	0.266354
Skewness	1.338936	−1.007807	−0.240063	−0.374122	−0.549835
Kurtosis	4.014770	2.015674	2.103356	2.536638	1.855395
Jarque-Bera	13.66792	8.385989	1.724150	1.290958	4.198992
Probability	0.001077	0.015101	0.422285	0.524411	0.122518
Sum	3.059514	37.25000	20.58350	16.10020	22.28560
Sum Sq. Dev.	0.197102	0.498437	1.817866	0.794218	2.766842
Observations	40	40	40	40	40

Source: Output data from EViews 10.0 (2026).

Table 2 shows the descriptive statistics of the variables, including the total number of observations, mean, median, maximum, minimum, standard deviation, and sum of mean deviation. The mean values of the independent and dependent variables—ROA, EcDI, EnDI, SDI, and GDI—are 0.076488, 0.931250, 0.514588, 0.402505, and 0.557140 respectively. The median of the study variables is 0.046620, 1.000000, 0.500000, 0.400000, and 0.571400 for ROA, EcDI, EnDI, SDI, and GDI, respectively. The maximum values of the series are 0.265165 for ROA, 1.000000 for EcDI, 0.833300 for EnDI, 0.666700 for SDI, and 0.857100 for GDI, while the minimum values are −0.009580, 0.750000, 0.083300, 0.100000, and

0.142900 for ROA, EcDI, EnDI, SDI, and GDI, respectively. The standard deviation of the variables is 0.071091 for ROA, 0.113051 for EcDI, 0.215898 for EnDI, 0.142704 for SDI, and 0.266354 for GDI.

The measure of asymmetry of the distribution of the series around its mean—that is, skewness—of all the variables is negative with the exception of ROA, suggesting that EcDI, EnDI, SDI, and GDI in the model are negatively skewed. The kurtosis, which measures the peakedness of the distribution of the variables, is above 3.0 only for ROA, evidencing that ROA is leptokurtic in nature while the other variables are platykurtic. The p-values of the Jarque-Bera test for some of the variables (ROA and EcDI) are significant at the 5% level, meaning that these variables deviate from normality; however, EnDI, SDI, and GDI are not statistically significant, indicating that they are approximately normally distributed and largely free from outliers that could affect the regression output.

4.2 Panel Unit Root Tests

TABLE 3. *Result of Unit Root Tests (Augmented Dickey-Fuller)*

VARIABLE	ADF P-VALUE @ LEVEL	DECISION	ADF P-VALUE @ 1ST DIFF.	DECISION	ORDER OF INTEGRATION
ROA	0.0326	Reject Null	—	—	I(0)
EcDI	0.0081	Reject Null	—	—	I(0)
EnDI	0.0005	Reject Null	—	—	I(0)
SDI	0.0121	Reject Null	—	—	I(0)
GDI	0.1180	Do not reject Null	0.0265	Reject Null	I(1)

Source: Output data from EViews 10.0 (2026).

From Table 3 above, it is clear that Return on Assets (ROA), Economic Disclosure Index (EcDI), Environmental Disclosure Index (EnDI), and Social Disclosure Index (SDI) were stationary at level, I(0). This means that, at the order of integration corresponding to levels, the null hypothesis of a unit root can be rejected for these four series. Governance Disclosure Index (GDI), however, was non-stationary at level but became stationary after first differencing, I(1).

4.3 Panel Regression Result

TABLE 4. *Panel OLS Regression Result on Return on Assets and Triple Bottom Line Reporting*

VARIABLE	COEFFICIENT	STD. ERROR	T-STATISTIC	PROB.
C	−0.111068	0.105512	−1.052661	0.3022
ECDI	−0.075105	0.102544	−0.732417	0.4705
ENDI	−0.032194	0.072280	−0.445414	0.6597
SDI	0.437381	0.193454	2.260904	0.0324
GDI	0.175928	0.051397	3.422901	0.0021

Source: Computer output data using EViews 10.0 (2026). Dependent variable: ROA. Method: Panel Least Squares (period fixed effects). Sample: 2016–2025. Periods included: 10. Cross-sections included: 4. Total panel (balanced) observations: 40. R-squared = 0.512680; Adjusted R-squared = 0.269019; F-statistic = 2.104077 (Prob. = 0.051613); Durbin-Watson stat = 1.362547.

TABLE 5. *Correlated Random Effects — Hausman Test (Test Period Random Effects)*

TEST SUMMARY	CHI-SQ. STATISTIC	CHI-SQ. D.F.	PROB.
Period random	14.880109	4	0.0050

Source: Computer output data using EViews 10.0 (2026).

The Hausman test in Table 5 suggests the preference of the fixed effects estimation over the random effects estimation, due to the significant p-value (0.0050) of the Chi-square statistic at the 5% level.

Hypothesis One

H_0: Economic disclosure index has no significant effect on the return on assets of brewery firms in Nigeria.

H_1: Economic disclosure index has a significant effect on the return on assets of brewery firms in Nigeria.

The panel least squares regression results presented in Table 4 indicate that the Economic Disclosure Index has a statistically insignificant effect on ROA, as evidenced by a p-value of 0.4705, which is greater than the 0.05 significance level. Consequently, the null hypothesis is accepted, implying that Triple Bottom Line Reporting, proxied by the Economic Disclosure Index, does not significantly influence the return on assets of brewery firms in Nigeria.

Hypothesis Two

H_0: Environmental disclosure index has no significant effect on the return on assets of brewery firms in Nigeria.

H_1: Environmental disclosure index has a significant effect on the return on assets of brewery firms in Nigeria.

The panel least squares regression results presented in Table 4 indicate that the Environmental Disclosure Index has a statistically insignificant effect on ROA, as evidenced by a p-value of 0.6597, which is greater than the 0.05 significance level. Consequently, the null hypothesis is accepted, implying that Triple Bottom Line Reporting, surrogated by the Environmental Disclosure Index, does not significantly influence the return on assets of brewery firms in Nigeria.

Hypothesis Three

H_0: Social disclosure index has no significant effect on the return on assets of brewery firms in Nigeria.

H_1: Social disclosure index has a significant effect on the return on assets of brewery firms in Nigeria.

The panel least squares regression results presented in Table 4 indicate that the Social Disclosure Index has a statistically positive and significant effect on ROA, as evidenced by a p-value of 0.0324, which is less than the 0.05 significance level. Consequently, the null hypothesis is rejected, implying that Triple Bottom Line Reporting, measured by the Social Disclosure Index, significantly influences the return on assets of brewery firms in Nigeria.

Governance Disclosure Index (Control Variable)

The panel least squares regression results presented in Table 4 indicate that the Governance Disclosure Index has a statistically positive and significant effect on ROA, as indicated by a p-value of 0.0021, which is less than the 0.05 significance level. Consequently, it is evident that the Governance Disclosure Index significantly influences the return on assets of brewery firms in Nigeria.

Based on the adjusted R-squared of 0.269019, it is clear that the explanatory variables, including the control variable, account for only 26.90% of the changes in return on assets. The Durbin-Watson statistic of 1.362547 is on the low side, suggesting the possibility of mild positive autocorrelation in the model residuals.

5. SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 Summary of Findings

The study reveals the following key findings regarding the effect of triple bottom line reporting on the financial performance of brewery firms in Nigeria:

a) Economic disclosure index has a negative and statistically insignificant effect on the return on assets of brewery firms in Nigeria.

b) Environmental disclosure index has a negative and statistically insignificant effect on the return on assets of brewery firms in Nigeria.

c) Social disclosure index has a positive and statistically significant effect on the return on assets of brewery firms in Nigeria.

d) Governance disclosure index has a statistically positive and significant effect on the return on assets of brewery firms in Nigeria.

5.2 Conclusion

The study examined the effect of triple bottom line accounting disclosure on the performance of brewery firms in Nigeria over the period 2016–2025. This study tested three hypotheses. The first hypothesis established that the economic disclosure index has a negative and statistically insignificant effect on the return on assets of brewery firms in Nigeria. This implies that economic disclosure practices of brewery firms do not significantly contribute to improving financial performance measured by return on assets (ROA). The negative coefficient suggests that increased economic disclosures may be associated with slight reductions in financial performance. However, because the effect is statistically insignificant, the relationship is weak and cannot be relied upon for prediction or policy conclusions. This finding is in consonance with the research report of Asuquo, Dada, and Ogar (2025), but is in contrast with the findings reported by Okoye, Oranefofor, and Agu (2024) and Nnamani et al. (2025).

With the outcome of the test of hypothesis two, it is indicated that the environmental disclosure index has a negative and statistically insignificant effect on the return on assets of brewery firms in Nigeria. This result suggests that environmental disclosure initiatives do not have a meaningful influence on the financial performance of brewery firms in Nigeria. Nevertheless, the insignificance of the effect implies that environmental disclosures neither substantially enhance nor reduce firms' ROA. This may further indicate low stakeholder sensitivity to environmental reporting within the Nigerian brewery sector or inadequate integration of environmental sustainability into strategic profitability objectives. This finding disagrees with the research reports of Asuquo, Dada, and Ogar (2025) and Okoye, Oranefofor, and Agu (2024).

The result of hypothesis three showed that the social disclosure index has a positive and statistically significant effect on the return on assets of brewery firms in Nigeria. This finding implies that social disclosure practices significantly improve the financial performance of brewery firms in Nigeria. The positive and significant relationship indicates that firms engaging more in social responsibility disclosures tend to achieve higher financial performance. This suggests that stakeholders positively respond to socially responsible activities, thereby enhancing corporate reputation, customer loyalty, and operational efficiency, which ultimately improves ROA. The result supports the argument that social sustainability practices create economic value for firms. This finding agrees with Okoye, Oranefofor, and Agu (2024).

Finally, the control variable exhibited a positive and statistically significant effect on the return on assets of brewery firms in Nigeria. This implies that good governance disclosure practices significantly enhance the profitability of brewery firms in Nigeria. The positive and statistically significant relationship suggests that increased transparency in corporate governance structures, board activities, accountability mechanisms, and ethical practices strengthens investor confidence and managerial efficiency, thereby improving return on assets. The result underscores the importance of sound corporate governance in promoting financial performance and organizational sustainability within the brewery industry. However, this finding is contrary to the result reported by Olayinka and Adegboye (2026).

In general, the study revealed that while economic and environmental disclosure indices exert negative but statistically insignificant effects on the return on assets of brewery firms in Nigeria, social and governance disclosure indices significantly and positively influence financial performance. The findings therefore suggest that brewery firms can enhance their financial performance and long-term sustainability through improved social responsibility engagement and sound corporate governance practices, while greater strategic attention should be directed toward making economic and environmental disclosures more impactful on corporate performance.

5.3 Recommendations

Based on the findings of this study, the following recommendations are suggested:

i. Management of brewery firms in Nigeria should review and improve the quality, relevance, and strategic application of economic disclosures to ensure that such disclosures contribute meaningfully to financial performance. Firms should focus on disclosures that enhance investor confidence and operational efficiency rather than merely satisfying reporting requirements.

ii. Brewery firms should adopt more cost-effective and strategically integrated environmental sustainability practices capable of generating long-term financial benefits. Regulatory agencies and management should also create greater awareness of the economic value of environmental responsibility so that environmental disclosures can attract stakeholder support and improve corporate performance over time.

iii. Management of brewery firms should intensify social responsibility initiatives and disclosures relating to employee welfare, community development, customer relations, and social investments, since these have proven to positively and significantly enhance profitability. Firms should therefore incorporate social sustainability practices into their core business strategies.

iv. Brewery firms should strengthen corporate governance mechanisms by ensuring greater transparency, accountability, board independence, and compliance with governance regulations. Since governance disclosure significantly improves financial performance, firms should sustain and continuously improve governance reporting practices to enhance investor confidence and operational effectiveness.

DECLARATIONS

Author Contributions (CRediT): Both authors contributed

Funding: This research received no external funding.

Conflict of Interest: The authors declare no conflict of interest.

Ethics Approval: Not applicable — this study relies solely on publicly available secondary data extracted from audited annual reports and sustainability reports.

Consent to Participate: Not applicable.

Data Availability Statement: The data supporting the findings of this study were extracted from the audited annual reports and sustainability reports of the sampled brewery firms and are available from the corresponding author upon reasonable request.

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