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An examination of environmental disclosure practices in the non-profit sector: Do UK NGOs Walk the *green talk*?

Abstract

Purpose: Drawing on legitimacy theory, this study examines whether UK NGOs have improved the quality and quantity of their environmental disclosures over a decade, in line with societal expectations for transparency and accountability.

Design, methodology and approach: We conducted a manual content analysis of annual reports from 35 leading UK NGOs, comparing environmental disclosures from 2013 and 2023. Drawing on established literature, we identified relevant keywords to assess disclosure quality. Consistent with prior studies, disclosures quality was coded into four categories: narrative (NAR), numerical (NUM), policy/targets (P/T), and operational activities (OA). Each disclosure was further classified as internally or externally oriented. To evaluate changes over time, we applied t-tests to examine the statistical significance of variations in disclosure patterns. The analysis compared hand-collected data from 2013 with matched data from 2023. This approach enabled a robust assessment of periodic shifts in environmental reporting practices within the UK NGO sector.

Findings: Results show a significant increase in both the volume and quality of environmental disclosures over time. Numerical and operational disclosures, deemed to be of higher quality, rose more than narrative and policy disclosures. Internal-facing disclosures also grew to a higher degree, compared to external-facing, highlighting NGOs' commitment to organizational environmental accountability.

Originality: This study provides the first evidence that over the passage of time, NGOs, like publicly listed firms, are adopting high-quality environmental reporting practices. It advances legitimacy theory and contributes to the understanding of NGO accountability.

Keywords: Environmental disclosure, legitimacy theory, NGOs, ecosystems, climate change, environmental management

1. Introduction

Environmental risks have intensified globally, with a 151% increase in disaster occurrences over recent decades, posing severe socio-economic threats (Haque & Irvine, 2018; Raimo et al., 2021). Environmental degradation, climate change, and biodiversity loss have emerged as some of the most pressing global challenges of the 21st century (Fernando et al., 2019; Nyberg & Wright, 2022). In response, international frameworks such as the United Nations Global Compact, the Kyoto Protocol (1997), the Paris Agreement (2015), and the Sustainable Development Goals (SDGs) have urged enhanced environmental commitments across sectors, including corporations and non-profit organisations (Almond et al., 2020; WEF, 2020; UNDP, 2020). These pressures have elevated the importance of environmental disclosures in both annual or sustainability reports, which provide stakeholders with insights into organisations environmental performance and accountability (Homroy & Slechten, 2019; Pariag-Maraye et al., 2022; Nicolò et al., 2020; Sparks, 2016). As echoed by various scholars (Giannarakis et al., 2019; Ho et al., 2018; Poddar et al., 2019), such disclosures are not merely compliance tools but also serve as mechanisms to reduce information asymmetry, build trust, and demonstrate alignment with societal expectations.

Accordingly, non-governmental organisations (NGOs) play a pivotal role in addressing environmental challenges, often embedding sustainability into their core missions through advocacy, disaster response, and operational initiatives (Asogwa, 2023; Leardini et al., 2020; Baier et al., 2020; Diesendorf, 2010; Haque & Irvine, 2018). Unlike profit-oriented firms, NGOs rely heavily on public trust, donor funding, and societal support to sustain operations, making transparent environmental reporting crucial for maintaining their 'license to operate' (Agyemang et al., 2019; O'Dwyer & Boomsma, 2015). However, despite societal assumptions that NGOs lead in ethical and environmental responsibility, empirical evidence on their disclosure practices remains limited. The present study is thus motivated by the need to examine whether UK NGOs are improving their environmental disclosures over time, amid rising stakeholder demands for accountability.

This motivation stems from the escalating global scrutiny on environmental accountability, where NGOs are positioned as key actors but face unique constraints such as limited resources and diffuse incentives compared to listed firms (Costa & Andreaus, 2021; Haque & Irvine, 2018; Asogwa et al., 2021; Harris & Neely, 2018). Besides, prior studies on environmental disclosures have predominantly focused on (profit-oriented) corporate entities, revealing increases in volume and quality to legitimise operations (Deegan, 2017; Garcia-Sanchez, 2020;

Stuebs & Sun, 2015). Nevertheless, the NGO-specific research is sparse and exhibits key weaknesses, since existing studies are cross-sectional and lacking longitudinal analysis to track changes over time (e.g., Asogwa, 2023; Haque & Irvine, 2018). Also, the existing NGO-focussed studies often overlook disclosure quality metrics, such as numerical versus narrative formats or operational versus policy-oriented content (Lim & Mali, 2022; Agyemang et al., 2019; Bourveau et al., 2022). Not least, NGO-focussed studies rarely distinguish between internal/organisational and external/societal orientations, potentially masking symbolic rather than substantive practices (Asogwa et al., 2021; Oliveira Neto et al., 2018). Thus, these gaps create uncertainty about whether NGOs, notwithstanding their mission-driven ethos, can produce high-quality disclosures or if resource limitations hinder their progress.

Theoretically, our study draws on legitimacy theory, which posits that organisations align disclosures with societal values/expectations in order to secure approval and resources (Deegan, 2017; Suchman, 1995; Deephouse et al., 2017). Notably, legitimacy is vital for NGOs in order to safeguard donor retention and operational continuity, although their incentives differ from corporations. For example, NGOs face less regulatory pressure but face greater moral imperatives tied to their advocacy roles (Kamal & Deegan, 2013; Asogwa et al., 2021). In light of this background, the empirical motivation for our study is inspired by the untested assumption that NGOs adapt reporting practices over time, particularly in domains like environmental management (ENVMGT), climate change (CC), and ecosystems (ECO). Without longitudinal evidence, it remains unclear whether NGOs are enhancing disclosure quantity (i.e. total volume of information disclosed) and quality (e.g., verifiable numerical data over descriptive narratives) to bridge the performance-information asymmetries (Arena et al., 2015; Cordery et al., 2019).

To address these gaps, the present study is guided by the following central research question: *Have the quality and quantity of environmental disclosures by UK NGOs increased between 2013 and 2023 in their annual reports?* In order to address the research question effectively, our study sets out to achieve the following objectives: (i) assess changes in overall environmental disclosure volume of UK NGOs, (ii) evaluate shifts toward higher-quality environmental disclosure formats (i.e. numerical over narrative) and/or vice versa, (iii) examine the prevalence of operational activities versus policy/target statements in UK NGOs environmental disclosures, and (iv) distinguish internal versus external orientations to gauge substantive commitment to environmental disclosure.

This study contributes to the literature in several ways. Theoretically, our study advances legitimacy theory by demonstrating its application in the non-profit sector beyond the profit-oriented corporate entities, as well as highlighting how NGOs use disclosures to construct moral and pragmatic legitimacy amid resource constraints (Deegan, 2019; Nicolò et al., 2021). Empirically, and to the best of our knowledge, our study provides the one of the first longitudinal evidence of NGO environmental reporting trends, addressing weaknesses in prior cross-sectional studies and introducing granular classifications (e.g., internal/external) that reveal NGOs shift toward verifiable practices (see Lim & Mali, 2022; Jarvinen et al., 2022). Lastly, the findings from our study have implications for practice by informing NGO managers, donors, and policymakers on how to enhance accountability, aligning with global frameworks such as SDG 13 and the UN Global Compact, while exposing areas for improvement in under-resourced sectors.

Our study employs a manual content analysis of annual reports from 35 leading UK NGOs selected by donation size. We compare disclosures from 2013 and 2023 using keywords across ENVMGT, CC, and ECO themes. The results indicate that there are significant increases in volume and quality of environmental disclosures, with numerical and operational disclosures improving more prominently and inspired by legitimacy-driven adaptations. The results also show that internal disclosures grew faster than external, suggesting organisational stewardship is an important driver of environmental disclosure in UK NGOs. When an automated text mining (additional) analysis is conducted using 2013 as a benchmark, empirical results reveal that it has taken 8-9 years for NGOs to enhance environmental disclosure availability, at a statistically significant level.

The remainder of this paper is structured as follows: Section 2 reviews the literature and develops hypotheses; Section 3 details the methodology; Section 4 presents empirical results; and Section 5 discusses contributions, implications, limitations, and future research directions.

2. NGO Setting in United Kingdom

Similar to other nations, the NGO sector in the UK functions within the third sector, majorly funded from various sources of income, including donations, public funds, grants, sponsorship, and the sale of goods and services (Connolly & Hyndman, 2013; Salamon & Sokowski, 2016). The sector has over 200,000 registered charities supported by about 924,000 employees, with a projected yearly income of £97 billion (Charity Commission for England and Wales, 2025). In legal form, the sector varies depending on whether the NGO has been registered as a

company limited by guarantee, a trust, a community association or an incorporated association (Bellante *et al*., 2016; Hyndman & McConville, 2018). Despite the differences, NGOs in the UK aim to advance the society's wellbeing, spanning from social services and public welfare (Dhanani & Connolly, 2012; Worth, 2020). In recent years, there has been a growing demand for accountability and transparency in the sector (Connolly *et al*., 2017; Hyndman & McKillop, 2018). Central is the petition requiring the sector to emulate their charitable ethos given declining public trust and confidence in their accountability mechanisms (Bryce, 2016; Hyndman & McConville, 2018; Kemp & Morgan, 2019). Accordingly, literature suggests that NGOs in the UK face challenges in reporting their social impact performance, albeit a stream of studies acknowledging that disclosure promotes NGOs' legitimacy (Connolly & Hyndman, 2016; Lokman *et al*., 2023). For example, Kemp & Morgan (2019) reports that UK NGOs, particularly the small ones, face challenges in reporting non-financial information. As suggested by researchers (Ebrahim, 2013; Ngo *et al*., 2024), these problems arise from lack of adequate resources, inadequate training and paucity of guidelines, among others. Given these constraints, academic tension exists as to whether NGOs may be meeting their non-financial reporting expectations.

In line with other developed countries, the UK has established a raft of legislative measures to enhance NGOs' non-financial reporting information (McConville, 2017; Hyndman & McConville, 2018). Key to this are efforts to improve environmental performance disclosure for NGOs, in an attempt to win their support for the race to net zero carbon emissions by 2050 (Connolly *et al*., 2017). As such, numerous guidelines have been dispensed, including streamlined energy and carbon reporting (SECR), the Taskforce on Climate-related Financial Disclosure (TCFD), S172, the Charity Information Sheet 5, the Charity Governance Code, the Standard Carbon Emissions Framework (SCEF) and the sustainability reporting standards. Thus, the reporting requirements of these accountability measures are subject to NGOs' gross income and whether they are registered as an incorporated company or an unincorporated one (Pariag-Maraye *et al*., 2022). Accordingly, NGOs that are registered as companies are required by the regulatory authorities to comply with the SECR and TCFD and to produce an S172 statement. For instance, SECR mandates all large NGOs with a turnover of £36M or more, a total balance sheet of £18M or more and 250 or more employees, to disclose annually the following: energy use, associated green gas emission, intensity ratio, energy efficiency action taken, methodology used, and last year figures for energy use and GHC emission.

Additionally, Sec 172 (1) of the Company Act 2006 requires large NGOs to provide a strategic report detailing the effect of their operations on the community and environment. Furthermore, large NGOs are required to disclose climate metrics and targets as defined by the Taskforce on Climate-Related Financial Disclosure. Lastly, charity information sheet 5 prescribes that large UK NGOs shall submit a statement of recommended practice (SORP) with information explaining how they have adopted low-energy users. Besides, other additional guidelines, such as the charity governance code, the sustainability reporting standards and the accountability charter, also serve as a source of environmental reporting references (Grant Thorton, 2023; Hyndman & McConville, 2018). Besides, Smaller NGOs may choose to report voluntarily to enhance their legitimacy (Bellante et al., 2018; Connolly et al., 2017). This initiative has been led by the National Council of Voluntary Organisations (NCVO), an independent organisation in England, is central to this topic, as it offers guidelines aimed at encouraging members to report their environmental performance (Dhanani & Connolly, 2012; Connolly et al., 2017). Existing research suggests that disclosure practices can enhance NGOs' social contract with pertinent stakeholders (Dhanani & Conolly, 2012). Prior studies also indicate incremental reporting on UK NGOs, albeit, this occurs in a less structured manner (McConville & Hyndman, 2015; Pariag-Maraye et al., 2022). Therefore, establishing the driver of the disclosure and whether this is growing with passage of time or not, is an important inquiry that may contribute to NGO environmental literature and policy development as well.

3. Literature Review & Hypothesis Development

3.1 Theoretical Framework

The literature argues that legitimacy theory is the most relevant theoretical lens regarding clarifications on firms' motivation towards environmental performance and reporting (Asogwa *et al*., 2021; Deephouse *et al*., 2018; Velte *et al*., 2020). However, there is limited application of the theory using NGO insights (Asogwa *et al*., 2021). Coherently, this study adopts the theory to explain NGOs' propensity to environmental disclosure. The theory argues that firms seeking legitimacy must operate within society expectations (Al-Bassam *et al*., 2018; Deegan, 2019). Particularly, firms must obey society's acceptable behaviours, norms and values in exchange for the legitimacy (Chowdhury *et al*., 2020; Deegan, 2019; Li *et al*., 2015). Thus, prior studies suggest that firms do have 'pacts' with the societies in which they operate (Deegan, 2014; 2019; Qian & Schaltegger, 2017). Accordingly, this social contract embodies

a resource value in which non-compliance with it may threaten firms' existence (Dowling & Pfeffer, 1975; Lai & Stacchezzini, 2021). This may result a loss of resources, impacting firm survival (Deegan, 2019; Hrasky, 2012). Given this, studies argue that legitimacy is dynamic in nature, requiring firms to gain it, maintain it and defend any challenges affecting it (Conway *et al*., 2015; Deegan, 2019; Vestergaad, 2015). Existing studies argue that firms use numerous mechanisms, such as environmental strategic approach, in pursuit of the legitimacy (Comyns, 2016; Gregory *et al*., 2014; Lie *et* al., 2018; Yingjun *et al*., 2015). Particularly, firms use this method as a way for communicating their environmental performance to society in order to address information asymmetries regarding their environmental performance, thus presenting an image of social legitimacy (Dowling & Pfeffer, 1975; Li et al., 2018; Liesen et al., 2017). It's for this reason, that prior studies (Deegan, 2019; Gregory et al., 2014), suggest that firms incrementally adopt environmental business practices in order to maintain legitimacy.

The literature shows that the demand for accountability regarding UK NGOs has risen in the past decade, driven by concerns of loss of legitimacy (Pariag-Maraye *et al.*, 2022). Specifically, firms may lose legitimacy if their environmental actions don't meet society expectations (Fernando & Lawrence, 2014; Hrasky, 2012). However, as suggested by social environmental and accounting researchers, managers may use impressive management techniques to influence stakeholders' perception regarding their environmental performance (Corazza *et al*., 2020; Edgar *et al*., 2018). Studies assert that such instances are largely in NGOs, where reporting guidelines are ambiguous and more narrative (Dhanani & Connolly, 2012; Perkiss *et al*., 2021; Traxler *et al*., 2018). According to legitimacy theory case argument, firms that demonstrate quality of environmental performance disclosure, increase outcomes, such as stakeholder trust, reputation, and financial resources (Deegan, 2014; 2019; Lamboglia et al., 2019; Sassen et al., 2016). Thus, using insights from legitimacy theory, we contend that NGOs are more likely to increase their environmental disclosure availability over passage of time in search of legitimacy stemming from UK regulators, as well as donors, and other stakeholders.

3.2 Hypothesis Development

3.2.1 Increasing Level of Total Environmental Disclosure

In recent years, environmental risks have become some of the most critical global challenges (World Economic Forum [WEF], 2020). These risks comprise of the ecosystem degradation, environmental damage, and climate-related threats (García-Sánchez et al., 2021; Raimo, 2023). Thus, a growing body of research highlights increasing concern about the adverse impacts of

these risks on planetary health (Asogwa et al., 2021; Akhter, 2021; Nyberg & Wright, 2022). For instance, the United Nation Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services has warned that over one million species face the threat of extinction. Furthermore, environmental degradations and climate change have continued to threaten the macroeconomic variables such as agriculture (Aragón et al., 2021; Cui & Xie, 2021), public health (Koltcher et al., 2021), and human migration (Asfaw et al., 2017; Parson & Nielsen, 2021). As such, literature shows increasing demand for corporate environmental performance accountability, as environmental risks bears implication not only for the current situation, but also the future (Nicolo et al., 2022; Vitolla & Raimo, 2018; Vitolla et al., 2018). In view of this, studies show growing environmental reporting in response to environmental performance accountability (Pariag-Maraye, 2022; Yasmin & Ghafran, 2021). This initiative has been built on assumption that there is environmental performance information asymmetry between firms and stakeholders, thus, creating accountability tensions (Li et al., 2018; Raimo et al., 2019). Therefore, environmental performance disclosure has become accountability tool for gaining the lost trust between the society and firms (Asogwa et al., 2022; Deegan, 2017). Accordingly, legitimacy theory argues that firms seeking to survive must act within acceptable behaviours of the society where they operate (Al-Bassam et al., 2018; Deephouse et al., 2017). On this purpose, some studies (Chowdhury et al., 2020; Deegan, 2017), argue that firms engage on environmental disclosure incrementally to avoid their legitimacy withdrawn when they fail to comply with ever changing society norms.

Thus, legitimacy theory posits that firms have implicit social contracts with the society where they domicile (Deephouse et al., 2017; Deegan, 2014). However, because of ever-changing societal norms and expectations, firms' face legitimacy gaps (Agyemang et al., 2019; Rezaee, 2016), which requires them to respond to legitimacy threat (Conway et al., 2017; Deegan, 2019). For example, Deegan (2002) establishes using a data drawn from BHP firm between 1983-1997, that BHP firm increases environmental disclosure as a way to minimise legitimacy threats. Consistently, studies report growing voluntary environmental disclosure in exchange with legitimacy (An *et al*., 2019; Belal & Owen, 2015; Boiral, 2013). Research reveals that legitimacy help firms to improve their social acceptance (Filatotchev & Nakajima, 2014; Nicolo *et al*., 2021; Manes-Rossi & Nicolo, 2022), which inherently, serve as a resource (Deegan, 2019; Suchman, 1995). Therefore, as suggested by prior literature (Asogwa *et al*., 2021; Deephouse *et al*., 2017; Huang & Chen, 2015), being legitimate helps corporations to attract additional resources required for their survival because stakeholders are more likely to

offer support to firms that share their desirable societal behaviours , thus, providing incentives to firms to incrementally engage on environmental performance accountability.

Drawing insights from the legitimacy theory, NGOs use environment disclosure as a means to acquire legitimacy (Asogwa *et al*., 2021; Deegan, 2019). Thus, NGOs engage in voluntary environmental disclosure to conform with the society's acceptable environmental standards and to influence their opinions regarding their environmental consciousness (Deegan, 2017; Kamal & Deegan, 2013; Raimo *et al*., 2021). For example, large NGOs in UK pursue their legitimacy through mandatory environmental reporting as defined in Sec 172 (1) of Company Act 2006 (Connolly *et al*., 2017; McConville, 2017). Also, NGOs just like corporations, face stakeholder pressure to account for their environmental performance (Alsaeed, 2006; Nicolo *et al*., 2022). In comparison to listed firms, NGOs face legitimacy gaps due to lower level of environmental disclosure combine with inferior reports (Agyemang et al., 2019; Asogwa, 2023; Goddard, 2020; Pariag-Maraye *et al*., 2022). Despite this, the empirical studies explaining the motivation for NGOs engagement on environmental disclosure is relatively low (Comyns & Figge, 2015; Diouf & Boiral, 2017). For instance, Haque & Irvine (2014) show an increase of environmental disclosure of 30 Australian NGOs between 2008 and 2012. Similarly, Leardini *et al*. (2020) note an increase of environmental disclosures as a condition of donation using I42 NGOs in the USA in 2018. Moreover, Aswoga (2023) using NGOs in Nigeria, finds that legitimacy drives environmental disclosure.

Besides, as suggested by coercive isomorphic pressure (Di Maggios & Powell, 1983), firms face pressure to increase environmental disclosure in line with new environmental guidelines. For example, Tauringana & Chitambo (2015) establish that after issuance of DEFRA guidance in 2009, there was significant GHC disclosure level among FTSE firms over a period between 2008-2011. In the same vein, D'Amico *et al*. (2016) observe that publication of voluntary code on environmental disclosure in Italy, resulted to increase of firm's environmental disclosure. Besides, Li *et al*. (2018) report using Chinese firms between 2008-2012 that environmental legitimacy provides incentives to firms to report more carbon disclosure. Likewise, Hofer *et al*. (2012) establish that legitimacy compel firms to increase environmental disclosure in order to attract stakeholders. Relatedly, prior studies provide evidence that environmental disclosure enhances firm visibility of good corporate citizenship, thus affecting improving its outcomes (Lauwo *et al*., 2016; Yin & Wang, 2018). As such, empirical studies document that NGOs with higher environmental disclosures attract more donations than those that report less (Agyemang *et al*., 2019; Clerkin and Quinn, 2021). We posit that a deeper understanding of the overall

NGOs' environmental disclosure level regarding environmental management (ENVMGT), climate changes (CC), and ecosystems (ECO) can extend the knowledge, extant literature, and serve as a reference to inspire this important sector to strive for environmental performance accountability.

Given that only few studies have examined extent to which NGOs adhere to environmental reporting expectations of society, academic tension exists. There is the potential that because the role of NGOs is to promote wellbeing in the society, they may simply lack the financial knowledge or expertise to produce high quality environmental disclosures. Also, there is a possibility that NGOs may simply not adhere to the environmental expectations of society, and exclude environmental disclosures from the annual reports.

On the other hand, based on three assertions, we postulate that it is more likely that NGOs will have higher quality/quantity disclosures over the passage of time. First, NGOs are resource-dependent firms (Aswoga *et al*., 2021; Thijssens *et al*., 2016) and their survival and growth are subject to being accountable to society and responsive to social norms (Connolly & Hyndman, 2013; Deegman, 2017). We therefore surmise that NGOs are more likely to continue increasing quality and quantity of environmental disclosures over time, thereby improving their social contract with the diverse stakeholders. For example, NGOs are likely to increase environmental disclosure over passage of time to enhance compliance with the UK environmental guidelines as means of obtaining legitimacy. Second, NGOs serve as advocates for sustainability practice; thus, it is essential for them to exemplify these practices to maintain credibility (O'Dwyer & Boomsma, 2015; Scobie *et al*., 2020). One way of achieving this is by increasing the quality and quantity of environmental disclosure to serve as a role model to other firms. Third, because of ever-increasing demand of environmental accountability (Asogwa, 2023; Cordery *et al*., 2019), we argue that NGOs are more likely to increase the quality and quantity of environmental disclosure over the passage of the time to minimise environmental performance information asymmetry. Based on the preceding discussion, we propose below hypothesis.

H.1: There is an increasing level of total environmental disclosure of NGOs in 2023, relative to 2013.

3.2.2 Increased Quality of Environmental Numerical Disclosure over Narrative

According to the literature on environmental reporting, managers use environmental disclosure as part of the company's publicity strategy in pursuit of legitimacy (Deegan, 2014; Talbot & Boiral, 2016). As indicated, companies disclose their environmental information in the form of qualitative/narrative or quantitative/numerical as strategies to acquire stakeholders' recognition of their accountability efforts, thus, improving legitimacy (Helfaya et al., 2019; Moussa, 2020). Yet, recently, research shows growing adoption of quantitative environmental disclosure at the expense of qualitative (Agyemang et al., 2019; Cordery et al., 2019). Scholars argue that numerical (NUM) data disclosures are of superior quality in comparison to the narrative (NAR) disclosures (Agymang *et al*., 2019; Lim and Mali, 2022; Melloni *et al*., 2017). Specifically, studies postulate that NUM environmental disclosure offers easier comparison of information over passage of the time, and across the firms (Bourveau *et al*., 2022; Espeland & Saunder, 2016). Additionally, NUM environmental disclosures are verifiable ex-post (Cordery *et al*., 2019; Yuesti *et al*., 2016). Moreover, studies emphasise that qualitative environmental disclosure is often manipulated by the management impression (Jones & Slack, 2013; Maas, 2018). Conversely, some studies suggest that narrative disclosure provides constructive soft information that may enhance firm environmental accountability image in a wider society (Cho et al., 2014). Against this backdrop, coupled with sparsely studies, literature document limited studies on numerical and narrative environmental disclosure (Tjarvinen *et al*., 2022; Espeland & Sauder, 2016). For example, Neu et al. (1998) using Canadians firms, report that managers prefer using narrative because of ease on employing impression management. Similarly, Cho et al (2014) report that managers prefer narrative disclosure relative to numeric, because of its adaptability to management tone. On the other hand, Vesty et al. (2015) find using Australian Banks as a sample, that numerical carbon emission reporting improves Banks credibility on environmental performance accountability. Similar findings have been confirmed by Laine et al. (2017). Also, as emphasised by scholars that institutional pressure inculcates firms' corporate governance practices (DiMaggios & Powell, 1983), UK environmental regulations and guidelines such as zero net carbon emissions, may influence NGOs in UK to adopt quantitative disclosures as a way of demonstrating their commitment to the guidelines.

Whilst we acknowledge previously that NGOs may lack the resources and expertise to craft high level environmental disclosures, we contend that NUM environmental disclosure may serve as an important accountability tool to address the accountability tension between NGOs and stakeholders regarding environmental performance asymmetry (Arena *et al*., 2015; Peters & Rami, 2013). Coherently, we postulate that NGOs are more likely to have a strong

incentive to include a higher volume of quality of NUM environmental disclosure over time, relative to NAR, as a mechanism to maintain and enhance the legitimacy. Thus, we posit the following hypothesis

H.2: There is increase of NUM environmental disclosure in 2023 to 2013, relative to NAR

3.2.3 Environmental Policy/Targets (P/T) and Operational Environmental Activities (OA)

As defined previously, legitimacy theory predicts that firms endeavour to be in line with their operations/activities with societal norms and values in order to uphold their social licence for existence (Asogwa et al., 2021; Deegan, 2019). In view of this, where there is a discrepancy gap between the societal norms and corporate actions, a legitimacy gap arises (Deegan, 2019). Literature shows that this gap is more pronounced for firms such as NGOs that face legitimacy threat (Aswogwa, 2023; Pariag-Maraye et al., 2022). To address this, previous studies show increase of use of the environmental remediation efforts as part of commitment to fulfil social expectations and legitimacy (Cai *et al* 2024). Such environmental mitigation actions include environment targets and policies (Maas, 2018). Research shows growing environmental targets disclosure as mechanism to enhance environmental accountability to stakeholders (Gouldson & Sullivan, 2013; Tauringana & Chitambo, 2015). Therefore, the literature notes this strategy as part of seeking legitimacy (Helfaye et al., 2019; Moussa et al., 2020). For example, Moussa et al (2022) report that UK firms prefer to disclose environmental targets as part of fulfilling their stakeholders' expectations, as well as seeking the legitimacy. Accordingly, studies argue that disclosure of firm environmental targets present proactive measure rather than conventional reactive method (Maas, 2018; Tadro & Magnana, 2019). As such, DEFRA (2013) asserts that environmental targets communicate environmental risks to stakeholders.

Besides, research suggests that corporate dynamics are defined by social norms, beliefs and symbols, which that firms are expected to conform to in pursuit of survival (Dimaggio & Powell, 1983; Meyer & Rowan, 1977). In line with this, firms have adopted environmental policies/targets in order to mainstream environmental operations (Ding *et al*., 2022; Li *et al*., 2018). For example, UK environmental commitments such as Carbon zero by 2050 requires

UK NGOs to set up similar commitments. Equally, some of UK environmental regulations mandates UK NGOs to enhance their environmental operational activities. Thus, such pressure may act as an incentive to NGOs to improve environmental disclosure related to target/policies and operational activities over the passage of time.

In the same vein, environmental targets/policies may provide motivation for firms to improve their environmental operational activities (Inman & Green, 2018; Li et al., 2018). Particularly, Lee (2013) report that US firms which use green supply chain policy, increase their environmental operational activities. Also, Yu *et al* (2014) document using China firms, that green supply chain practice enhances environmental operational activities. Furthermore, Lee (2013) finds that Korean firms that use green supply chain practice as part of their policy, enhance their environmental operational activities. Drawing from this evidence , we are interested in understanding the extent to which there can be an association between environmental operational activities (OA) and with policy/ target (P/T). We conclude that environmental policies/targets (P/T) may serve as an incentive, or pressure for the NGO's managements to improve environmental operational practices. This will result an increase of environmental operational activities (OA) disclosure overtime, relative to policies and targets (P/T). Based on the above, we posit the following hypothesis:

H.*3: There is a higher increase of environmental operational activities disclosure in 2023 to 2013, relative to policy/targets*.

3. Methodology

3.1 Research Design

This study adopts a manual content analysis approach to investigate the extent and evolution of environmental disclosures by NGOs between 2013 and 2023. A year-on-year content analysis is included in section 4.4. This approach is consistent with previous studies that investigate whether disclosure quality/quantity/behaviour changes over the passage of time. For example, Guthrie et al. (2006) conduct an analysis of whether firms disclose higher volumes of voluntary intellectual information in 2002, compared to 1998. McCracken et al. (2018) also conduct content analysis to determine whether intellectual capital disclosures are of higher quality in 2015, compared to 2013. A 10-year period is selected for this study, because to the best of our knowledge, no previous study investigates the extent to which NGO

environmental disclosure quality/quantity improves. Therefore, we envision that 10 years is sufficient to empirical capture whether NGOs have taken action to improve environmental disclosure quality/quantity, or whether knowledge/resources are lacking. As noted by Giles and Murphy (2016), content analysis is predicated on the assumption that the frequency of reference to a specific concept within a text reflects its relative importance to the reporting entity. Following this premise, we develop a structured analysis using an environmental disclosure keyword framework informed by Baier et al. (2020) and Haque and Irvine (2018). This framework includes a comprehensive list of 45 keywords representing three key thematic categories: ecosystems (ECO), environmental management (ENVMGT), and climate change (CC), as detailed in Table 1.

Thus, our first research hypothesis (H1) seeks to determine whether the overall level of environmental disclosure has increased over time, consistent with legitimacy theory expectations. Specifically, we posit that NGOs will disclose a greater volume of total environmental disclosures, that is, spanning ECO, ENVMGT, and CC over the study period as a mechanism to reinforce legitimacy.

The second hypothesis (H2) explores whether disclosure quality has improved alongside quantity. To assess this, we distinguish between narrative (NAR) and numerical (NUM) disclosures. Narrative disclosures are descriptive and qualitative, while numerical disclosures present quantifiable, verifiable data, including ratios, percentages, or absolute figures. Given the increasing demand for transparency and accountability in environmental reporting, we hypothesize that NGOs have progressively shifted toward a higher proportion of NUM disclosures over time.

The third hypothesis (H3) examines the type and quality of environmental disclosures based on content orientation. We distinguish between aspirational policy and target disclosures (P/T) and disclosures related to actual operational activities (OA). Prior research suggests that OA disclosures grounded in the organization's real-time practices are more substantive and verifiable than P/T disclosures, which are often forward-looking and less concrete (Lim & Mali, 2022). Therefore, we expect a greater increase in the volume and quality of OA disclosures relative to P/T disclosures over time.

Data Collection and Coding Procedure

To ensure the reliability and validity of the content analysis process, we follow a multi-step protocol aligned with established academic practice (Duff, 2018; McCracken et al., 2018; Lim

& Mali, 2022). We adopt the time-consuming approach of hand collecting data, as opposed to utilising AI and machine learning. The reason data has been hand collected, is due to an incentive to provide nuanced interpretations, regarding how NGOs disclose environmental information. If an AI and machine learning approach would have been adopted, each keyword identified would be acknowledged as an observation/occurrence, regardless of whether (or not) the disclosure was internally/externally facing, or related to OL, P/T. However, through a hand collected approach, authors are able to provide a granular interpretation of whether occurrences provide insights from an (i) external/policy; (ii) or internal/operational perspective. As explained in the hypothesis development section, these types of disclosures can be perceived differently in terms of quality, and as it pertains to actual environmental performance. Therefore, whilst utilising an AI and machine learning may increase observations/occurrences and save a significant amount of time, we envision that this approach reduces the granularity that can be derived from carefully hand collecting, and then, interpreting environmental disclosures.

Data Collection: We retrieved annual reports from the official websites of 35 leading UK NGOs. These organizations were selected from the top 50 NGOs by donation size, covering the years 2013 and 2023. The selection ensures a representative sample of large, publicly accountable NGOs with consistent reporting practices over the ten-year period.

Keyword Search and Contextual Reading: Using the 45 predefined keywords (see Table 1), we systematically searched the annual reports for keyword occurrences. Each keyword was examined in context whether in a sentence, paragraph, table, or figure to verify its relevance to one of the three thematic categories (ECO, ENVMGT, or CC).

Text Unit Definition and Classification: Following Lim and Mali (2022), a text unit (TU) was defined as a sentence. Each occurrence of a keyword was coded as either **Numerical (NUM)** if the environmental information included quantifiable data (e.g., figures, ratios, or metrics). **Narrative (NAR)** if the information was descriptive or qualitative, without accompanying numerical data. TOT refers to the combination of NAR and NUM disclosures. If a keyword is recognised as existing in a TU, and related to an environmental disclosure, it is assigned a value of 1 for TOTAL, NAR and NUM. Duplicate references to the same keyword within a sentence were recorded once. However, if a sentence referenced multiple unique sub-themes (e.g., solar energy and biofuels), each was coded separately.

Policy vs. Operational Categorization: Environmental information was further classified as: **Policy/Target (P/T):** Forward-looking, aspirational disclosures outlining strategic goals or targets related to environmental performance. **Operational Activity (OA):** Disclosures concerning actual environmental actions or initiatives implemented by the NGO. A value of 1 was assigned for each occurrence of P/T or OA disclosure; 0 was recorded when absent.

Internal Validity and Inter-Coder Reliability: To enhance the reliability of coding, a second reviewer independently analysed annual reports for five NGOs selected from across the sample range (ranks 1–10, 11–20, 21–30, 31–40, and 41–50). A comparison of coding outcomes between the two reviewers was conducted, followed by a consensus meeting to resolve discrepancies and ensure consistent application of the coding criteria.

Data Aggregation and Analysis

The total number of occurrences of TOTAL, NUM, NAR, P/T, and OA disclosures were aggregated on a per-organization basis and then merged to calculate cumulative totals for 2013 and 2023. These totals represent the basis for the quantitative analysis.

To assess whether the changes in disclosure levels are statistically significant, we conducted two-sample t-tests comparing the means of each disclosure type between the two years. The t-test methodology was selected based on its established use in similar studies analysing environmental reporting trends (e.g., Lim & Mali, 2022). This test allows us to determine whether the differences observed are due to random variation or reflect meaningful change over time.

[Table 1 goes about here]

3.2 Sample Selection

The sample consists of the 50 largest NGOs in the UK, based on donations.[1] An initial sample of 50 NGOs was chosen dependent on received donations of above £50 million by NGOs. We argue that NGOs receiving larger donations may be exposed to more scrutiny than smaller ones. Also, as posited by prior studies, such firms have similar characteristics (Graye *et al*., 1995; Mitchell *et al*., 1995). As such, we conclude that such NGOs may have similar propensity to disclose environment in pursuit of legitimacy. In line with researchers (Albitar *et al*., 2023;

[1] https://cividata.org/en/united-kingdom/ . These data is an open database Wiki data, largely drawn from NGOs tax documents or annual reports.

Gerged *et al*., 2021), we use annual reports as a source of environmental disclosure and firm characteristics data. Out of 50 largest NGOs in the UK, only 35 NGOs had annual reports for 2013 and 2023 on their website. After excluding 15 NGOs, we remained with a final sample of 35 NGOs, representing 70 firms' two years observations. We concur that this methodology is robust, as prior studies have adopted similar sample size (Duff, 2018; Lim and Mali, 2022). We choose ten-year study time span to examine the extent of environmental disclosure over 10 years period.

4. Empirical results

4.1 Descriptive statistics

Table 2 shows summary statistics of for Total environmental disclosure occurrences in 2013 and 2023 (70 firm year observations). Table 2 shows summary statistics of environmental disclosures (TOTAL, NAR, NUM, P/T, OA), and governance characteristic depicting firm commitment to environmental issues in year 2013 and 2023 (70 firm years observations). In summary, the main purpose of this Table is to show on average, the types of disclosures that firms include on annual reports. Table 2 presents that on average; each NGO has a TOTAL of 72.1 of in year 2013 and 2023. Also, while NAR represents an average of 62.9 through the sample period, NUM reports 9.01 in year 2013 and 2023. These results show that NAR disclosures are more prevalent, compared to NUM, which suggest that NGOs may not have the potential to disclose environmental information that is verifiable *ex ante*. Also, P/T and OA depicts a mean of 3.18 and 59.54, respectively in year 2013 and 2023. This result suggests that NGOs disclose a higher volume of information regarding business activities, compared to aspirational policies. Regarding NGOs commitment to environmental issues, an average, 0.69 of total samples, shows their commitment in year 2013 and 2023. Given the nature of NGOs, it may be surprising that 31% of the sample do not disclose an accountability statement.

[Table 2 goes about here]

4.2. Multivariate analysis

Table 3 represents the TOTAL environmental disclosure comprising environmental disclosure in 2013 and 2023. The T-test values reveal the difference between means in each year. The main empirical results from the Table 3, is that NGOs disclose higher levels and quality of

TOTAL environmental disclosures in 2023 (108.28), relative to 2013 (35.85). The result is statistically significant at 5% level (3.27**). This finding provides support for H1.

Empirical findings in Table 3 delineate that NUM environmental disclosure increases to a higher degree, compared to than NAR. More specifically, the results of t-tests reveal the difference in means to be statistically significant at 1 percent level (4.70***) for NUM. The results are less significant for NAR (2.99**). Taken together, this result infers that NGOs have the expertise and knowledge required to disclose increasing levels of comparable/verifiable environmental disclosures, hence meet the expectations of society. Thus, this finding therefore supports our H2.

In respect to H3, empirical findings present a higher disclosure of quality and quantity of the environmental operational activities (OA) in comparison to policy and targets (P/T). The t-tests confirm the differences in means between two groups (2013 & 2023) to be statistically significant at 5 percent and 1 percent for OA (2.86**) and P/T (5.18***), respectively. These findings support H.3 that NGOs disclose higher volumes of the environmental disclosures associated with actual business activities, as opposed to aspirational policy and targets.

Overall, climate changes present the highest disclosure on NUM and NAR among the three categories of disclosures. The T-tests depicts the differences in means between the two groups (2013 & 2023) to be statistically significant at 1 percent for the NAR (4.03***) and NUM (5.10***).

[Table 3 goes about here]

In Table 4, and 5, we separate total environmental disclosure into two; internal facing (Table 4) environmental disclosure and external facing environmental disclosures (Table 5), respectively. We based this division on GRI legislation.

Consistent with our main analysis (Table 3), Table 4 shows that NGOs discloses higher levels and quality of environmental disclosures in 2023, relative to 2013 in NAR and NUM, respectively. The result is statistically significant at 1% (3.36***). Also, empirical findings in Table 4 delineate that NUM environmental disclosure increases more than NAR. More specifically, the results of t-tests reveal the difference in means to be statistically significant at 1 percent level (4.68***) and 5 percent level for (3.03**) for NUM and NAR, respectively.

The empirical findings also provide that NGO disclose a higher quality and quantity of the environmental operational activities (OA, 5.18**) in comparison to policy and targets (P/T, 2.89). The t-tests confirm the differences in means between the two groups (2013 & 2023) of ENVMGT and CC disclosure to be statistically significant at 1 percent, while ECO shows insignificant results. Besides, the findings support H.3 that NGOs discloses higher volumes of environmental disclosures associated with the 'actual' business activities, as opposed to 'aspirational' policy and targets.

[Table 4 goes about here]

Second, we show the external facing (the societal) environmental disclosure. Table 5 depicts empirical results of mean difference of the t-tests of the external facing environmental disclosure in the context of ENVMGT, CC and ECO. The results shows that the disclosures of NUM (1.86**), NAR (2.09**) are both statistically significant at the 5% level. T-tests indicate a statistically significant difference in means for the NUM (1.91**), NAR (2.90**). Similar to the TOTAL and internal facing environmental disclosure, climate changes present the highest disclosure among the environmental categories. Overall, the findings, support our previous analysis.

[Table 5 goes about here]

4.3 Additional Analysis

As previously, management may have different incentives of engaging in producing environmental disclosures regarding, the internal facing and external facing environmental performance. To this end, we are motivated to investigate whether internal facing and external facing environmental disclosure increases at the same or different rate in year 2023. Empirical findings in Table 6 shows the results of the mean difference of T-tests of external facing and internal facing environment in year 2023 for ENVMGT, CC and ECO. The results delineate a higher internal facing environmental disclosure in year 2023, relative to external facing, for all types of environmental disclosures for all types of disclosures as it pertains to NUM, NAR, P/T and OA.

In Table 6(b), we repeat the analysis, but divide disclosures into TOTAL, and conduct T tests of each category. Empirical results again provide statistically significant results that regardless of the type of environmental disclosure provided, a higher volume of internal NAR, NUM, P/T and OA environmental information is disclosed, as compared to externally facing information.

[Table 6(a) and 6(b) goes about here]

Next, we conduct correlation analysis to discover whether there is an association between environmental disclosure propensity and firm level governance determinants. Table 7 depict a strong positive nexus between environmental disclosures (internal facing and external facing), and (ENVBDC)- environmental board sub-committees (0.57*), (WCEO)women CEO (0.40*), ISO 14001 EMS certification (0.66*) and NGOs that are signatory to the UN Global Compact (0.37*). This result supports assertion that environmental disclosures are associated with good sustainability practice (Gerged, 2021; Giannarakis *et al*., 2020).

[Table 7 goes about here]

4.4 Year-on-year analysis using automated text mining

In the main analysis, data is hand collected from a sample of 35 NGOs, over a two-year period (70 annual reports). The reason for adopting this approach, is because manually reading every TU which includes an environmental disclosure occurrence, can provide a basis to distinguish between P/T/OA, and Internal Facing/External facing disclosures. Moreover, a distinction could be made to include an occurrence, based on the best judgement of the author. However, identifying evolving reporting patterns could be challenging when only two annual reports are used. Thus, as an additional analysis, the authors conduct an in-depth qualitative analysis over a span of 10 years to better explore the evolving nature of reporting patterns. Whilst manually collecting data would provide valuable insights, this would take significant time commitment to perform (385 annual reports). This research bottleneck is recognised as a limiting constraint when conducting manual content analysis (Michelon et al., 2015). Loughran and McDonald (2016) accept that automated content analysis can be a viable solution. However, as Lim and Mali (2022) explain, automated text mining provides reduced granularity, when compared with a researcher reading a text. Moreover, they argue that whilst using automated text mining can

save time, it is not a substitute for an author reading the document. In view of these considerations, we employed the Python programming language to re-conduct the main analysis (TOTAL, NAR, NUM) using text mining. The sample consists of 10 years of NGO annual reports (35) from 2013 to 2023 (total of 385). The keyword tags are the same as those included in Table 1. However, because we use automated text mining, we are unable to provide results from P/T, OA, and Internal Facing/External facing disclosures. Furthermore, to avoid false positives, an occurrence is only recognised if a precise keyword match occurs. In comparison, using a manual approach, an author read every TU which contained any of the keywords listed in Table 1. Thus, if any keyword was deemed to be representative of an environmental disclosure by an author, it was included as an occurrence in the manual analysis.

Results are delineated in Table 8. Using text mining, TOT disclosures amount to 318 in 2013, and 1,290 in 2023. Whilst this result is substantially lower compared to the manual analysis, 1,244 (2013) and 3,795 (2023), the increase for both is relatively similar, 405% (1,290/318) for the text mining analysis, and 305% for the manual analysis. This result can be expected, given the constraint to only include exact matches in the automated text mining approach, to avoid false positives. Table 8 reveals that using automated text mining, it has taken at minimum 8-9 years for there to be a highly statistically significant (0.05<**) increase in environmental disclosure availability on the annual reports of NGOs. The results therefore suggest that whilst NGOs can have an incentive to enhance the availability of environmental disclosures on annual reports, this process has taken time.

[Table 8 goes about here]

5. Summary of findings, contributions and Recommendations

The study makes several significant contributions to the environmental accounting literature and sustainability policy. First, drawing on legitimacy theory, prior research has found that publicly listed firms tend to increase volume of environmental disclosures over time (Haque & Ntim, 2018). Moreover, the study reports that using 2013 as a benchmark, it has taken 8-9 years for NGOs to provide a statistically significantly higher availability of NAR/NUM/TOTAL environmental disclosures. Relatively few studies have examined environmental disclosure practices within non-governmental organizations (NGOs), creating academic uncertainty regarding whether NGOs possess the financial resources and technical expertise necessary to produce high-quality environmental reporting (Asogwa, 2023; Haque & Irvine, 2018). In this

regard, our findings provide empirical support indicating that given a sufficient time period, NGOs in the UK disclose statistically significant higher volumes of environmental information, aligning with societal expectations and demonstrating their capacity to fulfil their implicit social contract. This contribution has policy relevance, as it affirms that NGOs are actively engaged in reporting their environmental performance with both intent and capability.

Second, extant literature suggests that numerical (NUM) disclosures, as opposed to narrative (NAR), are indicative of higher reporting quality due to their verifiability (Bourveau et al., 2022; Duff, 2018). Given this, NUM disclosures are recognized for their potential to enhance environmental accountability and contribute positively to a firm's public image (Agyemang et al., 2019; Dillard & Vinnari, 2019). In line with these, our analysis reveals that NGOs are increasingly disclosing NUM-based environmental information over time, implying that they possess requisite expertise and the motivation to provide high-quality, and transparent data to stakeholders for search for legitimacy. Therefore, this result may serve as a source of reference to policy makers who are establishing environmental disclosure guidelines for NGOs in the wake of accountability deficits.

Third, Lim and Mali (2022) postulate that policy related disclosures in annual reports may sometimes obscure the operational realities of organizational behaviour. This raises concerns that NGOs might limit their disclosures to aspirational policy statements rather than substantive actions. Contrary to this concern, our results portray that NGOs disclose higher volumes of operational activities (OA) compared to policy and target (P/T) information. This suggests that NGOs are not only articulating environmental commitments but are also providing evidence of tangible actions, thereby reinforcing their legitimacy through operational transparency. In view of this, the results offer guidance to organisations, specifically those facing legitimacy threats for poor environmental performance, to adopt proactive environmental risk management, such as establishing targets/policies. Adopting these strategies may improve environmental practice, thus increasing environmental reporting.

Fourth, NGOs are understood to have a vested interest in meeting societal expectations by disclosing how their operations impact stakeholders and the broader environment (Baier et al., 2020; Haque & Irvine, 2018). This aligns with Friedman and Miles (2002), who argue that granular disclosures are consistent with stakeholder theory, particularly in the context of the growing public consciousness about environmental protection. Our study provides evidence that NGOs are equipped to disclose high-quality information about internally and externally oriented environmental practices. Notably, the volume and quality of the internal disclosures

appear to support externally facing disclosures (effect), suggesting a coherent and legitimate strategy that aligns environmental intent with performance. Drawing from this, policymakers, regulators and organisations may use this insight as guidelines for environmental performance disclosure to encourage firms to adopt internal-facing and external-facing disclosure, given that existing UK NGOs environmental guidelines don't suggest that as a mandatory requirement.

The study offers methodological insights and identifies areas for future research. A balanced panel of 35 NGOs was analysed over the passage of time, which aligns with sample sizes used in prior studies (Duff, 2018; Lim & Mali, 2022). These NGOs were selected based on their leading positions in terms of charitable donations, which may imply similar motivations to engage in environmental disclosure as a means of seeking legitimacy. Although this study utilised annual reports as the source of environmental disclosure in social and environmental accounting (SEA) research (Deegan, 2019; Lee et al., 2017), NGOs also disclose information through other mediums such as CSR reports, integrated reports, media releases, and websites. Therefore, future research may benefit from incorporating these additional sources to assess consistency of environmental reporting practices. Additionally, future studies could consider the use of algorithmic techniques, which have been shown to enhance analytical efficiency in small-sample research (Fisher & Hall, 1991). Moreover, forthcoming studies might incorporate interview method alongside quantitative data to enhance the robustness of the findings. This may permeate scholars to understand factors behind quantitative findings (Morse, 2016). Also, future research may carryout additional test in establishing governance factors driving internal facing and external facing environmental disclosure.

Finally, the study's limitations are introduced. We select a 10-year period because to the best of our knowledge, no pervious study has investigated the extent to which NGO environmental disclosure practices have changed over the passage of time. We also use a hand collected sample to provide nuance to our interpretations, specifically related to internally/externally facing, and OL – P/T disclosures. Because of the time-consuming nature of hand collecting data, we do not report on how disclosures may change on a year-on-year basis. Future studies may use AI and machine learning to investigate the extent to which environmental disclosures change on a year-on-year basis. However, as explained previously, AI and machine learning has a caveat, in the sense that any keyword included on the list would be recognised as an occurrence/observation, regardless of context. Moreover, our sample consists of 35 out of the largest 50 NGOs in the UK. Results may be different for smaller NGOs, or NGOs based in less developed countries. Future studies may investigate whether NGO size, location or funding,

can have an intervening effect on environmental disclosure quality. Besides, we use a single theoretical framework which may not explain all features that motivate NGOs to engage on environmental disclosure. Thus, future studies can use multi-theoretical framework such as combining social contract theory or stakeholder theory, with the legitimacy theory to improve understanding of factors that drive NGOs environmental reporting.

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List of Appendices

Table 1. Keywords for Environmental Disclosure

Climate Change	Environmental Management	Ecosystems
Biofuel	Environmental policy	Supply chain eco-efficiency index
Climate change strategy	Environmental goals	Eco-system planning
Green renewable solar energy	EMS systems	Biodiversity management
Stewardship of wind energy resources	Environmental auditing	Access to land and water
Emission ghg reductions	ISO 14001	Agriculture, deforestation and wetland
Greenhouse gases	Department of Environmental Management	Coastal ecosystem resilience
Ppm co2 aviation	Natural resources	Land, water, biodiversity
Ocean acidification	Energy efficiency	Ecosystem restoration and protection
Stratospheric ozone depletion	Soil conservation	Forest conservation
Climate adaptation	Biodiversity initiatives	Water conservation
Sequestration	Eco-efficiency	Species preservation

Source: (Baier et al., 2020; Haque & Irvine, 2018)

Table 2. Table 2 Descriptive Statistics

Variable	N	Mean	SD	Min	Max
TOTAL	70	72.1	99.0	0.00	539
NAR	70	62.9	90.89	0.00	506
NUM	70	9.01	11.42	0.00	51
P/T	70	3.18	3.64	0.00	17
ENV Accountability Statement	70	0.69	0.468	0.00	1.00
OA	70	59.54	88.68	0.00	499

Table 2 shows the descriptive statistics of environmental disclosures (Total, NAR, NUM, P/T, OA) and one governance characteristics. Total means all environmental disclosure, NAR represents narrative

disclosure, while NUM is numeric, P/T are environmental disclosures related to policy and target. OA is environmental operational activities disclosure. ENV accountability statement refers to NGOs environmental accountability commitment.

Table 3. Total Environmental Disclosure Statistics (2013 vs 2023)

Theme	Category	2013 (Sum)	2023 (Sum)	2013 (Mean)	2023 (Mean)	T-test (Diff)
ENVMGT	NAR	247	864	7.37	24.00	4.08***
ENVMGT	NUM	30	144	0.40	4.11	4.96***
ENVMGT	P/T	19	65	0.54	1.85	4.97***
ENVMGT	OA	228	799	5.77	20.05	3.72***
CC	NAR	294	1427	8.40	40.77	4.03***
CC	NUM	44	271	1.37	7.74	5.10***
CC	P/T	12	72	0.35	2.05	4.93***
CC	OA	282	1355	6.97	38.71	1.78**
ECO	NAR	572	990	19.08	28.34	0.89
ECO	NUM	57	97	2.11	7.74	4.32***
ECO	P/T	13	42	0.37	1.20	3.12**
ECO	OA	559	948	12.48	22.11	1.07
TOTAL	NAR	1123	3283	32.11	93.80	2.99**
TOTAL	NUM	131	512	3.40	14.62	4.7-***
TOTAL	P/T	34	179	1.25	5.11	5.18***
TOTAL	OA	1079	3104	30.85	88.62	2.89**
TOTAL	ALL	1,244	3,795	54.37	108.28	3.27**

Note: Table 3 shows the Total environmental disclosure and T-test values for difference between means, in year 2013 and 2023. ENVMGT represents environmental management disclosure. CC means climate change disclosure and ECO reflects ecosystems disclosure. NUM and NAR denote numerical and narrative disclosure, respectively. P/T and OA means disclosures related to policy and targets, and operational activities. *, **, *** indicate significance level at 10%, 5%, 1% respectively

Table 4: Summary of Internal Facing Environmental Disclosure Statistics (2013 vs. 2023)

Theme	Category	2013 (Sum)	2023 (Sum)	2013 (Mean)	2023 (Mean)	T-test (Diff)
ENVMGT	NAR	210	767	6.31	21.91	3.93***
ENVMGT	NUM	13	127	0.37	3.62	4.51***
ENVMGT	P/T	9	65	0.54	1.85	4.97***
ENVMGT	OA	201	702	5.77	20.05	3.72***
CC	NAR	256	1305	7.31	37.28	3.99***
CC	NUM	43	236	1.23	6.74	4.68***
CC	P/T	12	72	0.35	2.05	4.93***
CC	OA	244	1233	6.97	35.22	3.89***
ECO	NAR	450	818	12.85	23.37	1.16
ECO	NUM	19	42	0.54	1.20	1.13
ECO	P/T	13	42	0.37	1.2	3.12**
ECO	OA	437	776	12.48	22.11	1.07
TOTAL	NAR	916	2890	26.48	82.51	3.03**
TOTAL	NUM	75	405	2.14	11.57	4.68***
TOTAL	P/T	34	179	1.25	5.11	5.18***
TOTAL	OA	882	2711	25.22	77.4	2.89**
TOTAL	ALL	991	3295	28.62	94.14	3.36 ***

Note: Table 4 shows the internal facing (firm level) environmental disclosure. All descriptions of variables remain the same as table 3. *, **, *** indicate significance level at 10%, 5%, 1% respectively

Table 5. External-Facing Environmental Disclosure Statistics (2013 vs 2023)

Theme	Category	2013 (Sum)	2023 (Sum)	2013 (Mean)	2023 (Mean)	T-test (Diff)
ENVMGT	NAR	37	97	1.05	2.77	2.90**
ENVMGT	NUM	13	17	0.29	0.48	1.91**
ENVMGT	P/T	0.00	0.00	0.00	0.00	0.00
ENVMGT	OA	37	97	1.05	2.77	2.90**
CC	NAR	38	122	1.08	3.48	3.09**
CC	NUM	5	35	0.14	1.00	1.56
CC	P/T	0	0	0.00	0.00	0.00
CC	OA	38	122	1.08	3.48	3.48
ECO	NAR	122	174	3.48	4.97	0.78
ECO	NUM	38	55	1.08	1.57	0.53
ECO	P/T	0	0	0.00	0.00	0.00
ECO	OA	122	174	3.48	4.97	0.78
TOTAL	NAR	197	393	5.62	11.22	2.09**
TOTAL	NUM	56	107	1.25	3.05	1.60**
TOTAL	P/T	0	0	0.00	0.00	0.00
TOTAL	O/A	253	500	6.88	14.28	2.12**
TOTAL	ALL	253	500	6.88	14.28	2.12**

Table 5 presents external facing environmental disclosure (at society level) categories under ENVMG, CC and ECO. Descriptions of the variables are similar to Table 3. *, **, *** indicate significance level at 10%, 5%, 1% respectively

Table 6(a)
Internal vs. External Facing Environmental Disclosure (2023)

Category	Metric	External (Sum)	Internal (Sum)	External (Mean)	Internal (Mean)	T-test (Diff)
ENVMGT	NUM	17	127	0.48	3.63	4.27***
	NAR	97	767	2.77	21.97	5.48***
	P/T	0	65	0.00	1.86	8.86***
	OA	97	702	2.77	20.05	5.05***
CC	NUM	35	236	1.00	6.74	5.11***
	NAR	122	1305	3.48	37.28	4.83***
	P/T	0	72	0.00	2.05	6.48***
	OA	122	1233	3.48	35.22	4.69***
ECO	NUM	55	42	1.57	1.20	0.46
	NAR	174	818	4.97	23.37	2.30**
	P/T	0	42	0.00	1.20	4.89***
	OA	174	776	4.97	22.11	2.16**

Notes:

- ENVMGT = Environmental Management
- CC = Climate Change
- ECO = Ecosystems
- NUM = Numerical disclosures
- NAR = Narrative Disclosures
- P/T = Policy/Target Disclosures
- OA = Operational activities
- T-test significance levels: ***p < .01**, **p < .05**, *p < .1*

Table 6(b). Internally vs externally facing disclosures TOTAL mean difference.

Variable	External facing	Internal Facing	t-Statistic
Narrative words	393	2890	4.29***
Numerical disclosures	107	405	4.39***
Policy/Target disclosures	0	179	7.69***
Operational activities	393	2711	4.06***
Total	500	3295	

Table 7: Pairwise correlations Matrix

Variables	1	2	3	4	5	6	7	8	9	10	11	12
Internal facing ENVD	1.00											
External facing ENVD	0.80*	1.00										
WBD	0.41*	0.30	1.00									
ENVBDC	0.57*	0.46*	0 .19	1.00								
BDI	0.13	0.08	0.19	0.07	1.00							
BDSize	0.13	0.08	0.19	0.12	0.95*	1.00						
WCEO	0.40*	0.32*	0.24	0.16	0.08	0.11	1.00					
ENVAccountability	0.36*	0.37*	0.25	0.24	0.41*	0.37*	0.24	1.00				
Donation	0.21	0.18	0.31*	0.14	0.44*	0.47*	0.14	0.36*	1.00			
ISO14001	0.66*	0.61*	0.08	0.30	0.07	0.05	0.38*	0.17	0.08	1.00	1.00	
Sign toGlobal Compact	0.37*	0.60*	0.00	0.30	0.03	0.02	0.24	0.17	0.11	0.47*	1.00	
Firm Size	0.15	0.10	0.33*	0.12	0.34*	0.42*	0.09	0.21	0.86*	0.11	0.00	1.00

Table 8 represents pairwise correlation. ENVD is the environmental disclosure. Internal facing environmental disclosure, External facing environmental disclosure. WBD is the proportion of women directors to the board size. ENVBDC is the environment board subcommittee an indicator variable 1 if there is existing of such subcommittee, zero, otherwise. INED is the proportion of independent non-executive directors to the board size. BDSize is the total number of board of directors. WCEO is a dummy variable one if the CEO is woman, otherwise zero. ENV Accountability is the organization commitment environmental disclosure given 1 if there is annual statement, zero otherwise. ISO 14001, is an indicator variable 1 if the NGO has ISO1400 EMS, zero otherwise. Signatory to UN global impact, an indicator variable 1 if the NGO has signed the principles of UN global compact, zero otherwise. Donation size is measured as log of donation. Firm size is the log of asset. *** $p<0.01$, ** $p<0.05$, * $p<0.1$ indicate significance level.

Table 8: year-on-year analysis using automated text mining

Category	Theme	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
TOTAL	CC	71	70	83	117	101	116	140	325	524	517	614
Diff			-1	12	46	30	45	69	254	453	446	543
P-Val			0.48	0.46	0.39	0.42	0.30	0.25	0.16	0.00***	0.01***	0.00***
NAR	CC	55	56	66	100	83	93	129	233	409	397	471
Diff			1	10	34	-17	10	36	104	176	-12	74
P-Val			0.49	0.39	0.34	0.38	0.36	0.29	0.11	0.06*	0.02**	0.00***
NUM	CC	16	14	17	17	18	23	11	92	115	120	143
Diff			-2	1	1	2	7	-5	76	99	104	127
P-Val			0.39	0.43	0.43	0.40	0.33	0.36	0.14	0.12	0.06*	0.05**
TOTAL	ECO	211	209	204	285	302	327	347	317	442	480	549
Diff			-2	-7	74	91	116	136	106	231	269	338
P-Val			0.54	0.51	0.32	0.27	0.25	0.16	0.18	0.03**	0.01***	0.00***
NAR	ECO	185	184	175	245	267	284	308	278	390	431	502
Diff			-1	-10	60	82	99	123	93	205	246	317
P-Val			0.49	0.41	0.29	0.25	0.17	0.16	0.17	0.04**	0.01***	0.00***
NUM	ECO	26	28	29	40	35	43	39	39	52	49	47
Diff			2	1	11	-5	8	-4	0	13	-3	-2
P-Val			0.41	0.49	0.16	0.35	0.33	0.37	0.61	0.13	0.36	0.41
TOTAL	ENVMGT	38	39	40	40	38	65	63	78	97	106	127
Diff			1	2	2	0	27	25	40	59	68	89
P-Val			0.48	0.41	0.41	0.55	0.13	0.15	0.11	0.08***	0.07***	0.05**
NAR	ENVMGT	32	33	37	36	32	60	59	71	90	97	119
Diff			1	5	4	0	28	27	39	58	65	87
P-Val			0.43	0.45	0.46	0.56	0.13	0.14	0.12	0.06	0.06	0.05**
NUM	ENVMGT	6	3	3	4	6	5	4	7	7	9	8
Diff			-3	-3	-2	0	-1	-2	1	1	3	2
P-Val			0.39	0.33	0.48	0.46	0.56	0.49	0.55	0.53	0.43	0.46
TOTAL	TOTAL	320	318	327	442	441	508	550	720	1063	1103	1290
Diff			-2	7	122	121	188	230	400	743	783	970
P-Val			0.47	0.38	0.34	0.34	0.20	0.18	0.04**	0.00***	0.00***	0.00***
NAR	TOTAL	272	273	278	381	382	437	496	582	889	925	1092
Diff			1	6	109	110	165	224	310	617	653	820
P-Val			0.50	0.34	0.38	0.29	0.28	0.19	0.11	0.00***	0.00***	0.00***
NUM	TOTAL	48	45	49	61	59	71	54	138	174	178	198
Diff			-3	4	12	-2	12	-17	84	36	4	20
P-Val			0.34	0.34	0.32	0.33	0.29	0.33	0.04**	0.00***	0.00***	0.00***