

Sustainability Reporting in IT Sector vs. Other Sectors: The Impacts on Multidimensional Performance

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ABSTRACT

This study investigates the relationship between the level of sustainability reporting and information technology (IT) sectors' performance (operational, financial, and market) and compares the results with other sectors. The findings elicited from the empirical results demonstrate that there is a significant negative relationship between ESG and IT sector market performance (TQ). The study contributes to the literature of sustainability accounting by providing records of the cross-sector's experiences. It could serve as a guide to firms that wish to adopt sustainability reporting. Moreover, as the study adopted worldwide and used macroeconomic variables, it contributes to the literature of the economic implications of sustainability reporting.

KEYWORDS

ESG, Firm's Performance, IT Sector, Sectorial Analysis, Sustainability Reporting

1. INTRODUCTION

The number of sustainability reports published by firms around the world is growing (Buallay, 2020). This pace of growth increased markedly when research started to show that sustainability reporting is linked to improved business performance (Alhawaj et al., 2023). However, other scholars have identified a negative relationship (Duque-Grisales & Aguilera-Caracue, 2019; Landi & Sciarelli, 2019) or an insignificant relationship (Atan et al., 2018) between the two.

Despite this, many researchers claim that results of this research are ambiguous, inconclusive, or contradictory (Brooks & Oikonomou, 2018). It has been noticed that there is a lack in cross-sector studies in sustainability reporting (Buallay & Hamdan (2023). Qiu et al. (2016) suggests that sustainability reporting across industries matters to shareholders, as sustainability reporting may help the firms generate profit. Margolis et al. (2009) raise the problem of aggregation as a potential source of heterogeneity in empirical findings, the results should be analysed by sector, as sectors differ greatly in purpose and size, which gives results ranging from local to international levels, short-term to long-term, and voluntary to fully mandated. Barnett (2007) and Soana (2011) claim that the numbers of Sectorial studies of ESG disclosure and firm performance is lacking and that ESG

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characteristics vary across industries, thus making generalization from the results difficult when the study is run over several industries at once.

Cross-sector research used to address social issues provides multidisciplinary and different conceptual frameworks (Selsky & Parker, 2005). As this paper addresses sustainability reporting, which covers multidisciplinary issues (environmental, social and governance). Multidisciplinary literature may assist management, researchers and regulators in addressing the issue of sustainability reporting. Sectors differ greatly in purpose and size, which gives results ranging from local to international scope, short term to long term, and voluntary to fully mandated. This review explains that when researchers from different sectors focus on the same issue (i.e., sustainability reporting), they are likely to think about it differently (Buallay, 2022).

The e-waste production of the IT sector is estimated at between 20 and 50 million tons every year. Schwarxer et al. (2005) stated that e-waste increased 3–5% per year. Firms in this sector face many sustainability challenges. These include environmental challenges (for example, e-waste disposal may pollute groundwater or the environment), social challenges (for example, electronic equipment can be redistributed to social communities), governance challenges (for example, companies have legal responsibility to recycle electronics that are returned to them at the end of their life cycle; Nnorom & Oshibanjo, 2008) and economic challenges (for example, the use of email bills saves costs; Rainie & Horrigan, 2005). These sustainability issues need to be addressed with stakeholders. Sustainability reporting may help IT firms to communicate with their stakeholders about economic, environmental and social issues which enable those firms to be sustainable in the long term (Pojasek, 2007). The ICT industry plays a major role in economic growth and productivity, ICT technologies could contribute to energy efficiency solutions (Buallay & Al Marri, 2022). Some studies have also highlighted the possible services of the ICT industry to millennium developmental goals through disclosing sustainability related information (Kuhundt et al., 2006; Hilty et al., 2011). Stakeholders are increasingly seeking this information at different levels from the ICT sector, in particular on the sustainability impacts of products and services provided.

sustainability reporting is crucial for firms in this sector to retain their stakeholders, which indeed affects the performance of these firms (Buallay et al., 2022). Hence, there is a need to investigate the relationship between sustainability reporting and firm performance in this sector and compares the results with other sectors separately. Stakeholders are increasingly seeking this information at different levels from the ICT sector, in particular on the sustainability impacts of products and services provided. Therefore, sustainability disclosure is crucial for firms in this sector to retain their stakeholders, which indeed affects the performance of these firms. Hence, there is a need to investigate the relationship between sustainability disclosure and firm performance in this sector. To address this issue this study presents a valuable analytical framework for exploring sustainability disclosure as a driver of performance in Telecommunication and Information Technology sectors' economies. In addition, this study compares ICT sectors' management lacunae manifesting in terms of the weak nexus between ESG and IT sectors' performance.

This study contributes to literature in many ways. Firstly, the study contributes to the accounting literature considering a cross-sector analysis worldwide, which is found to be scarce. Moreover, the study provides evidence to show that macroeconomic variables, which are overlooked in the literature, influence the ESG accounting practices of firms worldwide. This result broadens the understanding of why firms and organisations adopt ESG reporting. Moreover, by providing records of the cross-sector's experiences, it could serve as a guide to firms that wish to adopt sustainability reporting. Finally, As the study contributes to the literature on the economic implications of sustainability reporting, its results can be used assess activities for potential risks and opportunities to achieve sustainability. It offers evidence that macroeconomic performance, which the literature has overlooked, influence the ESG practices. This result broadens the understanding of why and where firms and organizations adopt ESG. Importantly, the findings should be of interest to regulators and policymakers, who have mandated or are considering mandating sustainability reporting.

The remainder of this paper is organized as follows. Section 2 reviews the literature and examines prior studies to develop the hypotheses. Section 3 assesses the theoretical framework and section 4 describes the materials and methods used in the study. Section 5 provides the empirical results, Section 6 discusses the findings and Section 7 presents the conclusion, limitations, and future research.

2. LITERATURE REVIEW AND DEVELOPING HYPOTHESES

2.1 The Relationship Between Sustainability Reporting and Firm Performance

There are numerous studies investigating this relationship. In 1972, the first two research studies were published by (Moskowitz, 1972). Since then, thousands of empirical studies have investigated the relationship between a firm's sustainability reporting and its financial performance. However, these studies have generated mixed results.

Some found a positive relationship between sustainability reporting and financial performance. Carter et al. (2000) and Jo and Harjoto (2011) stated that disclosing information about environmental practices improved financial performance. AlAjmi et al. (2023.) also found that disclosing social information about the firm enhanced its financial performance. Gompers et al. (2003; 2010) found that corporate governance disclosure improved financial performance.

Many explanations for a positive relationship between sustainability reporting and firm performance can be found in the literature, for instance; Castaldo et al. (2009) state that sustainability reporting can be viewed as an investment that brings financial benefits. Other studies have also indicated that sustainability reporting positively impacts organizations in different ways, Lee et al., (2013) have linked it to increasing the competitive advantage for firms, whereas Waddock and Graves (1997) have highlighted that minimal costs of sustainability reporting resulted in greater benefits to firms. The literature available also highlights the funds required for sustainability reporting as firms with higher profits have more resources to fund sustainability reporting (Preston and O'Bannon 1997). By contrast, firms with lower profit have fewer resources to fund sustainability reporting (Campbell, 2007).

However, other studies have found a negative relationship between sustainability reporting and financial performance (e.g., 1988; Sarkis and Cordeiro, 2001).

Various other studies provide explanations for a negative relationship between sustainability reporting and firm performance, for example expenditures on sustainability reporting are unnecessary and put the firm at a competitive disadvantage. It may also have a negative impact on intangible assets, such as stakeholder satisfaction and employee loyalty, which are not reflected in terms of accounting-based performance (Lee et al., 2013).

As seen above, mixed results can be found in the literature about the relationship between sustainability reporting and firm performance. To explore these findings in more detail, firm performance was split into three main performance measures: operational performance, financial performance and market performance (Buallay et al., 2021). The next sections discuss the relationship between sustainability reporting and these different performance measures.

2.2 The Relationship Between Sustainability Reporting and Different Performance Measures

When measuring firm performance, scholars usually face three options: use accounting-based measures, market-based measures or a combination of both. Many scholars have preferred to use accounting-based measures of performance, which are a firm's return on assets (ROA) and return on equity (ROE). Other scholars, however, have selected market-based measures (i.e., Tobin's Q) (Wagner, 2010).

Accounting-based measures are less complex, since they reflect what actually happens in a firm (López et al., 2007), and they are better at forecasting sustainability performance (McGuire et al.,

1988). Market-based measures suffer from information asymmetry between managers and shareholders (Cordeiro and Sarkis, 1997) and assume that shareholders are the main stakeholder group (Orlitzky et al., 2003). Given the criticisms of accounting-based measures, some studies have used a combination of accounting- and market-based measures (e.g., Callan and Thomas, 2009). Thus, to overcome the criticism of both measures in this study, accounting-based and market-based measures are used.

Many empirical studies have tried to investigate the relationship between ESG (environmental, social and governance factors) disclosure and operational performance using ROA (Nishitani and Kokubu, 2012; Jayachandran et al., 2013). Some of them found that ESG was positively associated with ROA (Fatemi et al., 2015; Malik et al., 2015). However, other studies found a negative relationship between ESG and operational performance (i.e., Lyon et al., 2013). A number of studies have found a non-significant association between ESG and ROA (Renneboog et al., 2008).

The question of the relationship between sustainability reporting and firm financial performance has been the subject of contentious debate (Fatemi et al., 2017). According to neoclassical theory, early studies that investigated the relationship between ESG and financial performance found an inverse relationship (e.g., Vance, 1975; Wright & Ferris, 1997). Kim and Lyon (2014) observed that the negative relationship between ESG and financial performance continued to exist (Fisher-Vanden & Thorburn, 2011; Jacobs et al., 2010; Lyon et al., 2013). Such evidence suggests that shareholders perceive that disclosure of ESG is a costly investment. On the other hand, recent studies have found that ESG is positively associated with financial performance (Fatemi et al., 2015; Malik, 2015). This positive relationship is supported by the stakeholder theory (Freeman, 1999), which argues that disclosing sustainability related information better satisfies the needs of other stakeholders (e.g., debtors, employees, customers and regulators). A number of studies have found a non-significant association between ESG and financial performance (e.g. Horváthová, 2010).

The stock price or market value of a firm is seen as the most objective way of rating a firm. When we move to firm valuation, we find studies that have linked ESG with differences in valuation (as measured by Tobin's Q). For example, Buallay (2019) found that ESG disclosure has a positive impact on market performance, although Marsat and Williams (2011) documented a negative impact of ESG on market performance. The finding of a negative relationship between sustainability reporting and market value was later supported by Baboukardos and Rimmel (2016).

As detailed above, studies of the relationship between sustainability reporting and firm performance (operational, financial and market) have returned mixed results. Similarly, the most recent studies in this topic have shown positive, negative and neutral results (Table 1, Table 2 and Table 3).

Table 1. Recent studies of the relationship between sustainability reporting and operational performance

Author(s)	Country(s)	Year(s)	Performance	Main Result
Duque-Grisales & Aguilera-Caracue (2019)	Brazil, Chile, Colombia, Mexico and Peru	2011–2015	Operational (ROA)	The results suggest that the relationship between the ESG score and ROA is statistically significantly negative.
Deng & Cheng (2019)	China	2011–2019	Operational (ROA)	There is a positive correlation between an enterprise's ESG indices and its performance.
Aouadi & Marsat (2018)	worldwide	2002–2011	Operational (ROA)	The interaction term between ESG and ROA is positive and highly significant.
Zhao et al. (2018)	China	2008–2012	Operational (ROA)	The results show that good ESG can indeed improve operational performance.
Velte (2017)	Germany	2010–2014	Operational (ROA)	ESG has a positive impact on ROA.
Lins et al. (2017)	US	2007–2013	Operational (ROA)	Some excess operating performance for high-ESG firms is observed.

Table 2. Recent studies of the relationship between sustainability reporting and financial performance

Author(s)	Country(s)	Year(s)	Performance	Main Result
Aouadi & Marsat (2018)	Worldwide	2002–2011	Financial (ROE)	The interaction term between ESG and ROE is positive and highly significant.
Zhao et al. (2018)	China	2008–2012	Financial (ROE)	The results show that good ESG can indeed improve financial performance.
Atan et al. (2018)	Malaysia	2010–2013	Financial (ROE)	ESG is statistically insignificant in influencing the ROE.

Table 3. Recent studies of the relationship between sustainability reporting and market performance

Author(s)	Country(s)	Year(s)	Performance	Main Result
Garcia et al. (2019)	Brazil, Russia, India, China and South Africa	2010–2012	Market (Tobin's Q)	Market capitalization is the main predictor of ESG performance.
Nekhili et al. (2019)	France	2007–2017	Market (TQ)	Investors react positively to ESG performance.
Balasubramanian (2019)	India	2014–2018	Market (TQ)	The study found that ESG score did have an effect on the firm's performance.
Landi & Sciarelli (2019)	Italy	2007–2015	Market (TQ)	The authors found a negative statistically significant impact in terms of market performance.
Miralles-Quirós et al. (2019)	31 countries	2010–2015	Market (TQ)	There exists a positive and significant relationship of banks' environmental and corporate governance performance with Tobin's Q. On the other hand, there exists a negative and significant correlation of banks' social performance with Tobin's Q.
Aouadi & Marsat (2018)	worldwide	2002–2011	Market (TQ)	ESG is associated with greater firm value.
Atan et al. (2018)	Malaysia	2010–2013	Market (TQ)	ESG is statistically insignificant in influencing the Tobin's Q.
Fatemi et al. (2017)	US	2006–2011	Market (TQ)	The results indicate that ESG strengths significantly increase firm value (Tobin's Q).
Velte (2017)	Germany	2010–2014	Market (TQ)	ESG has no impact on Tobin's Q.

3. THEORETICAL FRAMEWORK

Recently, a new trend in accounting studies uses integrated theories to address the sustainability reporting topic (Lokuwaduge & Heenetigala, 2017). Researchers recognized a clear link between Agency theory and stakeholder theory (Soobaroyen & Mahadeo, 2016). Both theories look at the firm from a firm's social viewpoint.

First, *agency theory* describes the relationship between a principal (shareholders) and the agent (management) (Holmstrom, 1979; Holmstrom & Milgrom, 1987; Jensen and Meckling, 1976). This theory states that managers are agents to maximize shareholder wealth (Quinn and Jones, 1995, p. 22). It suggests that principal-agent problems can appear from nonalignment of interests between principals and agents (Jensen and Meckling, 1976). Managers focused on the need for maximizing profit own stock in the firm and/or receive compensation in reward for strong financial performance. The shareholders/principals, however, are focused on reducing risk and costs while increasing financial returns. Therefore, agency theory puts forward the concept that managers are

agents for shareholders, and maximizing the profitability of the firm is motivating the shareholders to reward the management.

Watts and Zimmerman (1990) assume that agency costs include transactions, and information costs exist. These costs are incurred due to sustainability reportings, as this disclosure is used as a tool to communicate with stakeholders, thus reducing the information asymmetry between shareholders and management. Thus, agency theory outlines that sustainability reporting reduces agency costs and decreases the problem of information asymmetries, as many of these risks are disclosed in sustainability reports. Therefore, reducing agency costs might increase financial performance.

Second, *stakeholder theory* expounds on why firms worldwide disclose their sustainability activity (Hörisch et al., 2014). Freeman (2010) defined a stakeholder as “any group or individual who can affect or is affected by the achievement of an organization’s objectives” (Freeman 1984: 46). In defining stakeholder, Freeman (2010) considers both internal and external parties that affect and are affected by the firm (Sarkis et al., 2010). External parties often create pressures on firms to lower negative impacts and improve positive ones (Sarkis et al., 2010). According to Keynes (1936), stakeholders are categorized into three major groups:

- External stakeholders: governments, suppliers, competitors and customers.
- Internal stakeholders: boards of directors, employees, subsidiaries and parent company.
- Shareholders: all individuals or firms who are investing in shares and other securities of the firm.

Freeman (1994) poses two essential questions to understand the core of stakeholder theory: 1) What is the main aim of the firm? and 2) What is the management responsibility to stakeholders? The first question addresses the value firms creates. The second question relate to management’s communication with stakeholders.

Stakeholder theory basically depends on the assumption that firms need to manage their relationship with their stakeholders in order to survive. Deegan and Blomquist (2006, p. 349) clarify that according to stakeholder theory, reporting on specific types of information can be used to attract or maintain particular groups of stakeholders. For example, if a powerful individual or group is interested in a firm’s social or environmental activities, then disclosing information about social or environmental performance is essential to attract or maintain them.

In fact, firms face challenges in meeting the expectations of various stakeholders. More attention is paid to investors (Verbeeten et al., 2016), as they are the main contributors to the firm’s survival. In the context of sustainability, the issue is to consider the needs of all stakeholders (shareholders, investors, employees, community and so on) while reporting on sustainability. This is supported by the normative section of stakeholder theory. A normative theory states that firms not only increase stockholders’ financial returns but also must give equal consideration to the needs of other stakeholders to gain the optimal balance among them (Hasnas, 1998, p. 32). In fact, any firm has explicit costs and implicit costs. The firm that attempts to decrease its implicit costs by being socially irresponsible will certainly incur additional explicit costs.

Therefore, managers should satisfy the needs of all stakeholders, not just investors or shareholders (Melé, 2008). Thus, sustainability reporting will satisfy stakeholders’ needs. For example, if employees are satisfied, they will work more effectively; satisfied customers will purchase more, and satisfied suppliers will provide discounts.

However, linking the two theories above still leaves a gap when a firm’s behaviour does not match the country’s expectation. At a macro level, legitimacy is defined in this way: “the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions” (Suchman, 1995, p. 574). Thus, values and standards may have different characteristics depending on cultural and environmental issues in the setting in which they are applied. Even societal perceptions and stakeholder pressure may be determined by those issues and changed over time, affecting the choice of a specific sustainability reporting model (Belal & Owen, 2015).

To close this gap, O'Donovan (2002) suggests that firms have to evaluate and align their social values with those of the country in which they operate. This is the main linking point between these two theories and political-economy theory. Firms need to legitimate their role within society. This is a broad concept that includes a set of agents with different expectations, values and requirements. When fulfilling their legitimation needs, firms should, at the same time, fulfil stakeholder needs. Hence, in this paper the integration of Agency theory and stakeholder theory within a specific political-economy setting. So, to integrate political-economy theory; in the following section (the study model) two variables were added to control the different institutional contexts/ within different countries and region (the public governance to represent the political context and the GDP to represent the economic context.

In this study we used both the stakeholder and agency theories in order to build our hypothesis. Therefore, the hypotheses are constructed as follows:

- H₁: Sustainability reporting affects the IT sectors' performance.
- H₂: Sustainability reporting affects the IT sectors' financial performance.
- H₃: Sustainability reporting affects the IT sectors' market performance.

4. METHODOLOGY

4.1 Study Model

In the model of our study, firm performance is the dependent variable. Firm performance consists of three dimensions: financial, operational and market performance. In addition, some factors were considered to be control variables to control the model (Buallay,2019; Buallay,2020; Buallay et al.,2020).

To determine the relationship between sustainability reporting and firm performance, we estimate the equations below.

The model is constructed to investigate the effects of sustainability reporting on firm performance as follows:

$$Perf_{itg} = \beta_0 + \beta_1 ESG_{itg-1} + \beta_2 TA_{itg} + \beta_3 FL_{itg} + \beta_4 GDP_{itg} + \beta_5 GOV_{itg} + \varepsilon_{itg}$$

This equation is divided further into three sub-equations based on the performance as follows:

$$ROA_{itg} = \beta_0 + \beta_1 ESG_{itg-1} + \beta_2 TA_{itg} + \beta_3 FL_{itg} + \beta_4 GDP_{itg} + \beta_5 GOV_{itg} + \varepsilon_{itg}$$

$$ROE_{itg} = \beta_0 + \beta_1 ESG_{itg-1} + \beta_2 TA_{itg} + \beta_3 FL_{itg} + \beta_4 GDP_{itg} + \beta_5 GOV_{itg} + \varepsilon_{itg}$$

$$TQ_{itg} = \beta_0 + \beta_1 ESG_{itg-1} + \beta_2 TA_{itg} + \beta_3 FL_{itg} + \beta_4 GDP_{itg} + \beta_5 GOV_{itg} + \varepsilon_{itg}$$

Where: Perf is a continuous variable; the dependent variable is the performance measured by three models (i.e. ROA model, ROE model and Tobin's Q model). β_0 is the constant and β_1 -5 the slope of the controls and independent variables. The independent variable is sustainability reporting (ESG) measured by the three indicators E, S and G. The firm's control variables are TA and FL, and the country's control variables are GDP and GOV. (ε) is a random error, (i) stands for firms, (t) stands for the period, (g) represents the country, and (-1) represents the 1-year lagged variables of ESG (Table 4).

Prior literature states that ESG will not immediately lead to better financial performance (Choi & Wang, 2009). Porter and Kramer (2006) stated that sustainability reporting is a strategic concept,

thus effects do not occur immediately (i.e., in the same year) but rather in the following period. Thus, we compare the ESG scores of the year $t - 1$ with the current performance.

4.2 Sample Selection

This researcher used secondary data, ESG data were retrieved from the Bloomberg database as a proxy for disclosure.

The data used in this study were collected from the Bloomberg database and included specific firms according to the following conditions:

- 1) Disclosed at least ESG information for 5 years.
- 2) Data available between (2008 to 2017).

As listed in Table 2, 3000 firms located in 80 countries around the world have met the criteria. Therefore, the sample of this study ends up with 23,738 observations.

The sample contains diverse listed firms from 80 countries. As listed in Table 5, most of the samples come from China (4,531 observations, or 19% of the sample). Past research has shown that CSR practices, and reporting on those practices, are implemented in China because of institutional pressures and peer effects, in which competitors mimic what other firms are doing (Ioannou & Serafeim, 2017; Misani, 2010). The second largest sample comes from the US, with 2,505 observations,

Table 4. Variable measurement

VARIABLES	LABELS	MEASUREMENTS
DEPENDENT VARIABLES		
Operational Performance	ROA	Net income divided by total assets
Financial Performance	ROE	Net income divided by shareholder equity
Market Performance	TQ	(Market value of equity + total liabilities + preferred equity + minority interest) ÷ book value of assets
INDEPENDENT VARIABLES		
ESG Disclosure	ESG	Bloomberg index which combines E, S and G
Environmental Disclosure	E	Bloomberg index which measures the disclosure of the bank's energy use, waste, pollution, natural resource conservation and animal treatment
Corporate Social Responsibility Disclosure	S	Bloomberg index which measures the disclosure of the bank's business relationships, bank donations, volunteer work, employees' health and safety
Corporate Governance Disclosure	G	Bloomberg index which measures the disclosure of corporate governance code
CONTROL VARIABLES:		
FIRM-SPECIFIC CONTROL VARIABLES		
Financial Leverage	FL	Ratio of non-equity funds to total assets
Total Assets	TA	Logarithm of annual total assets of the firm
MACROECONOMIC CONTROL VARIABLES		
Gross Domestic Product	GDP	Logarithm of annual GDP of the country
Governance	GOV	Worldwide Governance Indicators (WGI) of the country which measures six indicators (control of corruption, governmental effectiveness, political stability and absence of violation, rule of law, regulatory quality, and voice and accountability)

Table 5. Sample selection

COUNTRY NAME	NO. FIRMS	NO. OBSERVATIONS	COUNTRY NAME	NO. FIRMS	NO. OBSERVATIONS
Argentina	6	46	Macau	3	25
Australia	121	949	Malawi	1	9
Austria	15	112	Malaysia	31	237
Bahrain	2	20	Malta	1	6
Bangladesh	2	12	Mauritius	5	26
Belgium	17	154	Mexico	31	242
Bermuda	2	18	Morocco	1	6
Botswana	1	7	Namibia	1	6
Brazil	76	623	Netherlands	27	210
Canada	77	662	New Zealand	6	46
Chile	14	107	Nigeria	8	56
China	561	4,531	Norway	23	160
Colombia	16	104	Oman	4	16
Croatia	4	26	Pakistan	8	56
Czech Republic	2	17	Peru	4	34
Denmark	22	194	Philippines	13	99
Estonia	2	16	Poland	7	48
Finland	36	275	Portugal	9	87
France	90	768	Qatar	3	24
Georgia	1	4	Russia	23	188
Germany	78	613	Saudi Arabia	2	12
Gibraltar	1	9	Singapore	24	181
Greece	11	92	Slovakia	1	7
Guernsey	1	3	Slovenia	3	28
Hong Kong	72	544	South Africa	56	434
Hungary	2	17	South Korea	125	825
India	126	962	Spain	37	299
Indonesia	20	146	Sri Lanka	10	53
Ireland	12	92	Sweden	69	504
Isle of Man	1	8	Switzerland	44	363
Israel	6	35	Taiwan	154	1,092
Italy	39	310	Thailand	28	204
Japan	276	2,305	Togo	1	10
Jersey	2	19	Turkey	17	133
Jordan	1	7	Ukraine	1	4
Kenya	1	6	United Arab Emirates	6	43
Kuwait	2	13	United Kingdom	197	1566
Lebanon	1	8	United States	289	2,505
Lithuania	1	9	Vietnam	4	24
Luxembourg	2	18	Zambia	1	9
Total Countries					80
Total Firms					3,000

or 11% of the sample. In third place, Japan has 2,305 observations, which constitute 9% of the sample. The remaining 14,397 observations, which represent 60% of the samples, come from 77 different countries.

However, when sample is categorized into sectors. As shown in Table 6, the manufacturing sector has the greatest number of observations among the sectors, with 7,248 observations, or 30.5% of the sample. The logistics process in the manufacturing sector is excessively complex (Fletcher and Grose, 2012). It consists of thousands of suppliers, distributors, and retailers, which pushes manufacturers to report more data on sustainability to meet the needs of all stakeholders (Buallay, 2022).

Before moving to the findings, as quantitative data already chosen, the next step is to determine the research techniques and procedures. Reliability and validity are considered important aspects of a research study.

We adopt three kinds of diagnostic tests to assess the validity and reliability.

- Data diagnostics: normality (skewness, kurtosis and Jarque–Bera tests).
- Variables diagnostics: stationarity (augmented Dickey–Fuller test) and collinearity (variance inflation factor test).
- Models diagnostics: autocorrelation (Durbin–Watson) and heteroscedasticity (Breusch–Pagan and koenker tests).

4.3.1 Data Diagnostics

As presented in Table 7, to test the normality of the data, the skewness and kurtosis tests were used. The results show that not all the values for skewness and kurtosis were between -2 and +2, which are considered unacceptable proof of normal univariate distribution (George, 2011).

The normality of data was tested using the Jarque–Bera test. Variables are not normally distributed, as the p-value appears to be less than 0.050.

All test results indicate that data are not normally distributed; the abnormally distributed data may not influence the credibility of the study because the sample was large and it was assumed that the data was not distributed normally. However, to overcome this problem, the natural logarithms of these variables were considered.

Table 6. Sample selection (by sector)

SECTORS	NO. FIRMS	NO. OBSERVATIONS	PERCENTAGE
Primary:	591	4,736	19.9
Agriculture & Food Industries Sector	189	1,426	6
Energy Sector	402	3,310	13.9
Secondary:	932	7,248	30.5
Manufacturing Sector	932	7,248	30.5
Tertiary:	1,477	11,754	49.5
Banks & Financial Services Sector	530	4,457	18.8
Retail Sector	533	4,078	17.2
Telecommunication & Information Technology Sector	238	1,844	7.8
Tourism Sector	176	1,375	5.8
TOTAL	3,000	23,738	100%

Table 7. Normality tests

VARIABLES	LABELS	NORMALITY TESTS			
		Skewness	Kurtosis	Jarque–Bera	Probability
<i>DEPENDENT VARIABLES</i>	ROA	-0.388	17.858	150,116	0.000
	ROE	18.313	865.593	506,000,000	0.000
	TQ	90.538	8,267.742	46,300,000,000	0.000
<i>INDEPENDENT VARIABLES</i>	E	0.657	2.411	1,405	0.000
	S	0.535	2.878	786	0.000
	G	0.057	3.640	287	0.000
<i>FIRM-SPECIFIC CONTROL VARIABLES</i>	FL	27.676	1,300.553	1,140,000,000	0.000
	TA	2.998	14.875	166,593.4	0.000
<i>COUNTRY-SPECIFIC CONTROL VARIABLES</i>	GDP	0.419	3.247	719.469	0.000
	GOV	-0.433	1.456	2,125	0.000

4.3.2 Variables Diagnostics

The strength of the linear model depends on the hypothesis that independent variables are not correlated. Extreme multicollinearity tends to inflate the standard errors of the estimated coefficients. To test the collinearity of the independent variables, we calculated the variance inflation factor (VIF). Gujarati and Porter (2003) stated that a VIF higher than 10 indicates serious multicollinearity problem for the independent variable of concern. Table 8 shows that the VIF values for all independent variables are less than 10, meaning that the variables are not suffering from a serious collinearity problem.

However, empirical research using time series, as in this study, presupposes the stability of the series. Autocorrelation can occur in the model because the time series on which this study is based is non-stationary (Gujarati and Porter, 2003). To check the stationarity of time series, unit root tests, which include the parametric augmented Dicky–Fuller (ADF) test, were used. The results, presented in Table 8, show that the ADF test is statistically significant at the 1% level, meaning that the data series is stationary. This stationarity allows us to proceed with the regression. However, since the effect of ESG on financial performance does not occur immediately (in the same period), the lag ESG is included in the regression.

4.3.3 Models Diagnostics

A significant assumption of the regression is the presence of heteroscedasticity. We tested heteroscedasticity using the Breusch–Pagan and Koenker tests. As Table 9 shows, the p-values of the Breusch–Pagan tests for the three performance measures were lower than the conventional level of significance of 5% (0.000), so we rejected the null hypothesis that the models have a heteroscedasticity problem. However, the Koenker test for the ROE model was greater than the 5% level of significance in both models (0.491 and 0.399), so we accepted the null hypothesis that the models have a heteroscedasticity problem. This problem had to be resolved to obtain an accurate estimate of the standard error. The results used to test the hypotheses were therefore based on heteroscedasticity-robust standard errors. If heteroscedasticity is present in the model, then some statistical methods must be used to overcome this problem, such as the White test.

Finally, to test the autocorrelation problem in the study models, we used the Durbin–Watson (DW) test. Table 9 shows that the DW values of both models are almost within the 1.5–2.5 range. This indicates there is no autocorrelation problem that may affect the results of the regression.

Table 8. Variables diagnostics

VARIABLES	LABELS	STATIONARITY TEST		COLLINEARITY TEST	
		ADF	Probability	Tolerance	VIF
<i>DEPENDENT VARIABLES</i>	ROA	-57.202	0.000		
	ROE	-56.607	0.000		
	TQ	-38.778	0.000		
<i>INDEPENDENT VARIABLES</i>	E	-8.239	0.000	0.190	5.271
	S	-9.017	0.000	0.467	2.143
	G	-14.852	0.000	0.572	1.749
<i>FIRM-SPECIFIC CONTROL VARIABLES</i>	FL	-42.542	0.000	0.988	1.012
	TA	-31.530	0.000	0.914	1.094
	AQ	-22.564	0.000	0.641	1.561
	SEC	-30.193	0.000	0.952	1.051
<i>COUNTRY-SPECIFIC CONTROL VARIABLES</i>	GDP	-30.691	0.000	0.801	1.248
	GOV	-29.008	0.000	0.190	5.271

Table 9. Models diagnostics

MODELS	AUTOCORRELATION TEST	HETEROSCEDASTICITY TEST			
	Durbin–Watson	Breusch–Pagan	Probability	Koenker	Probability
ROA	1.060	392.371	0.000	22.010	0.000
ROE	1.297	1,368.589	0.000	3.415	0.491
TQ	1.010	53,239.742	0.000	10.232	0.037

5. DESCRIPTIVE ANALYSIS

As shown in Table 10, the maximum ESG disclosure was 80%, while the minimum was only 1.3%. When we come to the components of the ESG, the descriptive analysis results show that the mean of governance disclosure had the highest value (81%), followed by the mean for social disclosure (33%), while the mean for environmental disclosure had the lowest value among the firms (24%). This means that many firms concluded that the disclosure of corporate governance practices and roles ultimately leads to better performance. We explain the low environmental disclosure value by noting that almost half of the firms in the sample are from the tertiary sector, which is heavily service-based, and therefore these firms have less environmental impact than operations of other firms (e.g., manufacturers).

For firm performance, the descriptive analysis results show that the mean of ROE had the highest value (12%), followed by the ROA mean (4.6%), while the TQ mean had the lowest value (2%).

However, as shown in Table 11, the ESG was highest in the energy and manufacturing sectors, while it was lowest in the agriculture and food industries sector (Buallay, 2022). The initial descriptive results reflect that energy and manufacturing sector firms placed more emphasis on ESG investment than other sectors.

As detailed in Table 11, in all sectors the governance disclosure component had the highest value, while environmental disclosure had the lowest. However, when we split ESG into three components, the results show that the banks and financial services sector led in disclosing environmental information,

the energy sector led in disclosing social information, and finally the retail sector led in disclosing governance information.

Moving to firm performance, as shown in Table 8, in all sectors the ROE had the highest value, while the TQ had the lowest. The results also show that the IT sector had the highest ROA and ROE, while energy sector and manufacturing sector had the highest TQ.

However, in Table 12 ESG is contrasted with performance indicators of firms according to Matt Rosenberg's Official Eight Regional Groupings of the World. As shown in Table 12, Africa had the highest ESG mean (38%). In South Africa, the Johannesburg Stock Exchange (JSE) mandated the disclosure of ESG starting in the 2010 financial year. However, ESG disclosure had been widespread before the regulation (Loannou & Serafeim, 2017). Asia had the lowest ESG disclosure (26%). In Asia, only 11 countries out of 48 have mandatory sustainability reporting laws, which makes the level of ESG disclosure low compared to that seen in other regions.

Table 12 also illustrates that governance disclosure had the highest value in all regions, while environmental disclosure had the lowest. When we split the ESG into its three components, the results show that South America was the highest in disclosing environmental and social information (33% and 49%), and Sub-Saharan Africa was the highest in disclosing governance information (54%).

6. FINDINGS AND DISCUSSION

The results in Table 13 indicate that ROA, ROE and TQ regression models have high statistical significance and high explanatory power, as the p-values of the F-tests are less than 5% (0.000).

First, the slope coefficients of ESG for ROA indicate that the impact of ESG is insignificant in IT sector, as evident from coefficients and the p-values of more than 5% (0.360).

Therefore, we reject the first hypothesis.

Table 10. Descriptive results

VARIABLES	INDEPENDENT VARIABLES				DEPENDENT VARIABLES		
	ESG	E	S	G	ROA	ROE	TQ
Mean	24.24	15.43	48.20	27.19	5.08	12.46	1.73
Median	25.62	13.95	48.21	28.07	3.89	11.21	1.27
Maximum	66.94	69.77	75.00	73.68	181.17	1398.81	57.14
Minimum	1.37	1.38	1.59	1.85	-134.70	-279.57	0.23

Table 11. Descriptive results by sectors

Sectors	ESG	E	S	G	ROA	ROE	TQ
Agriculture & Food Industries Sector	29.118	22.938	30.593	48.583	6.272	13.789	2.033
Energy Sector	31.762	25.416	36.095	51.053	2.720	5.716	3.407
Manufacturing Sector	31.762	25.416	36.095	51.053	2.720	5.716	3.407
Banks & Financial Services Sector	31.354	26.229	32.960	49.949	4.718	10.754	1.611
Retail Sector	31.027	24.057	33.495	52.677	3.017	11.650	1.248
Telecommunication & Information Technology Sector	29.493	23.385	31.446	50.170	6.587	15.050	2.086
Tourism Sector	30.235	23.998	32.928	51.066	5.354	12.728	2.158

Table 12. Descriptive results by region

Region	ESG	E	S	G	ROA	ROE	TQ	FL	TA
Asia	26.463	19.618	28.306	47.888	4.818	10.266	1.726	91.719	27970
Australia	27.142	20.470	30.365	51.298	3.240	8.390	1.742	90.162	31562
Europe	37.376	31.295	40.812	53.508	4.342	11.492	1.583	136.851	69002
Mena	30.725	26.390	37.345	43.835	3.613	11.562	1.229	143.931	35730
North America	30.725	26.390	37.345	43.835	3.613	11.562	1.229	143.931	35730
South America	31.147	33.621	49.244	44.846	4.942	12.317	8.975	146.187	27780
Africa	38.954	25.638	42.892	54.433	6.676	18.067	1.712	62.940	8001

This result is in line with a recent study by Duque-Grisales and Aguilera-Caracue (2019), which looked at data from Brazil, Chile, Colombia, Mexico and Peru for the five years 2011 to 2015 and found that the relationship between ESG score and ROA was statistically significant and negative.

In fact, most firms still choose not to disclose sustainability information because they need to recruit and train new accountants to understand and prepare sustainability reports. They think that these additional costs may exceed the benefits in the short term. Moreover, sustainability reporting may have a negative impact on intangible assets such as employee loyalty (Ittner and Larcker, 1998; Lee et al., 2013). Thus, the results support shareholder expense theory and confirm that disclosing information about ESG can lead to inefficient utilization of firm's assets (Lee & Faff, 2009).

Second, the IT sector also showed insignificant relationship between ESG and ROE, as evident from coefficients and the p-values of more than 5% (0.538).

Therefore, we reject the second hypothesis.

These results are consistent with empirical investigations such as those by Climent (2018), Buallay (2019), and Duque-Grisales and Aguilera-Caracuel (2019).

An explanation of the results is that investors feel that expenditure on sustainability reporting is unnecessary and puts the firm at a competitive disadvantage (Barnett, 2007). For this reason, sustainability reporting may have a negative impact on intangible assets such as shareholder satisfaction, which is reflected in terms of their investment in the firm's equity (Lee & Faff, 2009).

Thirdly, it was found that sustainability reporting affects negatively the market performance of IT sectors, as evident from coefficients and the p-values of less than 5% (0.002). This supports a study by Landi and Sciarelli (2019) that found a negative and statistically significant impact in terms of market performance using Tobin's Q.

Therefore, we accept the third hypothesis:

H₃: Sustainability reporting affects the IT sectors' market performance.

Various studies have provided explanations for the negative relationship between sustainability reporting and a firm's market performance. Marsat and Williams (2014) argued that investing in ESG increases costs and has economic consequences, resulting in lower market values. The stock price or market value of a firm is seen as the most objective way of rating a firm, and any non-financial objectives will make the firm less effective (Friedman, 1962). The negative impact of ESG on market return indicates that, to some extent, ESG spending is not rewarding.

After Adding the control variables as shown in Table 14, the results indicate that ROA, ROE and TQ regression models have higher statistical significance results than Table 13, which means that the regression model after control variables has higher explanatory power.

The regression results on the relationship between Macroeconomic variables (GDP and GOV) and firm's performance produced interesting results. Firstly, consistent with the expectations, the results showed that GDP has positive relationships with ESG of the firms. These results suggest that the size of an economy or the GDP of a country affect the ESG accounting practices of the firms. A possible explanation of these results is that as a country's economic activities increase, firms would be more profitable and would have more resources to engage in ESG activities and report on them. This result confirms the findings of earlier studies such as Kühn et al. (2018) who found that a country's GDP influences the ESG accounting of firms in that country. Secondly, the evidence further revealed that a country's Gov has a positive and significant relationship with the ESG accounting practice of their firms. This result suggests that firms in a country with good governance structure, a sound legal system and low corruption disclose significantly more ESG information than firms in a country with a poor political environment. The implication of this result is that countries that are more advanced in terms Accounting of transparency, governance and the rule of law are more likely to regulate firms in terms of their environmental, social, governance and economic activities. This result confirms the findings of Kühn et al. (2018). They demonstrated that a higher level of regulation, transparency, the rule of law and governance structure in a country could result in a more extensive ESG accounting.

These results demonstrate that factors peculiar to a macroeconomic can influence the ESG reporting practices of firms. This relationship is plausible because firms in economically and politically advanced countries are likely to provide more ESG information as those countries would have higher levels of transparency and less corruption, which have a significant influence on ESG accounting. This suggests that firms in a stable institutional environment disclose more ESG information than their counterparts in a volatile institutional environment. The result also has some economic implications, in that governments can influence the ESG accounting practices and value of firms as evidence in the literature (Plumlee et al., 2015; Brooks and Oikonomou, 2018) shows a positive relationship between ESG accounting and firms' value. This is possible because the ESG accounting practice of firms affects their value as environmentally and socially sensitive investors only invest in firms that are socially and environmentally responsible. As a result, stock market regulators and the management of companies attempt to improve the quantity and quality of corporate information so that they can increase the level of transparency in corporate reporting (Barth et al., 2016). Eventually, this should increase stakeholders' confidence in firms, which would eventually lead to an increase in the share price, low cost of capital and improved operational performance.

The size of the firms also had a positive and significant impact on ESG of the firms. This result suggests that having more assets makes the banks significantly eager to disclose more ESG information. A possible explanation of this relationship is that larger firms might receive more attention from the press, society and the government. As a result, they might want to be perceived to be responsible by providing more ESG information. This explanation is consistent with the views of García-Sánchez et al. (2013) and Kansal et al. (2014) who maintain that firms with larger assets are under pressure to report more ESG information. This result is further consistent with the findings of Bae Choi et al. (2013) who found a positive link between firms' size and ESG disclosure.

Surprisingly, the evidence revealed that leverage had an inverse relationship with the ESG accounting practice of the firms. This result implies that having more debt makes firms significantly less motivated to provide ESG information. This negative relationship between leverage and ESG accounting is not surprising because creditors might influence the extent to which firms engage in ESG activities and reporting on them. This result surprisingly contradicts the findings of Esch et al. (2019) who reported that creditors are interested in the ESG reporting of firms.

According to the results displayed in Table 12, Table 13 is a summary of the results of Sectorial analysis of sustainability reporting and its impact on firm's performance.

As shown in Table 15, The result of the impact of ESG on ROA in IT sector similar to the Agriculture & Food Industries Sector. Moreover, The result of the impact of ESG on ROE in IT

Table 13. Multiple regressions (base model)

Variables	ROA Model			ROE Model			TQ Model		
	β	t-Statistic	Sig.	β	t-Statistic	Sig.	β	t-Statistic	Sig.
INDEPENDENT VARIABLE (ESG)									
IT Sector:									
Telecommunication & Information Technology Sector	-0.347	-0.915	0.360	-0.234	-0.616	0.538	-1.152	-3.050	0.002
Other Sectors:									
Agriculture & Food Industries Sector	-0.796	-1.171	0.242	-0.103	-0.155	0.877	-1.183	-1.796	0.073
Energy Sector	2.634	2.145	0.032	0.756	0.613	0.540	-1.269	-1.014	0.311
Manufacturing Sector	4.958	3.994	0.000	2.903	2.317	0.021	4.293	3.517	0.000
Banks & Financial Services Sector	-7.429	-15.291	0.000	-1.609	-3.152	0.002	-5.708	-11.374	0.000
Retail Sector	2.524	6.249	0.000	1.163	2.936	0.003	1.694	4.242	0.000
Tourism Sector	2.050	2.307	0.021	1.025	1.150	0.250	4.937	5.641	0.000
F	33.221			28.092			2.096		
Sig.	0.000			0.000			0.007		
R Square	0.028			0.020			0.001		
Adjusted R Square	0.028			0.020			0.001		

sector similar to the Agriculture & Food Industries Sector and Energy Sector. Finally, The result of the impact of ESG on TQ in IT sector similar to the Banks & Financial Services Sector.

7. CONCLUSION, LIMITATIONS, AND FUTURE RESEARCH

This study investigates the relationship between the level of sustainability reporting and IT sectors' performance (operational, financial and market) and compares the results with other sectors. Using data culled from 3,000 firms in 80 different countries for ten years (2008-2017), an independent variable derived from ESG score are regressed against dependent firm performance indicator variables [Return on Assets (ROA), Return on Equity (ROE) and Tobin's Q (TQ)]. Two types of control variables complete the regression analysis in this study: firm-specific and macroeconomic. The findings elicited from the empirical results demonstrate that there is a significant negative relationship between ESG and IT sector's market performance (TQ). Moreover, The result of the impact of ESG on ROA and ROE in IT sector similar to the Agriculture & Food Industries Sector, The result of the impact of ESG on ROE in IT sector similar to the Agriculture & Food Industries Sector and Energy Sector, Finally, The result of the impact of ESG on TQ in IT sector similar to the Banks & Financial Services Sector.

The results show which sector benefit more from disclosing sustainability information and point out how sustainability reporting is important in boosting firm's operational, financial and market performance. Hence, the results have significant empirical implications for policy makers, managers, stakeholders and investors, as they can compare the effect of sustainability reporting in terms of different institutional contexts/ within different countries perspectives.

This study has several limitations; The first limitation of this paper is that content analysis captures only quantity rather than the quality of ESG disclosure. Therefore, the results of this study may not necessarily give the "true" motivation for firms to disclose sustainability activities. Hence, the quality of ESG disclosure could be gathered from primary sources, such as interviews with firms' managers, to understand motivations that may be behind the sustainability practices. Second,

Table 14. Multiple regressions (robust model)

Variables	ROA Model			ROE Model			TQ Model		
	β	t-Statistic	Sig.	β	t-Statistic	Sig.	β	t-Statistic	Sig.
INDEPENDENT VARIABLE (ESG)									
IT Sector:									
Telecommunication & Information Technology Sector	-0.347	-0.915	0.360	-0.234	-0.616	0.538	-1.152	-3.050	0.002
Other Sectors:									
Agriculture & Food Industries Sector	-0.796	-1.171	0.242	-0.103	-0.155	0.877	-1.183	-1.796	0.073
Energy Sector	2.634	2.145	0.032	0.756	0.613	0.540	-1.269	-1.014	0.311
Manufacturing Sector	4.958	3.994	0.000	2.903	2.317	0.021	4.293	3.517	0.000
Banks & Financial Services Sector	-7.429	-15.291	0.000	-1.609	-3.152	0.002	-5.708	-11.374	0.000
Retail Sector	2.524	6.249	0.000	1.163	2.936	0.003	1.694	4.242	0.000
Tourism Sector	2.050	2.307	0.021	1.025	1.150	0.250	4.937	5.641	0.000
FIRM-SPECIFIC CONTROL VARIABLES									
FL	-0.105	-12.410	0.000	-0.028	-3.947	0.000	-0.069	-8.066	0.000
TA	5.438	3.876	0.000	3.113	2.197	0.028	5.242	3.812	0.000
MACROECONOMIC CONTROL VARIABLES									
GDP	8.819	15.025	0.000	2.163	3.505	0.000	6.778	11.211	0.000
GOV	2.810	6.506	0.000	1.332	3.143	0.002	1.998	4.678	0.000
F	56.461			40.172			2.436		
Sig.	0.000			0.000			0.007		
R Square	0.028			0.020			0.001		
Adjusted R Square	0.028			0.020			0.001		

Table 15. Summary of sectorial analysis

Sectors	Agriculture & Food Industries Sector	Energy Sector	Manufacturing Sector	Banks & Financial Services Sector	Retail Sector	Telecommunication & Information Technology Sector	Tourism Sector
ROA	Not Sig.	+	+	-	+	Not Sig.	+
ROE	Not Sig.	Not Sig.	+	-	+	Not Sig.	Not Sig.
TQ	Not Sig.	Not Sig.	+	-	+	-	+

the sample is restricted to only listed operating firms whose information is available on Bloomberg. There are many small and medium enterprises that are disclosing ESG but are not listed in Bloomberg. Thus, still more significant results could have been derived if the sample size had been enlarged.

Therefore, Future research could use mixed research methods (quantitative and qualitative). Supporting the analysis of secondary data with some primary sources, such as interviews with firms' managers, might allow for better understanding of motivations behind the sustainability practices. Other future research could perform similar testing by including small and medium business in financial services to get the full picture on the relationship between ESG and financial services' performance.

Finally, from the pedagogical context, we hope that these results will encourage business educators to make room for courses in sustainability reporting in their academic programs. Review of accounting and business programs offered by higher education institutions worldwide show that sustainability reporting is largely ignored (Al Hawaj & Buallay, 2022). If it is taught, it is not more than a topic in current issues in accounting, business or finance that is covered in a single lecture session. These results should encourage academic institutions to promote the adoption of the UN Partnership for Sustainability Development Goals (SDGs) and incorporate ESG in their curriculum. MBA programs at several universities (e.g, Harvard and Chicago) have added such courses in their curricula (Tett, 2019).

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