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Firm Attributes And Environmental Disclosure Of Quoted Brewery Firms In Nigeria: A Pathway To Ethical Governance And Sustainable Development

Hope Ifeoma Orjinta[1], Cosmas Anayochukwu Nwankwo[2], MacDonald Isaac Kanyangale[3]
[1]Chukwuemek Odumegwu Ojukwu University, Nigeria, https://orcid.org/0000-0002-0531-8056
hi.orjinta@coou.edu.ng
[2]Chukwuemeka Odumegwu Ojukwu University, Nigeria, https://orcid.org/0000-0002-3135-7788
ca.nwankwo@coou.edu.ng
[3]University of KwaZulu Natal, South Africa, https://orcid.org/0000-0003-2259-1449
kanyangalem@ukzn.ac.za

Abstract
Global economic expansion has had detrimental effects on the environment, causing natural disasters, unchecked waste disposal, and climate change. Sequel to the above, this study is set to investigate the effect of firm specific attributes on waste water environmental disclosure of selected brewery firms in Nigeria. The study relies on secondary data derived from various companies' financial statements to determine and measure the level of firm's compliance with environmental disclosure, applying an all-inclusive multivariate analysis. Samples of 4 brewery firms quoted in Nigeria Group limited were used for the period of fifteen years spanning 2010 to 2024. The study employed ex-post facto and longitudinal research design. The secondary sources of data were collected from annual reports of the selected brewery companies and four (4) specific objectives were formulated and its hypothesis were subjected to some preliminary data tests such as descriptive statistics, Pearson correlation analysis and Variance Inflation Factor and the formulated hypotheses were tested and analyzed using panel regression analysis. The empirical analysis using a total of 60 company-firm year observations showed that company size and industry type have a positive and significant effect on waste water environmental disclosure of brewery firms in Nigeria which were statistically significant at 1% level of significance respectively. Also firm leverage documented a negative and significant effect on waste water environmental disclosure of brewery firms in Nigeria which was also statistically significant at 5% level of significance respectively. Following the conclusions on the significant findings above, the study recommended among other things that management of brewery firms are encouraged to increase their total assets as there is need to increase the size of the firms in Nigeria in order to improve waste water environmental disclosure.
Keywords: *Environmental Disclosure, Firm attributes, Industry type, Brewery firms, Nigeria*

1 INTRODUCTION

Global economic expansion has had detrimental effects on the environment, causing natural disasters, unchecked waste disposal, and climate change (Angela & Handoyo, 2021). Due to the damage these businesses' environmental effects have created, the environment is no longer able to provide clean water, clean air, electricity, and land that can be used for agriculture. The negative consequence of this degradation on the ecological atmosphere and human life has necessitated the users of annual reports and various stakeholders to show concern and demand for the disclosure of quantitative and qualitative data on environmental impacts of a firm annually (Ozonuwe & Orjinta, 2025; Joshua, Onuora & Orjinta, 2024; Usiomon & Iyoha, 2024; Wahyuningrum, 2023; Atang & Eyisi, 2020). Due to factors like rising corporate productivity, regulatory pressure, the influence of environmental groups, competition, and corporate stakeholder demands, corporate entries are being forced to disclose environmental information in their annual reports (Muttanachai & Stanton, 2012 quoted in Usiomon & Iyoha, 2024). Consequently, because more and more informed stakeholders are demanding accurate and tangible information about companies' corporate environmental performance, corporate environmental disclosure has emerged as a critical conversation point (Ozonuwe & Orjinta, 2025; Joshua, Onuora & Orjinta, 2024; Usiomon & Iyoha, 2024). Therefore, this paper is designed to investigate the effect of various firm specific factors that affect waste water environmental disclosure, which has attracted major interest in recent scholarly literature.

Over the last few years, researchers have attempted to study the motivations behind disclosing non-financial information like waste water disclosure in different contexts. Prior research carried out in the Nigerian setting shows that waste water issues have been rarely investigated as part of ethical governance and sustainable

development (Orjinta, et al., 2025; Wahyuningrum, 2023, Gunawan, 2016). The number of studies related to corporate waste water information disclosure is starting to grow rapidly, but previous research has mostly focused on waste water information disclosure practices in developed countries like USA, UK, Japan, Indonesia, China, Australia, and East Asia (Ben-Amar & Chelli, 2018; Burritt, Christ, and Omori, 2016; Liu, Su, and Zhang, 2021; Zhang et al., 2021; Zhou, Wang, Zeng, Jin, and Zeng, 2021) leaving developing countries like Nigeria unexplored. However, there is a sense that what has been concluded so far is partial, contradictory and inconclusive leading to the need for different methods of research on firm specific attributes of waste water environmental disclosure (Wahyuningrum, 2023; Spence & Gray 2007). The body of literature on environmental accounting is quickly expanding because of the increased research on environmental information disclosure. Regrettably, there has not been a lot of useful research on the environmental component of water information sharing (Wahyuningrum, 2023, Zhou, Liu, Zeng & Chen, 2018). Existing research on water information also does not specifically look at water information disclosure, and the studies are located outside of Nigeria. To the best of our knowledge, none of the previous studies that were analyzed have addressed waste water disclosure in any particular sense from an accountability perspective despite the fact that research on the disclosure of environmental information is growing rapidly and adding to the repertoire of environmental accounting literature but all have abandoned waste water disclosure as part of environmental information disclosure. Hence this study ventured into this area in other to bridge the gap in knowledge. This however form the significant reasons and justification for this conference paper, hence the need to x-ray the effect of firm specific attributes on waste water environmental disclosure. Therefore, this paper is subdivided into five sections including this introduction. Section 2 covers the review of the related literature, section 3 concentrates on the methodology adopted while in section 4 we present and discuss the results of the analysis. Lastly in section 5, we draw the conclusion and proffer our recommendation for policy implementation.

2 THEORETICAL FRAMEWORK

This paper is anchored on stakeholder's theory. Stakeholder theory was propounded by Edward Freeman in 1984. Stakeholder theory upholds that firms have accountability towards a broad range of stakeholders, apart from shareholders, that is customers, suppliers, employees, government, community, environment, lenders and future generation. Stakeholder theory looks at the relationship between an organization and others in its internal and external environment. It also looks at how these relationships affect the organizations and how the organization conducts its activities (Freeman; 2004). To this end, this study is anchored on stakeholder theory because the basic proposition of the stakeholder theory is that the firm's success is dependent upon the successful management of all the relationships that a firm has with its stakeholders. When viewed as such, the conventional view that the success of the firm is dependent solely upon maximizing shareholders' wealth is not sufficient because the entity is perceived to be a nexus of explicit and implicit contracts between the firm and its various stakeholders. The stakeholder theory asserts that corporation's continued existence requires the support of the stakeholders and their approval must be sought and the activities of the corporation adjusted to gain that approval.

2 Firm Attributes and Waste Water Environmental Disclosure

Companies can be differentiated from each other based on certain attribute they possess. Such attributes are referred to as characteristics' - which exist at the firm's level and have the potential to influence the decisions of the managers in the firm (Ozonuwe & Orjinta, 2025). Shehu and Farouk (2014) defined firm determinant factors as variables at the firm level that affect the decision of the firm both internally and externally over time. Water Environmental Disclosure means the disclosure, notification or reporting of information in relation to any Soil or Groundwater Contamination by or on behalf of the Purchaser to any Environmental Authority or other Third Party (Usiomon & Iyoha, 2024; Wahyuningrum, 2023). Effluents are wastewater whether treated or untreated that flows out of a treatment plant, sewer or industrial outfall. They are generally referred to as wastes discharged into surface waters or liquid discharge. Waste is unwanted or unusable materials. Usiomon and Iyoha, (2024) quoting Sean (2019) defined waste as any substance which is discarded after primary use, or is worthless, defective and of no use. Environmental waste management disclosure is a disclosure on the control of emissions and waste water effluents into environment. It constitutes the use of materials, processes, or practices to reduce, minimize, or eliminate the creation of pollutants or wastes. A number of researchers have identified vital internal factors that' determine the voluntary disclosure of information such as firm size, leverage, profitability, liquidity, firm growth, firm age, ownership factors, corporate governance factors, auditing factors and others (Joshua, Onuora & Orjinta, 2024; Nwankwo, Kanyangale, Anoke & Eze, 2023). Therefore, in this present study, the following

determinants factors (profitability, company size, industry type and firm leverage) were discussed as they influence waste water environmental disclosure. They are as follows:

2.1 Profitability and Waste Water Environmental Disclosure

Firm profitability is company's ability to generate new resources, from day-to-day operations, over a given period of time and is gauged by net income and cash from operations. According to Nguyen and Phan (2024), financial performance is a general measure of how well a firm generates revenues from its capital. Profitability is important in determining a company's sustainability (Ozonuwe & Orjinta, 2025; Joshua, Onuora & Orjinta, 2024; Wahyuningrum, Amal, & Sularsih, 2021). Companies with large profits have relatively stable finances, so they can publish relatively good non-financial information (Wahyuningrum, Oktavilia, Putri, Solikhah, Djajadikerta, &Tjahjaningsih, 2021). In addition, companies with high profitability have the opportunity to manage water (water sources, recycling, wastewater, etc.). Nagendrakumar, Nagalingam, et al. (2022) find that environmental policies are sensitive to profitability. Profitability gives businesses the tools and resources they need to respond to stakeholder concerns (Lu, & Abeysekera, 2014). The expectations of stakeholders are another pressure point for businesses (Gamerschlag, Moller, & Verbeeten, 2011; Kuo, Yeh, & Yu, 2012). As a result, it is anticipated that a corporation will provide more detailed water management information the more profitable it is.

2.2 Company Size and Waste Water Environmental Disclosure

Company size has been variously defined in the literature to refer to the total assets, scale of operations and number of employees among others. Ozonuwe and Orjinta (2025) opined that the concept of company size describes how large or small a company is and can be measured by its total assets or by its total capitalization. Larger companies attract public attention more easily, and a wider range of stakeholders' interests are often represented in their operations (Lahouel, Peretti & Autissier, 2014). Larger companies are also more likely to be the focus of intense government or specialized stakeholder scrutiny (e.g., hostile consumers or radical employees) (Wahyuningrum, et al 2023). Hence, in order to avoid unfavorable publicity, larger companies are typically more ready to provide information about water (Brammer, & Ravelin, 2008 cited by Wahyuningrum, et al 2023), maintain legitimacy (Kuo, Yu, & Chang, 2015), and prevent consumer boycotts of their products. Thus, the larger the scale of the company, the more likely there will be a broader disclosure of water information.

2.3 Industry Type and Waste Water Environmental Disclosure

The term "industry type" relates to a company's standards or classification in relation to its industry, business risks, workforce, and work environment (Wahyuningrum, Oktavilia, Setyadharma, Hidayah, & Lina, 2022). Industries are classified into two types based on their proximity to the environment: high-profile industries (environmentally sensitive) and low-profile industries (not environmentally sensitive) (Nuskiya, Ekanayake, Beddewela, & Gerged, 2021; Wang, Song, & Yao, 2013). Companies with high-profile status generally receive more public attention because their operations have a high potential for intersecting with broad interests, particularly the environment. As a result, more information about water will be reported by high-profile companies or companies in environmentally conscious industries than by low-profile companies (that are not environmentally sensitive). Conversely, an early study by Cowen et al. (1987) as cited by Usiomon and Iyoha (2024) and another one in India by Sahay, (2004) found no relationship between type of industry and the levels of corporate environmental disclosure.

2.4: Empirical Studies

Joshua, Onuora and Orjinta (2024) investigated the determinants of voluntary disclosure of non-financial information of selected consumer goods firms in Nigeria. The study relies on secondary data derived from various companies' financial statements to determine and measure the level of firm's compliance with voluntary disclosure, applying an all-inclusive multivariate analysis. Samples of 16 consumer goods firms quoted in Nigeria Exchange Group were used for the period of seven years spanning 2016 to 2022. The study employed ex-post facto and longitudinal research design. The secondary sources of data were collected from annual reports of the selected consumer goods companies and three (3) specific objectives were formulated and its hypothesis were subjected to some preliminary and the formulated hypotheses were tested and analyzed using panel regression analysis. The empirical analysis using a total of 112 company-firm year observations showed that firm age and managerial ownership have a positive and significant effect on voluntary disclosure of non-financial information of quoted consumer goods firms in Nigeria which were statistically significant at 1% level of significance while firm liquidity documented a negative but significant effect on voluntary disclosure of non-financial information of quoted consumer goods firms in Nigeria which was also statistically significant at 1% level of significance.

Usiomon and Iyoha (2024) explores the factors of environmental disclosure across oil and gas corporations operating in Nigeria over a ten-year period (2012-2021). The study emphasizes the need for firms to disclose their environmental performance, particularly in the downstream oil sector, and examines the determinants that shape corporate disclosure, including leverage, firm size, and profitability, taking a holistic approach to examine their collective impact on environmental disclosure. The ex-post facto research design was employed, making use of panel data that includes ten years' worth of financial records for oil businesses that are quoted on the Nigeria Exchange Group. The findings revealed that environmental disclosure and business size are positively correlated, while profitability has no statistically significant impact. Also, interestingly, and contrary to early assumptions, the study finds that leverage positively improves corporate environmental disclosure, although at a 10% significance level.

Wahyuningrum et al (2023) investigates the extent of water information disclosed by manufacturing companies listed on the Indonesian Stock Exchange. The study also investigates the determinants that affect the disclosure of water information. Water information disclosure is analyzed using content analysis based on the Global Reporting Initiative (GRI)-G4, the CDP's 2020 Water Safety Questionnaires, and indicators used in previous research. This study uses data from the annual reports and sustainability reports of manufacturing companies listed on the Indonesia Stock Exchange from 2017 to 2020. The determinants tested in this study include the existence of a CSR committee, board independence, government ownership, profitability, company size, and industry type. These findings indicate that companies with CSR committees disclose less water information. Meanwhile, share ownership by the government has a significantly positive effect on water information disclosure.

Samuel, Nirosha, and Yimei (2022) examine the association between environmental disclosure and waste performance. This study is based on a sample of S&P 500 firms over a nine-year period from 2010 to 2018. The findings show a significant positive relationship between waste performance and environmental disclosure, suggesting that firms with superior waste performance tend to disclose more environmental information. Further, the authors distinguish between “hard” and “soft” environmental disclosures and find that the effect of waste performance is consistently positive and significant for each type. The observed positive and significant association of waste performance with environmental disclosure remains unchanged, regardless of the industry affiliation of firms, although firms from industries that are less environmentally sensitive provide a slightly higher level of environmental disclosure. The findings are useful for corporations and stakeholders and have important implications around the globe as the authors continue to grapple with the ongoing issue of waste.

The above scholars attempted to study effect of firm attributes on environmental disclosure but none of them created a study in Nigeria using brewery firms. The scholars also used liquidity, firm size, firm performance, firm age and others to proxy firm attributes but this study used company size and industry type in addition to the previously used ones by prior studies and extended the study for a long period of time (15years) spanning from 2010 to 2024. Moreover, there is no indigenous study that has used industry type to measure firm attributes and none has used waste water disclosure to capture environmental disclosure. This is the knowledge gap this study intends to address therefore contributing to the existing literature. Given the mixed results reported by the related literature reviewed on the association between firm specific attributes and waste water environmental disclosure in various contexts and the study objectives, the study suggests the following hypothetical framework.

Figure 2.1: Framework Figure

Source: Researchers’ Theoretical Constructs (2025)

3 METHODOLOGY

In other to accomplish the aim of this paper, the study predominantly adopted ex-post facto research design and embraces the panel least regression so as to properly find out about the attributes of firm as well as waste water

environmental disclosure in Nigeria for the period of 15-years (2010-2024), as it connects to the various Brewery firms that are found to be quoted and actively traded on the Nigeria Exchange Group as at December 31st, 2024 which gave rise to our population of the study. The secondary data are obtained from the corporate annual report of the sampled brewery firms on the Nigeria Exchange Limited for the period 2010-2024 financial year. The researcher utilizes only corporate annual reports because they are readily available and accessible. The sample of this study is basically made up of 4 active Brewery firms. The proposed analytical framework in figure 1 above shows the schematic diagram of the causal relations with that of the dependent variable that is represented by waste water environmental disclosure and explanatory variables (firm specific attributes) which consists of profitability, company size, industry type and leverage. We anchored this study on Stakeholders theory. Also, the schematic framework culminates into the required model specifications. The model adopted in this study assumed a linear relationship between firm specific attributes and waste water environmental disclosure and panel least square was adopted for the purpose of hypothesis testing and was guided by the following linear model:

$WAWED_{it} = \beta 0 + \beta 1 PROF_{it} + \beta 2 COMSZE_{it} + \beta 3 INDTP_{it} + \beta 4 LEVG_{it} + \varepsilon_{it}$.....1

Where:

WAWED stands for Waste water environmental disclosure which was measured as a dummy variable where '1 ' is assigned to companies with full or some sections in annual reports table of contents with qualitative non-financial information disclosed about their waste water effluents and '0' otherwise. This is in line with Global Reporting Initiative (GRI)-G4. PROF equals Profitability Measured as profit after tax. (PAT) divided by total assets in a year. COMSZE stands for Company Size which was measured as log of total assets, (fixed asset + current asset). INDTP connotes Industry Type measured as a dummy variable where '1 ' is assigned to companies that were classified as high-profile companies and '0 ' otherwise. LEVG equals Firm Leverage measured using long-term debt ratio. That is leverage is measured by total liability divided by total assets in a year.

4. ESTIMATION RESULTS AND DISCUSSION OF FINDINGS

The study investigated the empirical effect that exists between firm attributes and waste water environmental disclosure of quoted Brewery firms in Nigeria for a period of 15 years spanning 2010 to 2024. The study carried out some preliminary data tests like descriptive statistics, correlations and variance inflation factor (VIF) analysis. The table below shows the descriptive statistics of the 4 selected brewery firms that make up our sample.

Table 4.1 Descriptive Statistics Analysis

	WAWED	PROF	COMSZE	INDTP	FLEVG
Mean	0.883333	0.695667	7.629167	0.500000	0.318000
Median	1.000000	0.720000	7.820000	0.500000	0.280000
Maximum	1.000000	0.980000	8.680000	1.000000	0.870000
Minimum	0.000000	0.050000	6.010000	0.000000	0.090000
Std. Dev.	0.323732	0.196472	0.737527	0.504219	0.187822
Skewness	-2.388201	-1.236901	-0.595018	0.000000	1.371531
Kurtosis	6.703504	4.821489	2.235283	1.000000	4.599467
Jarque-Bera	91.32490	23.59380	5.002448	10.00000	25.20671
Probability	0.000000	0.000008	0.081985	0.006738	0.000003
Observations	60	60	60	60	60

Source: researcher's summary of descriptive result (2025)

The descriptive statistics result in table 4.2.1 above shows the mean values for each of the variables, their maximum values, minimum values, standard deviation and Jarque-Bera values which show the normality of the data. The result provides some insight into the nature of the selected listed breweries company in Nigeria that was used in the study. Waste water environmental disclosure which was the dependent variable was measured as a dummy variable where '1' is assigned to companies with full sections in annual reports table of contents with qualitative non-financial information disclosed about their waste water effluents and '0' otherwise. It was observed that over the period under review, the sampled companies have average positive disclosure of waste water effluents to the tune of 88.3% voluntarily. While the minimum and maximum values disclosure of waste water effluents which are dichotomous values are 0 and 1 respectively. The findings showed that the average disclosure of waste water

effluents for the 15 years' period is 88.3% which is consistent with disclosure index by Omar et al. (2011) in conformity with the voluntary disclosure practices.

Profitability which was measured using profit after tax has a mean value of 0.695. This shows the performance level of the brewery firms in Nigeria. On this note, It was observed that over the period under review, the sampled firms have average positive financial performance of 0.695. Within the period under review, the firms have maximum profit of 0.980 while the minimum value of profit after tax was 0.050. Hence, it can be argued that Nigeria brewery firms had been efficient enough to generate a higher rate of return out of their assets. The variable COMSZE (calculated using the log of total assets) in the table had a mean value of ₦7,629,167,000 billion. This suggests that, throughout the course of the 15-year research period, the average size of the studied brewery enterprises was around ₦7.629 billion. The largest brewery business in the sample, Champion breweries, had a total asset of up to ₦8.68 billion as of year-end 2017, according to the lowest and maximum estimates, while the smallest company in the log had a total asset of around ₦6.01 billion at the beginning of the research in year 2023 by Guinness Breweries

Industry type was measured as a dummy variable where '1 ' is assigned to brewery firms that were classified as high-profile companies and '0 ' otherwise. It is worthy to note that high profile brewery companies are those operating in highly environmentally sensitive industries. On the average about 50% of the brewery firms in this study were classified as high-profile companies that operating in highly environmentally sensitive industries. This suggests that companies in high environmentally sensitive industries disclose more waste water environmental information in annual reports than companies in low profile industries. Financial leverage, shows the proportion of debt financing used by the firm. The result shows that on the average, the firm used for the study has about 0.3180 percent of leverage financing, the maximum value of 87% (percent) and minimum value of 9 percent. This reveals that few of the firm used high level of leverage financing while most of them maintain leverage policy of less than 9 percent. The minimum and maximum values of leverage variable are 0.090 and 0.870 respectively. A close scrutiny of the results revealed that there were minimal variations on the seven variables measuring dependent variable in the period under examination. Generally, the JB Probability values of 0.0000 shows that majority of the variables are normally distributed at 1% level of significance. It is an indication that all variables are approximately normally distributed. This means that there are no variables with outlier, even if there are, they are not likely to distort the conclusion and are therefore reliable for drawing generalization.

4.2 Pearson Correlation Matrix

Pearson's correlation matrix was applied to check the degree of association between waste water environmental disclosure of quoted brewery firms in Nigeria and its firm specific attributes so as to determine the nature or degree of association i.e. positive or negative correlation and the significance of the relationship between dependent variable (waste water environmental disclosure) and independent variables. Therefore, in examining the association among the variables, we employed the Pearson correlation coefficient (correlation matrix) and the results are presented in the table 4.2.2 below.

Table 4.2: Correlation Analysis Result

	WAWED	PROF	COMSZE	INDTP	FLEVG
WAWED	1.000000				
PROF	-0.213272	1.000000			
COMSZE	0.519927	-0.143733	1.000000		
INDTP	0.363422	0.022242	0.359378	1.000000	
FLEVG	0.057423	-0.165313	0.188048	0.495748	1.000000

Source: researcher's summary of correlation result (2025)

The result of the correlation coefficient above showed mixed correlation. This association identified buttresses the point that our variables have a linear relationship with varying degrees of direction. Generally, the strength of the relationship between variables measured by the Pearson product-moment correlation showed that the association between the variables is relatively mild and strong. but everything was below the threshold of 0.80, suggesting the absence of the problem of multi-collinearity in the predictor variables. This indicates the absence of multi-collinearity problem in the model used for the analysis. This also justifies the use of the panel regression analysis and variation inflation factor (VIF).

4.3: Variance Inflation Factor (VIF)

To further check for multi-collinearity problem or to know whether the independent variables used are perfectly correlated, we conducted Variance Inflation Factor (VIF) to check for the multi-collinearity problem. The result of the Variance Inflation Factor (VIF) is provided below in table 4.2.3 below:

Table 4.3: Variance Inflation Factor Result

Variance Inflation Factors			
Date: 05/29/25 Time: 06:47			
Sample: 2010 2024			
Included observations: 60			
	Coefficient	Uncentered	Centered
Variable	Variance	VIF	VIF
C	0.149304	227.4309	NA
PROF	0.020854	16.57880	1.205756
COMSZE	0.001587	142.0153	1.293199
INDTP	0.005730	4.364112	2.182056
FLEVG	0.035108	7.263216	1.855165

Source: Researcher's summary of VIF result (2025)

As can be observed from the result of VIF in table 4.2.3 above, the mean value of the independent variables coefficient is less than 10. The variance inflation factor (VIF) values of all variables are less than 10; therefore, the effect of multi-collinearity is negligible. This implies that there was no multicollinearity problem with the variables thus all the variables were maintained in the regression model. Therefore, it can be concluded that there is no problem of multicollinearity. Hence, any recommendations made to a very large extent would represent the characteristics of the true population of study and thus can be used to draw conclusion.

4.4: Regression Results

In order to examine the relationship between the dependent variable waste water environmental disclosure (WAWED) and independent variables (PROF, COMSZE, INDTP and FLEVG) and to test the formulated hypotheses, we employed panel regression analysis since the data had both time series (2010-2024) and longitudinal properties (4 quoted brewery firms). Our analysis is presented in table 4.4 below:

Table 4.4. Panel Regression Result

Dependent Variable: WAWED				
Method: Panel Least Squares				
Date: 05/29/25 Time: 06:46				
Sample: 2010 2024				
Periods included: 15				
Cross-sections included: 4				
Total panel (balanced) observations: 60				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.110983	0.386399	-0.287224	0.7751
PROF	0.152481	0.144408	1.055907	0.2959
COMSZE	0.130164	0.039840	3.267195	0.0019
INDTP	0.209118	0.075696	2.762589	0.0079
FLEVG	-0.382260	0.187372	-2.040110	0.0464
Root MSE	0.184762	R-squared		0.668751
Mean dependent var	0.883333	Adjusted R-squared		0.624159
S.D. dependent var	0.323732	S.E. of regression		0.198466
Akaike info criterion	-0.272827	Sum squared resid		2.048225

Schwarz criterion	0.006419	Log likelihood	16.18481
Hannan-Quinn criter.	-0.163599	F-statistic	14.99735
Durbin-Watson stat	1.961964	Prob(F-statistic)	0.000000

Source: Researcher's summary of panel regression result (2025).

The table 4.3.1 above shows the panel regression analysis of quoted brewery firms in Nigeria. From the result above, the study observed that the R. squared value is 0.6687 (67%) approximately and R-squared adjusted value is 0.624 (62%) approximately. The value of R- squared which is the coefficient of determination stood at 67% which implies that 67% of the systematic variations in individual dependent variables were explained in the model while about 33% were unexplained thereby captured by the stochastic error term. This indicates that PROF, COMSZE, INDTP and FLEVG explain 67% of variation in waste water environmental disclosure practices and policies of brewery companies in Nigeria

Based on the regression result above, it was found that firm profitability has a positive but statistically insignificant effect on waste water environmental disclosure of brewery firms in Nigeria having recorded a positive coefficient value of 0.1524 and probability value of 0.2959 ($\beta4$= 0.1524, p = 0.2959). The value $\beta4$ was positive showing that firm profitability has a positive effect on waste water environmental disclosure of brewery firms in Nigeria. This suggests that, firms that perform well normally disclose both mandatory and voluntary items. This suggests that, firms that perform well normally disclose both mandatory and voluntary items.

Again, company size has positive and significant effect on disclosure of waste water environmental information having recorded a positive coefficient value of 0.13016 and t-statistics value of 3.2671 and a probability value of 0.0019 which is statistically significant at 1% level of significance. This implies that as firm size is increasing, the desire to disclose waste water environmental effluents is increasing. As firms becomes larger in size, they tend to comply with all manner of regulations to also improve their reputation thus engaging themselves in disclosure of waste water environmental information. A positive relationship between size of a corporation and the amount of waste water environmental disclosure has been consistently found by prior studies like Usiomon and Iyoha (2024); this therefore made our work to be in consistent with these prior studies.

Similarly, it was found that firm industry type has a positive and statistically significant effect on waste water environmental disclosure of brewery firms in Nigeria which was statistically significant at 1% level of significance having recorded a positive coefficient value of 0.2091 and probability value of 0.0079 ($\beta6$= 0.2091, p = 0.0079). Using the association between the levels of corporate environmental disclosure in annual reports and type of industry. Conversely, an early study by Cowen et al. (1987) as cited by Usiomon and Iyoha (2024) and another one in India by Sahay, (2004) found no relationship between type of industry and the levels of corporate environmental disclosure. Upon this backdrop of conflict assertions, we therefore conclude that industry type has positive and significant effect on waste water environmental disclosure which was statistically significant at 1% level of significance.

Result of regression analysis above revealed that leverage has negative and significant effect on waste water environmental disclosure of brewery firms in Nigeria having recorded a negative coefficient value of -0.3822 and probability value of 0.0464 ($\beta7$= -0.3822, p = 0.0464). This means that the less you utilize debt in your operation, the more you try to disclose more information voluntarily to impress the facility providers. Firm leverage is considered a probable determinant of waste water environmental disclosure because organizations with external debt are more accountable for providing more voluntary corporate information due to the reduced cost of debt (Masum et al., 2020a).

5. CONCLUSION AND RECOMMENDATIONS

In general, most of the firm specific attributes' coefficients and probability values have a substantial percentage of significant results (i.e. 50% or more) with the exception of coefficients of firm profitability that reported insignificant effect. In general, most of the coefficients seem to be widely dispersed from the standard deviation results. We therefore documented a positive effect for almost all our variables with exception of firm leverage. This is in line with our a priori expectation. In conclusion, our result show that company size and industry type have a positive and significant effect on waste water environmental of brewery firms in Nigeria which were statistically significant at 1% level of significance respectively while firm leverage documented a negative and significant effect on waste water environmental disclosure of brewery firms in Nigeria which was also statistically

significant at 5% level of significance respectively. Based on the findings and conclusion of the study, the following recommendations were made as follows:

1. Management of brewery firms are encouraged to increase their total assets as there is need to increase the size of the firms in Nigeria in order to improve waste water environmental disclosure.
2. Management of brewery firms should endeavor to make sure that their industry is classified as high profile companies operating in highly environmentally sensitive industries to boost waste water environmental disclosure.
3. Finally, usage of more debt as sources of finance should be discouraged in order to improve waste water environmental disclosure of brewery firms in Nigeria.

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