COMPARATIVE ENVIRONMENTAL DISCLOSURE PRACTICES: EVIDENCE FROM THE UK AND THE USA

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Abstract

This study examines environmental reporting practices among leading firms in the United Kingdom (UK) and the United States of America (USA) by analyzing the top 50 firms from the Financial Times Stock Exchange 100 (FTSE100) and the Standard & Poor 100 (S&P100) indices during 2018 and 2019. Using volumetric metrics from annual and stand-alone reports, we assess disclosure patterns prior to the adoption of the revised Global Reporting Initiative (GRI) Standards and in anticipation of the International Financial Reporting Standards (IFRS) S1 and S2. Statistical analyses including correlation tests and both independent and paired sample t-tests reveal three key findings: (1) UK firms disclosed significantly less environmental content than US firms, suggesting strategic prioritization of other environmental, social, and governance (ESG) topics and alignment with national reporting expectations; (2) strong correlations among volumetric disclosure measures, coupled with statistically significant shifts over time, indicate that firms exhibit both consistency and adaptability in disclosure practices; and (3) significant differences in disclosure volumes between the two countries confirm the influence of regulatory systems, national cultures, and reporting norms. These findings support legitimacy theory and suggest that the environmental disclosure volume highlights the role of institutional and cultural contexts. They illustrate how multinational corporations navigate regulatory changes and prepare for new standards, offering a valuable perspective for evaluating corporate environmental accountability. This study underscores the continuing relevance of legitimacy theory and calls for further research into the drivers of voluntary sustainability reporting in a shifting regulatory landscape.

Keywords: *Environmental Information Disclosure; Environmental Reporting; Voluntary Disclosure; Disclosure Quantity; UK; USA*

JEL Classification M41. Q51. Q56. G15

1. Introduction

In the dynamic landscape of corporate environmental reporting, differing national legislations and evolving global standards continue to shape both the form and substance of corporate disclosures. In the United Kingdom (UK), Section 417 of the Companies Act 2006 (Great Britain, Companies Act 2006) mandates the inclusion of detailed environmental information within the Business Review, with the stated objective of promoting transparency and accountability. Yet, its reliance on broad, principles-based guidelines has attracted criticism for fostering inconsistent reporting practices in the absence of a robust interpretive framework. By contrast, the United States of America (USA), through the Securities and Exchange Commission (SEC) Regulation S-K, particularly Items 101, 103, 303, and 503(c), (SEC, 2008) requires disclosure of environmental risks and liabilities but largely frames them within financial materiality, reinforcing a legalistic and investor-focused orientation. These diverging systems, the UK's stakeholder-oriented principles and the USA's investor-oriented rules, reflect not only regulatory contrasts but also deeper institutional and cultural logics underpinning corporate disclosure behavior (Harper Ho, 2020; Nölke, 2005).

Efforts to harmonize global reporting practices have recently intensified with the introduction of the International Financial Reporting Standards (IFRS) S1 (ISSB, 2023a) and IFRS S2 (ISSB, 2023b) by the International Sustainability Standards Board (ISSB) in 2023. These standards aim to provide a unified framework for sustainability and climate-related disclosures across jurisdictions, emphasizing comparability, consistency, and decision-usefulness. IFRS S1 (ISSB, 2023a) requires entities to disclose sustainability-related risks and opportunities affecting enterprise value, while IFRS S2 (ISSB, 2023b) focuses specifically on climate-related metrics and targets. These frameworks are expected to be effective from January 1, 2024, and represent a pivotal step toward globally consistent environmental reporting. However, given that US firms largely follow the US Generally Accepted Accounting Principles (GAAP), with its embedded emphasis on legal compliance and financial risk, direct adoption of IFRS-based sustainability standards remains improbable. As a result, differences in national disclosure practices are likely to continue, influenced not only by regulatory frameworks but also by institutional norms and the strategic quest for legitimacy.

In the United States, the landscape of sustainability disclosure is evolving rapidly. The Securities and Exchange Commission (SEC) adopted climate-related disclosure rules on March 6, 2024. However, the implementation of these rules has been voluntarily stayed by the SEC pending the completion of judicial review following multiple legal challenges. The ongoing litigation in the US Court of Appeals for the Eighth Circuit has created uncertainty regarding the ultimate status of these rules, highlighting the complex interplay between regulatory efforts and legal challenges in shaping sustainability disclosure requirements in the USA (Pirzada et al., 2025).

While regulatory structures provide formal scaffolding for environmental reporting, they do not operate in isolation. Firms often respond not only to legal mandates but also to broader societal expectations, strategic imperatives, and deeply embedded institutional norms. This behavioral rationale is aptly captured by legitimacy theory, which posits that organizations engage in disclosure practices to justify their operations, align with stakeholder values, and secure continued acceptance within their social environment (Chelli et al., 2014; Cho & Patten, 2007; Clarkson et al., 2008). A more refined application of this theory identifies three distinct

mechanisms of legitimacy: pragmatic legitimacy, which satisfies the self-interest of key stakeholders; moral legitimacy, which is grounded in normative expectations of ethical conduct; and cognitive legitimacy, which arises from conforming to established social norms and taken-for-granted practices (Baalouch et al., 2019; Dhaliwal et al., 2014).

These legitimacy pathways are not uniformly distributed across jurisdictions but are shaped by the surrounding institutional and cultural environments. For example, the United States regulatory landscape, which is rooted in common law traditions and market-based governance, tends to prioritize pragmatic legitimacy through detailed and compliance-focused disclosures aimed at satisfying investors and mitigating litigation risk. By contrast, the United Kingdom, with its principles-based and stakeholder-oriented model, may encourage disclosures that appeal more to moral or cognitive legitimacy, aligning with societal values and prevailing norms of accountability. This divergence is further influenced by broader institutional logics, such as national culture, legal origin, and corporate governance systems, which create distinctive expectations regarding transparency and accountability (Cieslewicz, 2014; Prescott & Vann, 2015). Cultural values, including attitudes toward regulation, risk, and corporate responsibility, play a formative role in shaping disclosure behavior, often reinforcing or counterbalancing regulatory intent. Consequently, the act of environmental reporting becomes not merely a function of compliance, but a strategic response embedded in a complex web of institutional, cultural, and stakeholder pressures. By examining disclosure volume as an observable manifestation of legitimacy-seeking behavior, this study interrogates how firms in different national systems construct and deploy disclosure practices to navigate these intersecting pressures (Pirzada et al., 2023; Tarquinio & Posadas, 2020).

Beyond national regulatory mandates, supranational organizations have played a pivotal role in shaping the evolution of environmental disclosure practices by promoting voluntary reporting frameworks. Initiatives such as the United Nations (UN) Global Compact (UN, 2010), the Organization for Economic Co-Operation and Development (OECD) Guidelines for Multinational Enterprises (OECD, 2011), the UK Department for Environment, Food, and Rural Affairs (DEFRA) reporting guidelines (DEFRA, 2006, 2009, 2011, 2019), and the Global Reporting Initiative (GRI) Sustainability Reporting Guidelines (GRI, 2000, 2002, 2006, 2011, 2013, 2016) have encouraged corporations to extend their reporting efforts beyond legal compliance toward broader accountability. These frameworks seek to align corporate behavior with sustainable development goals by fostering transparency, comparability, and inclusivity in environmental reporting. However, despite their growing adoption, significant variation persists in how companies implement and interpret these guidelines. This variation reflects not only the diversity in institutional environments but also the strategic decisions firms make in response to perceived legitimacy threats or opportunities. In institutional contexts where stakeholder expectations exert normative pressure, firms may adopt such voluntary frameworks to secure moral or cognitive legitimacy. In contrast, in environments where disclosure is primarily evaluated through a financial lens, these frameworks may be adopted symbolically or selectively to reinforce pragmatic legitimacy with investors or regulators. Consequently, voluntary disclosure does not occur in a theoretical vacuum but is embedded within a broader matrix of regulatory, cultural, and institutional forces. The strategic use of voluntary frameworks highlights the agency of firms in shaping their legitimacy narratives and adapting to the dual imperatives of global convergence and local responsiveness in environmental governance.

Despite extensive scholarship on corporate environmental disclosure, comparative studies that systematically investigate the volumetric dimensions of such disclosures across differing regulatory and institutional environments remain limited. Much of the existing literature has focused on single-country contexts, often emphasizing either the qualitative content of disclosures or aggregated environmental, social, and governance (ESG) ratings without disentangling the strategic use of disclosure volume as a means of organizational legitimation (Hoang et al., 2023; Konar & Cohen, 1997; Lock & Seele, 2016). While several studies have acknowledged the role of regulation in shaping disclosure practices, fewer have investigated how these disclosures are quantitatively deployed by firms operating under distinct institutional logics, such as the principles-based system of the UK versus the rules-based framework of the US (Adams & Kuasirikun, 2000; Alotaibi & Hussainey, 2016; Bhatia & Tuli, 2018; Michelon et al., 2015). In particular, minimal attention has been paid to the ways in which disclosure volume may serve as a strategic vehicle for securing legitimacy within culturally and institutionally divergent settings.

This oversight is especially salient considering the imminent implementation of global sustainability standards, such as IFRS S1 (ISSB, 2023a) and IFRS S2 (ISSB, 2023b), which promise to reconfigure the disclosure landscape in the coming years. The present study leverages data from 2018 and 2019 to capture a critical transitional moment, just before these standards begin to influence reporting behavior. By establishing a baseline assessment of disclosure volumes in the UK and USA, this study offers empirical insights into how corporations may already be adapting their practices in anticipation of global convergence, even while embedded in nationally distinct systems. Through a comparative lens and a refined set of volumetric indicators, the study responds to calls for more granular, theory-driven analyses that move beyond descriptive comparisons to reveal the underlying strategic rationales and legitimacy imperatives that drive environmental disclosure decisions.

Building on this theoretical and empirical foundation, the present study aims to investigate how divergent regulatory, institutional, and cultural environments influence the volume and nature of corporate environmental disclosures. Focusing on the UK and the USA, two economically advanced nations with contrasting disclosure philosophies and institutional logics, this study employs a comparative approach to examine how firms respond strategically to different configurations of regulatory pressure and legitimacy expectations. The selected timeframe of 2018 and 2019 captures a unique transitional period, just before the rollout of the IFRS S1 and IFRS S2 standards. This temporal positioning allows for an exploration of pre-standardization disclosure behaviors, offering a baseline for understanding how corporations may be preparing for greater alignment with global sustainability norms.

Rather than evaluating disclosure solely as a matter of content or compliance, this study conceptualizes disclosure volume as an observable proxy for strategic intent and legitimacy-seeking behavior. By applying multiple volumetric indicators, the research investigates whether firms use disclosure quantitatively to signal environmental responsibility and conform to institutional expectations shaped by their domestic environments. This approach enables the identification of both convergences and divergences in disclosure strategies between UK and US firms, while also allowing for an assessment of whether such strategies reflect anticipatory adaptation to forthcoming global standards. In doing so, the study not only addresses a critical gap in the environmental reporting literature but also contributes to a deeper understanding of how regulatory, institutional, and cultural forces shape the evolving landscape of corporate

environmental accountability.

The remainder of this paper is organized as follows. Section 2 provides a comprehensive review of relevant literature, grounding the study's hypotheses in legitimacy theory and institutional perspectives, and elaborates on prior empirical findings related to environmental disclosure practices and their measurement. Section 3 outlines the research methodology, including the rationale for sample selection, the operationalization of disclosure metrics, and the analytical techniques used to evaluate cross-jurisdictional patterns. Section 4 presents the results of the analysis, highlighting significant trends and statistical relationships in disclosure behaviors between UK and US firms. Section 5 offers a critical discussion of these findings, interpreting them through the lens of regulatory design, cultural context, and legitimacy-seeking behavior. Finally, Section 6 concludes the study by summarizing the key insights, acknowledging limitations, and proposing avenues for future research. In doing so, the paper contributes to ongoing scholarly debates about the strategic role of environmental disclosure in diverse institutional settings and provides a timely empirical foundation for assessing the implications of global reporting standardization efforts led by the ISSB.

2. Literature Review

2.1 Environmental, Social and Governance (ESG) issues

Environmental, social, and governance (ESG) disclosures have become a central component of corporate communication strategies, reflecting the growing expectations of stakeholders regarding transparency, sustainability, and ethical behavior. The increasing importance of ESG-related information stems from heightened awareness of corporate environmental and social impacts, as well as evolving standards for responsible governance. While ESG disclosures are often framed as mechanisms of transparency, an emerging body of research interprets them as strategic tools through which firms manage stakeholder perceptions and secure organizational legitimacy (Adams et al., 1998; Deegan et al., 2002; Patten, 2002; Tohang et al., 2024).

Legitimacy theory provides a robust theoretical lens for understanding this behavior. Drawing from Lindblom's (1994) foundational work, four strategies are commonly identified through which firms may attempt to maintain or restore legitimacy: (1) educating and informing stakeholders about desirable performance, (2) changing stakeholder perceptions through selective disclosure, (3) distracting attention from undesirable actions by emphasizing positive attributes, and (4) reshaping societal expectations themselves. Each of these strategies may manifest through ESG reporting, particularly in contexts where firms perceive a legitimacy gap or anticipate future scrutiny. Empirical evidence suggests that large firms and those operating in environmentally sensitive industries are more likely to engage in extensive ESG reporting, both to mitigate reputational risk and to signal alignment with societal norms (Chelli et al., 2014; Clarkson et al., 2008; Dhaliwal et al., 2014).

Legitimacy theory has largely been employed to explain corporate environmental disclosure practices in terms of whether they are used as strategies to: gain, maintain or restore firm legitimacy. In line with this, Lindblom (1994) suggested that the disclosure may be used to inform the public about performance on matters relating to environment and society, change attitudes about such performance, distract scrutiny from visibly recognized harms by

emphasizing positive information, or to adjust society anticipation about performance. Following this, firms in vulnerable industries or large firms have empirically been found to provide more environmental information both in terms of volumes and extent of information content (e.g. Adams et al., 1998; Deegan et al., 2002; Patten, 2002; Tohang et al., 2024). Nonetheless, as there is a growing consensus that Environmental, Social and Governance (ESG) issues are important for corporate resiliency and competitiveness, environmental issues may not only be a central consideration. This research first hypothesizes that the quantity of environmental information disclosure may be manipulated in an effort to legitimize the firms itself.

While much of the literature has focused on the qualitative content or thematic orientation of ESG disclosures, the volume of disclosure itself can serve as a powerful signal of a firm's legitimacy-seeking intent. The underlying assumption is that firms strategically adjust the quantity of disclosure in response to various external pressures, including regulatory mandates, societal expectations, and reputational concerns. Higher volumes may reflect a more proactive strategy to demonstrate transparency and engagement, particularly when facing heightened expectations or operating within stakeholder-oriented governance environments. Conversely, lower volumes may indicate either the absence of external pressure or a deliberate effort to minimize exposure, particularly within investor-centric regimes that prioritize financial over non-financial information. This strategic variability in disclosure volume corresponds to the nuanced mechanisms of legitimacy identified by Suchman (1995), which include pragmatic legitimacy that emphasizes tangible benefits to stakeholders, moral legitimacy that is grounded in ethical and normative approval, and cognitive legitimacy that reflects conformity with established societal norms and expectations.

In the context of ESG reporting, these legitimacy mechanisms often intersect. For instance, a firm may seek pragmatic legitimacy by highlighting its environmental performance to investors, while also pursuing moral legitimacy by aligning disclosures with global sustainability goals. This intersection underscores the complexity of ESG communication, especially in institutional contexts with differing expectations around what constitutes credible disclosure. As the global push for standardization intensifies, through initiatives such as IFRS S1 (ISSB, 2023a) and IFRS S2 (ISSB, 2023b), the volume and structure of ESG disclosures are likely to become even more critical as firms attempt to position themselves as compliant, responsible, and forward-looking.

Given this theoretical framing, we propose that the volumetric level of ESG disclosure is not merely a function of data availability or compliance requirements. Rather, it reflects a deliberate strategic choice, made considering institutional pressures and legitimacy goals. Firms are expected to manage ESG disclosure volume in ways that enhance their legitimacy, especially under the scrutiny of increasingly sustainability-conscious stakeholders. Accordingly, the following hypothesis is posited:

H_1: *The volumetric level of environmental information disclosure is strategically manipulated, and the overall voluntary disclosure is not solely concentrated on environmental issues but also encompasses other ESG dimensions to enhance corporate legitimacy.*

This hypothesis focuses on understanding how firms balance the disclosure of environmental information with other ESG concerns, reflecting the broader strategic imperatives that guide corporate disclosure practices today. By framing the hypothesis in this manner, the discussion

is directly anchored in the literature on legitimacy theory and the evolving importance of comprehensive ESG reporting. This approach not only aligns the hypothesis with the problem statement but also clarifies its relevance in the current corporate governance landscape.

In addition, different measures of environmental disclosure are discussed, followed by the impact of different reporting regulations on disclosure.

2.2 Measures of disclosure

The measurement of corporate environmental disclosure has long been a focal point in sustainability and accounting research, particularly as scholars seek to understand not just whether firms disclose, but how much and in what manner. Early studies in the field often adopted a binary lens, focusing on the presence or absence of disclosure items to construct indices that could compare reporting behavior across firms or jurisdictions. However, as the field matured, it became increasingly evident that this dichotomous approach failed to capture the complexity, strategic intent, and variation in how disclosures are presented. Consequently, contemporary research has turned toward more nuanced measurement strategies, typically differentiating between two major dimensions of disclosure: quantity and quality (Deegan et al., 2002; Patten, 2002).

The quantity of environmental disclosure refers to the volume or frequency of reported information, which can be operationalized through raw counts of sentences, words, or paragraphs that relate to environmental issues. This approach assumes that a greater volume signals greater transparency or organizational responsiveness, although it does not inherently capture the substance or depth of what is reported. On the other hand, quality of disclosure pertains to the meaningfulness, specificity, credibility, and comprehensiveness of the information provided. Quality assessments often involve applying semantic analysis, weighted scoring schemes, or alignment with reporting standards such as the Global Reporting Initiative (GRI) Sustainability Reporting Guidelines. Despite this conceptual distinction, many studies still treat quantity and quality in isolation, potentially obscuring the strategic interplay between these two dimensions in shaping corporate communication practices.

One of the earliest and most influential attempts to go beyond binary disclosure indices was conducted by Hasseldine et al. (2005), who explored the link between corporate environmental disclosure and reputation management strategies in the United Kingdom (UK). Their methodological innovation lay in using sentence counts as a direct measure of disclosure quantity, combined with a six-point ordinal scale designed to classify the content's degree of specificity and actionability. The scale ranged from the highest level of disclosure, featuring implementation, monitoring, and numeric performance targets, to the lowest, which included vague rhetorical statements or complete silence on environmental matters. This framework not only enabled a distinction between symbolic and substantive disclosures but also allowed for the identification of patterns across firms, industries, and time. Their findings revealed that although disclosure levels were generally low across the sample, both the volume and quality dimensions were positively correlated, implying that firms producing longer reports also tended to disclose more specific, actionable environmental data.

Expanding on this foundation, Michelon et al. (2015) conducted a comprehensive investigation into the environmental and social disclosure practices of Western firms, with a particular focus on UK companies. Their study adopted a more granular volumetric approach, utilizing

sentence-level indicators benchmarked against industry norms to assess both the absolute quantity and relative density of disclosures. Furthermore, their analysis incorporated semantic attributes drawn from the GRI G3 guidelines (GRI, 2006), scoring disclosures based on characteristics such as presentation format, quantitative expression, financial valuation, and the presence of goals or outcome metrics. These weighted measures enabled them to assess both the depth and intentionality behind corporate disclosures. While Michelon et al. (2015) did not explicitly explore the relationship between quantity and quality in their statistical models, they did report a positive alignment between the two, reinforcing the idea that high-volume disclosure may coincide with more meaningful or performance-oriented communication strategies. Their work remains a methodological benchmark for studies seeking to balance empirical tractability with theoretical rigor.

In recent years, the proliferation of third-party ESG rating systems has significantly influenced both corporate practice and academic research, especially in large-scale or cross-country studies. Prominent data providers such as Bloomberg, Thomson Reuters Eikon, and regional systems like Hua Zheng in China have developed proprietary scoring frameworks designed to assess the environmental, social, and governance performance of firms. These ratings typically aggregate a wide range of indicators into composite scores or rankings that can be used for benchmarking, investment screening, or longitudinal analysis. For instance, Hoang et al. (2023) utilized Bloomberg's ESG scores to evaluate the ESG performance of FTSE350 firms in the UK from 2016 to 2021. While their findings provided an informative overview of post-COVID-19 ESG trajectories, with average scores stabilizing around 50, the methodology relied heavily on predefined data structures and lacked transparency regarding weighting and scoring mechanisms.

Similar methodological concerns have been raised regarding other widely used systems. Dahlberg & Wiklund (2018) employed the Thomson Reuters Eikon ESG rating tool to evaluate Nordic firms, many of which enjoy strong reputations in global sustainability rankings. This system categorizes ESG factors into ten subdomains and produces percentile scores across sectors. However, such aggregation often results in the condensation of complex, multidimensional data into simplified numerical outputs that may not adequately reflect variation in firm-level disclosure strategies. Likewise, Zhang (2022) adopted the Hua Zheng ESG rating to analyze Chinese firms, using a nine-grade classification system that scores the completeness and quality of disclosed information. While this approach allows for some qualitative nuance, it still suffers from a lack of contextual flexibility and comparability across jurisdictions.

Similarly, Junius et al. (2020) employed Bloomberg's ESG scores to assess ESG engagement across firms in the ASEAN region. Although this approach offered a broad overview of corporate participation in sustainability practices, the study reported an average ESG score of just 26.1794, which the authors interpreted as indicative of superficial or symbolic adoption of ESG frameworks. This finding reinforces concerns that numerical scoring systems may reflect formal compliance rather than substantive performance, especially when firms engage in disclosure to meet minimal expectations rather than to communicate genuine commitment or long-term strategy.

A key shortcoming of these scoring systems lies in their opacity and standardization, which limit their ability to uncover strategic variations in how firms present their disclosures. By

reducing multidimensional information into single indices, they often obscure differences in tone, emphasis, or intent which are elements critical to understanding legitimacy-seeking behavior. Moreover, these systems are rarely sensitive to the regulatory, cultural, and institutional differences that influence disclosure expectations across jurisdictions. As such, while they offer a valuable macro-level perspective, they are less suited for fine-grained analysis of disclosure volume as a strategic and context-dependent communication tool.

Alongside third-party ratings, a substantial body of environmental disclosure research, particularly in developing country contexts, has continued to rely on simplified volumetric metrics, such as sentence counts, word counts, or dichotomous indices. These approaches remain widely used due to their accessibility, replicability, and compatibility with content analysis methods. For example, Buniamin (2010) examined corporate environmental reporting in Malaysia using basic sentence counts, while Alotaibi & Hussainey (2016) adopted a dichotomous index to assess environmental disclosures in Saudi Arabia. Similarly, Eljayash et al. (2012) investigated corporate environmental reporting in Middle Eastern and Northern African countries by counting words and applying a traditional index that allocated weighted scores to different disclosure categories. These studies collectively reveal that while disclosure volumes tend to be modest in these regions, the methods used often fail to reflect the strategic intentions or communicative nuances underlying the disclosures.

The main advantage of such methods lies in their comparative utility. Sentence or word counts provide clear, numerical indicators that can be used to benchmark firms across industries, countries, or during time periods. However, this simplicity comes at the cost of theoretical richness. Binary scoring systems that indicate the presence or absence of a disclosure item may ignore critical differences in tone, specificity, or narrative framing. For instance, a report that contains vague environmental slogans and one that includes detailed carbon emission metrics may receive the same score under a dichotomous scheme, despite representing vastly different levels of transparency and strategic engagement. Furthermore, these simplified metrics often abstract disclosures from their institutional settings, thereby failing to account for the cultural, regulatory, and market pressures that influence corporate behavior. In doing so, they risk presenting disclosure as a uniform practice rather than a contextualized strategic response. As legitimacy theory suggests, firms may deliberately tailor the quantity and form of their environmental reporting to satisfy diverse stakeholder expectations. When such variation is masked by rudimentary coding techniques, important insights into the interplay between institutional context and disclosure strategy may be lost.

The limitations of both dichotomous indices and aggregated ESG scores underscore the need for a more focused yet systematic approach to environmental disclosure measurement, one that enables comparability while remaining theoretically grounded. While previous methodologies have yielded valuable descriptive benchmarks, they often lack the granularity required to uncover strategic behavioral patterns embedded in disclosure practices. Additionally, the reliance on qualitative scoring or semantic interpretation, especially when executed through opaque or third-party mechanisms, risks masking firm-level variation and reducing disclosure to a compliance artifact. In contrast, volumetric measures, although more limited in their ability to capture content nuance, offer a transparent and replicable method for examining the extent of corporate environmental communication, which is especially relevant when disclosure volume itself is theorized as a legitimacy-seeking strategy.

This study adopts such an approach deliberately. While thematic or semantic analyses provide insights into message content and tone, they introduce a level of subjectivity that can complicate cross-firm or cross-country comparisons, particularly in large-sample studies. Moreover, as prior research has shown, volume itself may serve as a strategic signal, firms may choose to disclose more environmental information as a means of managing stakeholder expectations, responding to regulatory scrutiny, or maintaining institutional legitimacy in the absence of substantive policy changes. In this way, disclosure volume becomes a meaningful variable, not simply a mechanical indicator. It provides a way to observe how organizations allocate space and emphasis to environmental topics, and how these patterns differ systematically across regulatory and cultural contexts. By relying on clearly defined textual units, words, lines, paragraphs, sentences, and report page proportions, this study avoids the pitfalls of thematic ambiguity while enabling a structured comparison of disclosure extensiveness. The assumption here is not that more disclosure necessarily equates to greater transparency, but that it reflects strategic prioritization. Therefore, assessing the internal consistency and directional trends of these volumetric indicators enables us to evaluate whether firms exhibit deliberate, cohesive disclosure strategies or whether volume fluctuates opportunistically across metrics or time. These considerations directly motivate the two hypotheses that follow.

These methodological approaches, while beneficial for broad assessments, often do not critically engage with the data to uncover deeper insights into firms' strategic behaviors and motivations behind disclosures. Moreover, they may overlook the regulatory and cultural contexts that significantly influence disclosure practices. This research addresses these gaps by employing a refined set of volumetric indicators that consider both the quantity and strategic implications of disclosures. By analyzing data from the UK and USA, the study aims to uncover the underlying strategies firms employ within these diverse regulatory contexts, assessing how these strategies align with or diverge from traditional legitimacy theory. This approach not only contributes to our understanding of environmental disclosure practices but also challenges and expands upon the existing methodologies by highlighting their limitations and proposing more nuanced measures.

Building on this foundation, it is observed that previous studies have often favored volumetric reporting measures, noting that the disclosure volumes of firms from both developed and developing countries typically range from mild to moderate, with notable exceptions in recent disclosures from Chinese companies. These observations suggest that while volumetric measures are prevalent, the strategic use of these metrics can vary significantly across different contexts. This variability is particularly pertinent to legitimacy theory, which posits that firms strategically manage their disclosures to align with societal expectations and enhance their legitimacy. A detailed examination of correlations among diverse types of volumetric measures can reveal whether firms consistently apply these strategies across various regulatory environments and whether the direction of these disclosures aligns with or diverges from expected norms.

Specifically, differences in the direction of various volumetric measures may reflect deliberate strategic choices, where firms might emphasize certain types of disclosures while minimizing others, depending on their specific legitimacy needs. For example, a firm may increase the volume of certain disclosures to showcase environmental responsibility, while downplaying others that might expose vulnerabilities. Exploring these correlations, particularly in the context of UK and US firms, offers valuable insights into how disclosures are tailored to meet differing

stakeholder expectations and regulatory demands. This analysis not only underscores the strategic dimensions of environmental reporting but also enhances our understanding of how these strategies are implemented in practice. Consequently, the findings from this study are anticipated to contribute significantly to existing literature by clarifying the preferred choices between different volumetric measures of disclosure in these two prestigious countries and examining how these choices serve to boost, protect, or reinforce corporate legitimacy. To empirically test these propositions and assess whether firms adopt consistent or differentiated volumetric disclosure strategies across jurisdictions, the following hypotheses are advanced.

H_2: *Firms exhibit both consistent and strategically differentiated patterns in volumetric environmental disclosure practices, influenced by geographic and regulatory contexts.*

This overarching hypothesis posits that firms' disclosure behaviors reflect a combination of universal strategies and localized adaptations, driven by differences in institutional environments such as regulatory requirements or stakeholder pressures. To investigate this, the hypothesis is divided into two sub-components:

$H_{2.1}$: *There will be significant correlations between different volumetric measures of environmental information disclosure.*

This hypothesis explores whether the correlations between different volumetric measures reflect consistent reporting strategies employed across firms, irrespective of and specific to their geographical locations. It aims to identify both universal and region-specific patterns in how firms manage environmental reporting, serving as a preliminary investigation into geographic disparities that will be explored in greater detail in the following subsection.

$H_{2.2}$: *The trend in volumetric levels of environmental disclosures over time will show patterns indicative of strategic adjustments in disclosure practices, which may vary by geographic location.*

This hypothesis seeks to uncover whether there is a general trend of increasing or decreasing disclosure volume over time and whether these trends differ significantly between the UK and the USA, suggesting shifts in environmental reporting strategies or responsiveness to external pressures specific to each regulatory environment. Research such as Baalouch et al. (2019), Eakpisankit (2012), Panait et al. (2023), and Tadros et al. (2020) provide empirical support, demonstrating how firms adjust their environmental reporting in response to evolving market conditions and regulatory pressures.

These hypotheses are designed to examine the overarching patterns and trends in environmental disclosure practices, providing insights into both global and regional strategic behaviors. This setup allows for a nuanced understanding of commonalities and differences in disclosure strategies across firms, setting the stage for a more focused investigation of regulatory impacts in the following subsection.

2.3 Different regulations, cultures and customs, and the disclosure

Eakpisankit (2012) highlighted that different reporting systems lead to variations in the level of voluntary environmental disclosure, which differs from the findings of voluntary financial

information disclosure studies such as Beattie and Jones (1997), Beattie and McInnes (2006), and Benston et al. (2006), who found that UK firms with principles-based accounting system tend to disclose more information quality than US firms with rules-based system. This is grounded in the belief that principles-based accounting system tends to encourage more voluntary environmental information disclosure in the absence of detailed reporting requirements.

With the ongoing notion of climate change and environmental impact, voluntary guidelines have been updated for corporations to act socially and environmentally responsibly. The appearance of IFRS S1 (ISSB, 2023a), IFRS S2 (ISSB, 2023b), and many others is further renowned. In addition, the elimination of the differences between global accounting standards has been continuously enviable. Standards on revenue recognition, financial instruments, and lease accounting mark the formal convergence between IFRS and the US Generally Accepted Accounting Principles (GAAP), albeit significant differences remain. This issue remains to be investigated to determine whether there is any adjustment in the results. Based on Eakpisankit's (2012) study, the third hypothesis for this research is set if rules-based and principles-based accounting systems in relation to the USA and the UK, respectively, are factors influencing the difference in quantity of environmental disclosure.

Research comparing environmental disclosures under varied legislative frameworks, particularly between the UK and the USA, is limited but offers significant insights. Holland & Foo (2003) conducted an analysis using a single volumetric measure – the number of sentences in environmental reports – to evaluate disclosure practices, finding that UK firms typically provided more extensive disclosures than their USA counterparts did. This study suggests that the UK principles-based approach may encourage broader and more detailed disclosures than the US rules-based system. In a more comprehensive analysis, Eakpisankit (2012) departed from purely volumetric assessments and developed a framework based on the qualitative characteristics of useful financial information from the IASB's Framework for the Preparation and Presentation of Financial Statements (2001) (IASB, 2001). This approach adapts financial reporting principles to evaluate corporate environmental reporting (CER), focusing on understandability, relevance, reliability, comparability, and consistency, emphasizing that quality in environmental reporting is crucial for its effectiveness.

In contrast, Bhatia & Tuli (2018) documented a potential shift, observing that US firms might have enhanced their sustainability reporting practices over time, exceeding UK firms in certain aspects of sustainability reporting, based on the GRI framework. This finding highlights the possible improvements in US disclosure practices influenced by global standards and stakeholder demands for corporate accountability.

Adding complexity to these findings, Adams & Kuasirikun (2000) compared environmental disclosures in the UK and Germany and found that less litigious environments led to fewer disclosures, in contrast to Holland & Foo (2003), where less stringent regulatory environments did not necessarily reduce disclosure levels. These contrasting findings illustrate the nuanced influence of socio-political and institutional factors on disclosure practices. Both studies confirmed that variations in regulations, cultures, and customs, along with broader societal pressures, play a significant role in shaping the extent of voluntary corporate disclosure, though their results diverged.

These inconsistencies across empirical studies underscore the need to analyze environmental

disclosure practices not solely through the legal structures in place, but also in relation to deeper institutional logics, national governance models, and cultural expectations that shape organizational behavior. While regulatory frameworks set the baseline for disclosure, the way in which firms respond to these mandates is often conditioned by broader societal norms, investor pressures, and reporting customs. For example, principle-based systems like that of the UK may be expected to foster broader discretionary reporting, but in practice, such flexibility can lead to varied interpretations and inconsistent implementation. Conversely, the US system, though more prescriptive, may incentivize firms to disclose extensively to demonstrate compliance, mitigate legal risk, or satisfy investor demands for standardized information. These dynamics suggest that volumetric differences may emerge not only from the presence or absence of regulation but from how regulation interacts with cultural norms about transparency, corporate accountability, and legitimacy. Therefore, whether the UK or the USA exhibits greater disclosure volume is not predetermined by system type, but reflects the complex interplay of regulatory form, cultural practices, and institutional incentives, precisely the relationship that Hypothesis 3 aims to assess empirically.

Institutional theory also offers a valuable lens through which to understand the cross-national variation in volumetric disclosure, particularly when comparing countries like the UK and the USA, which differ in their legal origins, corporate governance philosophies, and cultural orientations. According to Cieslewicz (2014), national accounting systems are shaped by deeper societal values, including levels of individualism, uncertainty avoidance, and the strength of institutional trust. These values influence the extent to which firms feel compelled to justify their actions publicly through disclosure. In common law countries such as the USA and UK, there is often a stronger emphasis on legal compliance and financial transparency, but how that translates into reporting practice can diverge. Prescott & Vann (2015) further note that while US firms operate within a litigious environment that promotes formal, rules-based compliance, this same pressure can lead to voluminous disclosures aimed at demonstrating due diligence and avoiding liability. In contrast, UK firms may face softer forms of normative pressure under stakeholder capitalism, which can encourage either more selective or more narrative-driven reporting. Gray & Vint (1995) suggest that cultural attributes such as secrecy versus transparency orientations and hierarchical versus participative societal structures shape the perceived necessity and acceptability of extensive disclosures. Together, these factors help explain why regulatory form alone does not predict the volume of disclosure. Instead, the quantity of environmental reporting observed across jurisdictions is likely to be a function of how cultural, legal, and institutional elements interact to define both the expectations placed on firms and the strategies they adopt to meet them.

Beyond formal regulation and cultural predispositions, corporate environmental disclosure practices are also shaped by what may be termed customary pressures, which refer to the informal, society-wide expectations that emerge through national discourse, political climate, media narratives, and civic engagement. These customary influences operate in tandem with legal obligations to shape what is perceived as socially acceptable or desirable in corporate communication. In the UK, where there is a long-standing emphasis on stakeholder dialogue and corporate responsibility, firms may face implicit expectations to acknowledge environmental concerns even in the absence of legally binding disclosure requirements. Such expectations may cultivate an environment in which environmental disclosure serves reputational or relational purposes, and where a lack of reporting could be construed as evasive or neglectful. In contrast, the USA has traditionally prioritized performance-oriented

transparency grounded in financial materiality, even as ESG-conscious investor pressure continues to grow. In this context, customary expectations tend to focus more on demonstrating operational control, risk mitigation, and compliance with evolving regulatory norms, rather than on engaging in broad-based environmental dialogue. In both countries, media scrutiny, public opinion, and civil society activism play an important role in shaping these expectations and, in turn, influence how firms craft their legitimacy strategies. When examined through the lens of volumetric disclosure, these customary norms may help explain cross-national differences in the extent of environmental information firms choose to disclose, regardless of formal regulatory mandates. These unwritten societal expectations, embedded within national reporting cultures, thus serve as critical informal institutions that shape disclosure behavior and offer important explanatory power for the empirical patterns observed in this study.

These contrasting outcomes indicate that there is no common explanation for the observed variations and further investigation is necessary. Regulations, culture, and customs significantly influence corporate disclosure practices. Regulations establish the baseline for mandatory disclosures, providing a framework that companies must adhere to. However, the stringency and enforcement of these regulations vary across jurisdictions, leading to differences in the extent and nature of disclosures. For instance, more stringent regulations might result in higher levels of mandatory disclosures, potentially influencing voluntary disclosures as companies strive to maintain legitimacy and manage stakeholder expectations (Akhter et al., 2022, Saha & Kabra, 2020). Conversely, less stringent regulations may lead to greater reliance on voluntary disclosures, driven by market forces, stakeholder pressure, and the adoption of global standards (Flammer et al., 2021; Tarquinio & Posadas, 2020). Cultural and customary norms further shape disclosure practices. Values related to transparency, accountability, and environmental responsibility influence corporate behavior and the perceived importance of disclosing information.

Cultural factors can interact with regulatory frameworks to create a complex landscape that shapes corporate disclosure decisions. In some cultures, a strong emphasis on transparency might encourage proactive and comprehensive disclosures, while in others, a more cautious approach might prevail (Gray & Vint, 1995). National reporting practices and established disclosure conventions can also influence disclosure norms, creating informal expectations that complement or even supersede formal regulations. These interwoven factors impact environmental transparency and accountability. Research comparing financial disclosure requirements across different jurisdictions, such as the work by Brennan & Marston (1999), offers valuable insights into how regulatory differences can shape corporate reporting practices, potentially extending to environmental disclosures as well.

Further research is needed to fully understand the complex interplay of these factors and their impact on corporate disclosure practices. A comparative analysis of environmental disclosure levels between the UK and the USA, employing quantitative measures, could provide important insights. These two regions exhibit distinct regulatory environments and cultural norms, which are likely to lead to significant differences in the volume and depth of environmental information disclosed by companies. Accordingly, H_3 is established to encapsulate the broader implications of regulatory, cultural, and customary influences on disclosure practices.

> H_3: *Regulatory, cultural, and customary pressures significantly influence the volumetric level of environmental information disclosure, leading to measurable differences between*

the UK and the USA.

This hypothesis posits that the variations in environmental disclosure between these two jurisdictions are influenced by differing regulatory frameworks, cultural norms, and customary practices that shape corporate transparency and accountability. By quantitatively examining environmental disclosures across these contrasting jurisdictions, the study aims to reveal how these broader factors manifest in corporate disclosure volumes. This comparative study will not only quantify the differences in disclosure volumes but also infer the underlying reasons for these differences from a quantitative perspective. This method enhances the existing literature by providing a clear, quantitative understanding of how firms adapt their disclosure practices in response to localized regulatory and cultural pressures.

3. Research Methodology

3.1 Research setting

This study employs legitimacy theory to examine the nuances of voluntary environmental reporting practices in the UK and the USA during the pivotal years of 2018 and 2019. These years mark a significant period in sustainability reporting due to regulatory transitions and evolving global standards. A brief overview of the pertinent reporting regulations and guidelines, as detailed in subsection 2.3, sets the stage for understanding the impacts on environmental disclosure practices observed in these regions.

Environmental reporting practices in the UK and the USA reflect their broader regulatory philosophies. The UK adopts a principles-based approach, while the US system is rules-based. These differing approaches are hypothesized to significantly impact how firms in each country engage in voluntary environmental reporting, potentially influencing corporate transparency and the strategic disclosure of environmental information. This alignment with legitimacy theory suggests that organizational behavior is influenced by external pressures and expectations.

Globally, the Global Reporting Initiative (GRI) remains the most dominant standard for sustainability reporting. According to the KPMG Survey of Sustainability Reporting (KPMG, 2022), over 70% of the world's largest 250 companies, known as G250, reported using GRI Standards. In 2016, GRI shifted from providing guidelines to setting the first voluntary global standards for sustainability reporting, known as the GRI Standards (GRI, 2016). The previous version, the G4 guidelines, was phased out in June 2018, making 2018 the last year before the revised GRI Standards fully came into effect on July 1, 2018. This transition period is critical for this study as it provides a unique window to examine how the introduction of new standards influences voluntary environmental reporting behaviors and motivations under different regulatory regimes. By analyzing these influences, the research seeks to uncover insights into how firms in the UK and the USA adapt their disclosure practices in anticipation of, or in response to, new global norms, enhancing our understanding of the strategic dimensions underpinning corporate transparency and accountability.

3.2 Sample selection

The data for this study are sourced from disclosures made by firms listed on three major stock exchanges, the London Stock Exchange (LSE), the New York Stock Exchange (NYSE), and the Nasdaq stock exchange (NASDAQ). The sample comprises a panel of UK and US firms, selected from the top 50 companies by market capitalization within the Financial Times Stock Exchange 100 index (FTSE100) and the Standard & Poor 100 index (S&P100), respectively, covering the years 2018 and 2019. This results in 200 firm-year observations from 100 firms. The selection of these top 50 firms from each index is strategic, aiming to analyze firms with significant market visibility and regulatory scrutiny, which are often leaders in disclosure practices. These firms are likely to exhibit more robust and mature environmental disclosure practices, making them ideal subjects for studying variations and evolutionary trends in CER across the regulatory systems of the UK and the USA. The 2-year period of 2018 and 2019 was specifically chosen to capture the recent dynamics in environmental disclosure practices around the time of significant regulatory changes, including the enhancements in the GRI Standards (GRI, 2016) that took full effect in 2019. The year 2018 represented the last full year before the revised version of the GRI Standards (GRI, 2016), which came into effect on July 1, 2018, was fully operational throughout an entire reporting cycle. This time frame allows for an assessment of how firms adjusted their environmental disclosure practices in anticipation of and response to these new standards.

To ensure statistical robustness, a power analysis was conducted following standard guidelines (Cohen, 1992). Assuming a medium effect size (Cohen's d = 0.5), a two-tailed significance level ($\alpha = 0.05$), and desired statistical power ($1-\beta$) of 0.80, the minimum recommended sample size per group for *t*-tests (mean differences and comparisons of correlation coefficients) is approximately 64 firm-year observations. The total of 200 observations (100 per country) thus comfortably exceeds this threshold, ensuring robust comparative analyses between UK and US firms. To further validate the sample adequacy for year-on-year comparisons within each country, additional post hoc power analyses were conducted using G*Power 3.1.9.7. For matched-pair *t*-tests assessing mean differences between 2018 and 2019 disclosures (50 paired observations per country), the achieved statistical power was approximately 0.9339, greatly exceeding the recommended 0.80 threshold. This strongly supports the sample's capacity to detect meaningful intra-country temporal differences.

Furthermore, to confirm robustness in comparing correlation coefficients across the two years within each country, Fisher's *Z*-transformation was employed. These tests confirmed that the sample size and structure provided sufficient power to detect statistically meaningful changes in correlations over time, with significant differences specifically identified in selected disclosure measures, further reinforcing the analytical validity. Collectively, the overall sample size and subsequent power analyses provide a sufficiently robust basis to capture meaningful trends and differences in environmental disclosure practices, ensuring reliable statistical inferences regarding UK- and US-specific regulatory influences and strategic corporate reporting behaviors.

Standalone reports, including environmental matters, if available, are primarily used in this study and are obtained from CorporateRegister.com and/or a corporation's website. Corporate annual reports, with sections devoted to environmental responsibility, were also used, ensuring a comprehensive assessment of each firm's disclosure practices.

3.3 Variable measurement

To assess the magnitude of environmental disclosure for firm j in year t ($CERQTY_{jt}$), this study employed five volumetric-based metrics, including word, line, paragraph, and sentence counts (W_{jt}, L_{jt}, P_{jt}, S_{jt}, respectively), and the proportion of report pages devoted to environmental matters (PP_{jt}). These measures enabled a systematic quantification of disclosure extensiveness across reports and overtime. Disclosure content was identified through a topic-based framework initially developed from the Global Reporting Initiative's G4 guidelines (GRI, 2013) and later refined to align with the GRI Standards (GRI, 2016), particularly the environmental topics in the 300-series (e.g., GRI 301 for Materials, GRI 305 for Emissions). This framework was supported by content classification schemes adapted from Michelon et al. (2015) and recent applications by Akhter et al. (2022), providing a structured and internationally recognized basis for identifying relevant disclosures.

To ensure consistency in the identification and treatment of disclosure content, a standardized coding manual was developed and is included as Appendix 1. The manual contains coding instructions, disclosure definitions, and example applications by GRI topic, supporting transparency and replicability. This manual was constructed by synthesizing established frameworks from prior literature and adapting them to the present study's objectives and metrics.

Prior to full-scale data collection, a pilot test was conducted on ten corporate reports (five from UK firms and five from US firms) that were drawn from companies not included in the final sample and from reporting years outside the 2018 – 2019 study period, thereby ensuring the independence of the pilot dataset and preventing any sample contamination. These reports were independently coded by three researchers, comprising the first author and two trained research assistants. Discrepancies in coding were discussed to refine the definitions and resolve ambiguities in the protocol. The pilot phase, which lasted four weeks, confirmed the manual's applicability and usability in diverse disclosure formats.

During the primary data collection phase, inter-coder reliability was rigorously assessed at three checkpoints: (1) after coding 10 percent of the sample, (2) at the midpoint (50 percent), and (3) upon completion before final cleaning. At each stage, a random 10 percent of the reports were independently double-coded. Krippendorff's α was calculated for each round, yielding values of 0.791, 0.773, and 0.805, respectively, all exceeding the accepted threshold of 0.667 (Krippendorff, 2004), ensuring strong reliability and coder alignment. Coders were instructed to focus on environmental disclosures explicitly related to GRI topics, excluding brief or generic mentions not tied to substantive environmental content. Volume, rather than thematic depth, was the coding priority.

In addition to the volumetric metrics used to measure environmental disclosure, it is essential to acknowledge the limitations of such an approach in fully capturing the content quality or relevance of the disclosures. While word, line, paragraph counts, and the proportion of pages devoted to environmental issues serve as quantitative indicators of disclosure magnitude, they do not inherently reflect the quality or strategic importance of the information presented. This study recognizes that volume does not necessarily equate to transparency and that more voluminous disclosures could potentially obscure key environmental information amidst less relevant content. To address these limitations, the decision to utilize volumetric measures was driven by the study's focus on assessing the extent of disclosure practices across the regulatory systems of the UK and

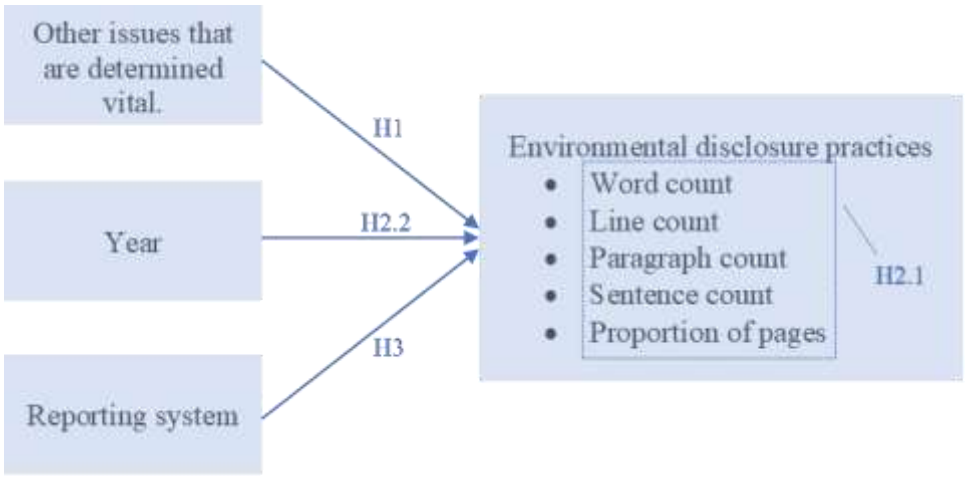
the USA systematically. These metrics, while potentially simplistic, provide a consistent and quantifiable method to compare disclosure practices across a large sample of firms, enabling an analysis of trends over time within the UK and US reporting systems. The inclusion of the proportion of pages devoted to environmental issues was specifically chosen as it provides a direct, observable metric of how much emphasis firms place on environmental responsibility within their annual reports. This contrasts with more qualitative approaches like thematic content analysis, which, while insightful, could introduce subjective biases and require extensive qualitative data interpretation that may be impractical given the focused scope and resource limitations of this study.

Future research could supplement these volumetric measures with qualitative analyses, such as thematic content analysis, to provide a deeper understanding of the strategic and qualitative aspects of environmental disclosures. This combined approach would allow for a more comprehensive evaluation of both the quantity and quality of corporate environmental transparency, thereby enriching our understanding of the true impact of such disclosures on stakeholder perceptions and corporate accountability.

3.4 Analytical method

As outlined in Figure 1, our analytical methods begin by presenting descriptive statistics to quantify the volume of disclosures. We then evaluated the relationships among reporting measures using Pearson's correlation analyses for normally distributed data and Spearman's correlation analyses, a non-parametric approach, for all samples as well as separately for each year of data collection. The use of Spearman's correlation is particularly vital given the non-normal distribution of data and the limited size of the subsamples across years and countries, which may not meet the assumptions required for Pearson's correlation. This dual approach allows for a more robust analysis of the relationships among the reporting measures under different distributional characteristics, enhancing the reliability of our findings. To investigate differences in environmental disclosure practices between UK and USA firms, two independent sample *t*-tests were conducted to compare the means of reporting measures across countries. For intra-country temporal comparisons (i.e., 2018 versus 2019 within the UK and within the USA), paired sample *t*-tests were employed to assess year-on-year changes in disclosure behavior. This dual approach ensures appropriate statistical treatment of cross-sectional (between-country) and longitudinal (within-country) variations. Additionally, correlation analyses were performed to examine the strength and direction of relationships among volumetric disclosure measures over time. Together, these methods provide a comprehensive and rigorous evaluation of strategic disclosure patterns, allowing for robust inferences about regulatory and temporal effects on corporate environmental reporting practices in the UK and USA.

Figure 1. Research Framework



In this study, environmental disclosure practices were compared between UK and US firms without stratifying the sample by industry sector or firm size. This decision was driven by both methodological and practical considerations. First, the primary objective of the study was to examine the broad influence of differing national regulatory frameworks on disclosure behavior, with a specific focus on how these macro-level systems shape environmental reporting at the firm level. Introducing stratification, while analytically valuable, would have required a substantially larger and more diversified sample to ensure statistical power across multiple strata, which was not feasible within the constraints of the available data and the study's design. Moreover, firms selected from the top 50 by market capitalization in each country were already subject to high levels of stakeholder visibility and regulatory scrutiny, making them suitable for assessing disclosure behavior at the institutional level.

Although selecting the top 50 firms by market capitalization in each country inherently emphasizes large, well-resourced corporations, this strategy provides analytical advantages that extend beyond firm size alone. These firms are typically industry leaders and trendsetters in corporate governance and sustainability practices. Their disclosures are often subject to more rigorous scrutiny from regulators, investors, and civil society actors, and they tend to be early adopters of international reporting frameworks such as the GRI or ISSB standards. As such, their behavior may signal broader shifts in environmental reporting expectations that influence peers within and beyond their sectors. Moreover, the extensive public visibility and media exposure associated with large-cap firms create additional legitimacy pressures, making their reporting practices particularly informative for understanding how national regulatory frameworks translate into observable disclosure behaviors at the institutional level.

Nevertheless, the absence of stratification by industry sector remains a potential limitation. Environmental risk profiles, stakeholder expectations, and material reporting topics can vary considerably across industries, raising the possibility that differences in sectoral composition between the UK and US samples may influence the observed disclosure volumes. To partially address this concern, supplementary descriptive analyses were performed by comparing disclosure means across broad sectoral groupings, based on the International Standard Industrial Classification of All Economic Activities (ISIC), Rev. 4 (United Nations, 2008). The sectoral categories included: (1) Agriculture, forestry, and fishing; (2) Manufacturing; (3)

Construction; (4) Mining and quarrying; Electricity, gas and water supply; (5) Market services (Trade; Transportation; Accommodation and food; and Business and administrative services); and (6) Non-market services (Public administration; Community, Social and other services and activities). Notably, no firms from the agriculture or construction sectors were represented in the sample.

The analysis presented in Appendix 2 revealed that for the combined UK sample over 2018 – 2019, disclosure volumes differed significantly across sectoral groupings for all volumetric indicators. This finding suggests that within-country sectoral dynamics can affect disclosure levels. However, in most other analyses, including the combined UK-USA sample and the pooled cross-year tests, these sectoral differences were not statistically significant. Therefore, while sectoral effects may influence disclosure in certain national contexts, they do not appear to account for the broader cross-country differences observed in this study. Future research could expand on this analysis by introducing industry fixed effects or stratified sampling to isolate regulatory influences from sector-level variation more precisely.

Lastly, it is important to recognize that industry affiliation and firm size can influence disclosure intensity and focus, particularly due to differences in environmental impact and reporting expectations. The omission of stratification may limit the generalizability of the findings to smaller firms or those in industries with atypical environmental profiles. This choice may also mask within-country heterogeneity in disclosure behavior that is not attributable solely to national regulatory factors. Future studies should address this limitation by incorporating multivariate controls or stratified designs that can disentangle regulatory effects from firm-level and industry-specific influences, thereby enhancing the explanatory precision of international disclosure comparisons.

4. Results

The results for environmental disclosure magnitude are considered according to the analytical methods.

4.1 Descriptive statistics for each measure of the disclosure level

Tables 1 and 2 present the descriptive statistics for each measure of environmental disclosure for the pooled sample by year and country. The results revealed that the average proportion of pages devoted to environment-related information out of the total pages in the reports examined was 27.32 percent. This proportion decreased slightly from 27.64 percent to 27.00 percent over the two years of the study, although the change was not statistically significant. When comparing disclosures between the two countries, it becomes evident that UK firms disclose a significantly lower proportion of environmental information – 21.84 percent of the total pages – compared to US firms, which disclose at a higher rate of 32.81 percent. These findings suggest a variance in the emphasis placed on environmental issues. Assuming an even balance across the three ESG pillars -environmental, social, and governance- each would theoretically represent approximately one-third of total sustainability disclosure. However, the findings, particularly among UK firms, show that environmental disclosures fall notably below the theoretical benchmark. This disparity suggests a possible emphasis on other ESG dimensions. In several reports, while environmental disclosures were quantitatively measured, adjacent sections frequently addressed social concerns such as employee well-being, diversity, and

community engagement, as well as governance topic like board oversight and ethical compliance, albeit in a more narrative format. Although these were not included in volumetric analysis, their recurring presence indicates a broader ESG framing. This support the interpretation of that supports the interpretation of H_1, highlighting how firm may selectively prioritize the disclosure areas in response of institutional expectations and stakeholder interests.

Table 1. Descriptive statistics for each measure of the disclosure level by year

$CERQTY_{jt}$	2018	2019[(a)]	Total
Word count, W_{jt}			
Minimum	45.00	42.00	42.00
Maximum	39,711.00	37,083.00	39,711.00
Mean	7,285.48	7,809.00	7,547.24
Std. Dev.	7,521.86	7,591.32	7,542.22
Line count, L_{jt}			
Minimum	8.00	7.00	7.00
Maximum	14,938.00	32,606.00	32,606.00
Mean	2,494.97	2,737.76	2,616.37
Std. Dev.	3,204.87	4,058.66	3,649.60
Paragraph count, P_{jt}			
Minimum	1.00	1.00	1.00
Maximum	2,504.00	3,773.00	3,773.00
Mean	461.83	505.86	483.85
Std. Dev.	561.83	632.40	597.06
Sentence count, S_{jt}			
Minimum	2.00	1.00	1.00
Maximum	2,156.00	1,698.00	2,156.00
Mean	308.42	299.17	303.80
Std. Dev.	380.27	313.84	347.79
Proportion of pages (%), PP_{jt}			
Minimum	0.70	0.53	0.53
Maximum	94.81	93.18	94.81
Mean	27.64	27.00	27.32
Std. Dev.	21.65	20.32	20.95
Observations	100	100	200

[(a)] $CERQTY_{jt}$ mean significantly different from that of 2018 according to the two independent samples *t*-test at the 10% level ([*]), at the 5% level ([**]) and at the 1% level ([***]).

Table 2. Descriptive statistics for each measure of the disclosure level by country

$CERQTY_{jt}$	UK[(b)]	US	Total
Word count, W_{jt}			
Minimum	42.00	45.00	42.00
Maximum	39,435.00	39,711.00	39,711.00
Mean	4,963.19[***]	10,131.29	7,547.24
Std. Dev.	5,841.89	8,168.70	7,542.22

$CERQTY_{jt}$	UK[(b)]	US	Total
Line count, L_{jt}			
Minimum	7.00	24.00	7.00
Maximum	8,874.00	32,606.00	32,606.00
Mean	1,708.86***	3,523.87	2,616.37
Std. Dev.	2,025.34	4,583.44	3,649.60
Paragraph count, P_{jt}			
Minimum	1.00	3.00	1.00
Maximum	2,332.00	3,773.00	3,773.00
Mean	324.65***	643.04	483.85
Std. Dev.	457.10	675.59	597.06
Sentence count, S_{jt}			
Minimum	1.00	10.00	1.00
Maximum	2,156.00	2,052.00	2,156.00
Mean	183.74***	423.85	303.80
Std. Dev.	246.43	391.53	347.79
Proportion of pages (%), PP_{jt}			
Minimum	0.53	1.281	0.53
Maximum	68.75	94.81	94.81
Mean	21.84***	32.81	27.32
Std. Dev.	16.26	23.59	20.95
Observations	100	100	200

[(b)] $CERQTY_{jt}$ mean significantly different from that of the US firms according to the two independent samples *t*-test at the 10% level (*), at the 5% level (**) and at the 1% level (***).

A particularly striking observation from Table 2 is the significant deviation in line counts, with UK firms having a maximum of 8,874.00 lines compared to a much higher count of 32,606.00 lines for US firms. This substantial difference raises questions regarding the depth and details of environmental reporting practices in the two countries. In the USA, where there is a heightened focus on corporate transparency and detailed disclosures driven by shareholder demands and stringent regulatory expectations, such as those mandated under SEC Regulation S-K, firms are likely to adopt more exhaustive reporting practices. Conversely, the principles-based regulatory environment in the UK may encourage firms to adopt a more concise reporting style that meets compliance requirements efficiently, but with fewer lines, reflecting a strategic choice to integrate environmental information succinctly within broader sustainability reports.

These variations in reporting volumes underscore different approaches to environmental transparency. UK firms appear to strategically prioritize efficiency and directness in their environmental disclosures, possibly reflecting different stakeholder pressures or corporate governance structures. Meanwhile, US firms may emphasize comprehensiveness and detail, potentially because of the litigious nature of the US business environment, where extensive documentation is crucial.

Overall, these findings not only support hypothesis H_1, suggesting that the focus on environmental issues as part of corporate sustainability reporting varies significantly between the two countries but also highlight the influence of regulatory, cultural, and business practice contexts on disclosure practices. A detailed analysis of these discrepancies provides valuable insights into how different regulatory frameworks shape corporate reporting behaviors and stakeholder engagement in environmental sustainability.

In presenting the descriptive statistics for each measure of disclosure level, we carefully considered the potential influence of document formatting differences between the UK and US reports. Significant deviations in disclosure volume observed between the two regions prompted a deeper investigation to ensure that these differences reflect actual variations in reporting practices rather than mere discrepancies in document formatting. To address this concern, we scrutinized the formatting styles of the reports to ensure that variations in word, line, paragraph, and sentence counts, as well as the proportion of pages devoted to environmental responsibility, were not influenced by non-content elements. This examination included assessing text alignment, margins, and spacing which could artificially inflate line and paragraph counts, as well as the placement and frequency of non-textual elements like charts and graphs that might affect page proportions dedicated to textual content. Our analysis specifically filtered out graphical and tabular data when calculating word and sentence counts to maintain focus on textual disclosures. By normalizing these factors across all reports, we ensured that the quantitative measures reflected true disclosure content rather than discrepancies in document formatting styles.

To further ensure the validity and robustness of the volumetric metrics employed in this study, we conducted a comprehensive series of sensitivity analyses designed to rule out potential biases arising from document formatting inconsistencies. These formatting differences, such as variations in layout, font size, white space, graphics, and tables, could otherwise artificially inflate or reduce the measured disclosure volumes. To address this, we normalized the original volumetric metrics by computing standardized disclosure density values for each firm-year observation. Specifically, we calculated the number of words, lines, paragraphs, and sentences per page of each report, resulting in five standardized disclosure metrics: standardized word count (SW_{jt}), line count (SL_{jt}), paragraph count (SP_{jt}), sentence count (SS_{jt}), and the proportion of environmental pages (PP_{jt}).We then statistically compared these standardized metrics using both parametric (independent and paired sample *t*-tests) and non-parametric (Mann-Whitney and Wilcoxon signed-rank tests) methods. These sensitivity tests were conducted across six comparative scenarios, including year-on-year comparisons within the combined UK and US sample, cross-national comparisons for the pooled and individual years, and within-country longitudinal comparisons. Specifically, we compared: (i) combined UK and US firms in 2018 versus 2019; (ii) pooled UK versus pooled US firms across both years; (iii) UK and US firms separately for 2018 and 2019; and (iv) intra-country changes between 2018 and 2019 for both UK and US firms. Detailed statistical results for each of these analyses are presented in Appendix 3 in Supplementary material.

The findings from these sensitivity analyses confirmed that the statistical significance and directional patterns of the results remained stable even after standardization. In particular, US firms consistently demonstrated significantly higher environmental disclosure density across all five indicators when compared to their UK counterparts, both at the aggregate level and within each year. Additionally, within-country year-on-year comparisons further supported the

original trends identified in the main results. These robust checks confirm that the differences observed are unlikely to be artifacts of formatting or structural report inconsistencies and are instead reflective of underlying strategic and regulatory-driven differences in environmental reporting behavior.

4.2 Correlation analyses

Table 3 presents the correlation matrices of the disclosure measures separately for UK and US firms across the two examined years, 2018 and 2019. The correlations demonstrate consistently strong and statistically significant positive relationships among the volumetric disclosure measures at the 99% significance level, with coefficients exceeding 0.50, affirming their interrelatedness. Notably, the correlations between word, line, paragraph, and sentence counts (W_{jt}, L_{jt}, P_{jt}, and S_{jt}, respectively) were stronger than those between these counts and the proportion of pages devoted to environmental responsibility (PP_{jt}). The strength of these correlations provides insight into the consistency of disclosure practices across different formats within reports. A particularly strong correlation among word, line, paragraph, and sentence counts suggests that firms that are comprehensive in one aspect of reporting tend to be comprehensive across others, indicating a holistic approach to environmental disclosure. This finding aligns with legitimacy theory, which posits that organizations engage in environmental disclosure not merely to comply with regulations but to legitimize their operations within the societal and environmental framework. By disclosing environmental information extensively across various dimensions, firms may be seeking to enhance their legitimacy among stakeholders concerned about environmental impact.

Table 3. Correlation analyses

$CERQTY_{jt}$	W_{jt}	L_{jt}	P_{jt}	S_{jt}	PP_{jt}
W_{jt}	1.000				
L_{jt}	0.715***	1.000			
P_{jt}	0.803***	0.871***	1.000		
S_{jt}	0.858***	0.627***	0.677***	1.000	
PP_{jt}	0.538***	0.496***	0.587***	0.445***	1.000
Total observations	200	200	200	200	200
W_{jt}	1.000				
L_{jt}	0.736***	1.000			
P_{jt}	0.795***	0.892***	1.000		
S_{jt}	0.855***	0.582***	0.641***	1.000	
PP_{jt}	0.540***	0.574***	0.616***	0.427***	1.000
2018 observations	100	100	100	100	100
W_{jt}	1.000				
L_{jt}	0.706***	1.000			
P_{jt}	0.811***	0.859***	1.000		
S_{jt}	0.873***	0.699***	0.734***	1.000	
PP_{jt}	0.538***	0.442***	0.567***	0.470***	1.000
2019 observations	100	100	100	100	100
W_{jt}	1.000				
L_{jt}	0.714***	1.000			
P_{jt}	0.704***	0.806***	1.000		
S_{jt}	0.957***	0.586***	0.610***	1.000	

$CERQTY_{jt}$	W_{jt}	L_{jt}	P_{jt}	S_{jt}	PP_{jt}
PP_{jt}	0.585***	0.448***	0.442***	0.511***	1.000
UK 2018 observations	50	50	50	50	50
W_{jt}	1.000				
L_{jt}	0.657***	1.000			
P_{jt}	0.691***	0.819***	1.000		
S_{jt}	0.839***	0.504***	0.420***	1.000	
PP_{jt}	0.564***	0.390***	0.396***	0.523***	1.000
UK 2019 observations	50	50	50	50	50
W_{jt}	1.000				
L_{jt}	0.723***	1.000			
P_{jt}	0.816***	0.920***	1.000		
S_{jt}	0.771***	0.540***	0.612***	1.000	
PP_{jt}	0.451***	0.576***	0.650***	0.311***	1.000
US 2018 observations	50	50	50	50	50
W_{jt}	1.000				
L_{jt}	0.715***	1.000			
P_{jt}	0.842***	0.888***	1.000		
S_{jt}	0.884***	0.703***	0.808***	1.000	
PP_{jt}	0.464***	0.432***	0.606***	0.405***	1.000
US 2019 observations	50	50	50	50	50

Note: Statistically significant according to Pearson's correlations at the 10% level (*), at the 5% level (**) and at the 1% level (***).

Furthermore, the analysis separated by year revealed dynamic shifts in the strength of these correlations over time. While the positive correlations among word, line, and paragraph counts (W_{jt}, L_{jt}, and P_{jt}) with the proportion of pages reporting on environmental matters (PP_{jt}) declined from 2018 to 2019, the correlations between word, line, and paragraph counts (W_{jt}, L_{jt}, and P_{jt}) with sentence count (S_{jt}) also weakened for UK disclosures but strengthened for US disclosures. Fisher's *Z*-tests confirmed these observations statistically: a significant reduction in correlation strength between word and sentence counts was detected for UK disclosures ($Z = 3.3497$, $p < 0.05$), while for US disclosures, a significant enhancement was found both between word and sentence counts ($Z = -1.7985$, $p < 0.10$) and between paragraph and sentence counts ($Z = -1.9827$, $p < 0.05$).

This trend may suggest a shift in reporting strategies in response to evolving environmental standards and stakeholder expectations, particularly in the USA, where increased transparency might reflect a strategic response to heightened regulatory scrutiny and a proactive effort to manage stakeholder perceptions. The Fisher's *Z*-test results further substantiate these observations, showing statistically significant changes in correlation strengths between key disclosure measures. These trends of changing correlation strengths from year to year underscore the dynamic and adaptive nature of environmental disclosure practices under varying regulatory pressures, market expectations, and cultural contexts. Specifically, the weakening correlations observed in the UK may indicate a move towards greater diversification or fragmentation in how environmental information is structured and conveyed, possibly reflecting increased discretion afforded by a principles-based reporting environment and evolving societal expectations that encourage more selective or nuanced reporting. Conversely, the strengthening correlations in the US suggest a consolidation around more standardized and transparent disclosure formats, likely driven by clearer regulatory mandates, the litigious

corporate environment, and growing demands from investors and other stakeholders for consistent and comparable sustainability information. These diverging trends highlight how national regulatory philosophies and stakeholder pressures can significantly influence the evolution of disclosure strategies, prompting firms to strategically recalibrate their reporting practices to maintain legitimacy and meet the shifting expectations of their external environment.

In conclusion, the consistent positive correlations found across volumetric disclosure measures support hypothesis $H_{2.1}$, affirming that firms typically maintain a uniform level of disclosure across different dimensions of their reports. The observed statistically significant variations in correlation strength over the years, as confirmed by Fisher's *Z*-tests, lend further support to hypothesis $H_{2.2}$, suggesting that firms' environmental disclosure strategies evolve over time in response to external regulatory, cultural, and stakeholder pressures. This nuanced analysis contributes to a deeper understanding of how external conditions shape corporate disclosure strategies and influence firms' efforts to maintain and enhance perceived legitimacy in the public eye.

4.3 Two independent samples t-tests

Both two independent sample *t*-tests and paired sample *t*-tests were performed where appropriate to assess mean differences across years and between countries, enhancing the robustness of the findings. As shown in Table 1, the pooled sample presents positive trends between 2018 and 2019 for word, line, and paragraph counts, although these changes are not statistically significant. Conversely, sentence counts, and the proportion of pages devoted to environmental information showed a slight decline over time. For UK firms, changes between the two years are relatively stable, with only a marginal increase in the proportion of environmentally related pages, from 21.74 percent in 2018 to 21.93 percent in 2019, as seen in Table 4. For US firms, Table 5 indicates statistically insignificant increases across word, line, paragraph, and sentence counts, with a small decrease in the proportion of environment-related pages. These cross-year variations provide preliminary support for Hypothesis $H_{2.2}$, suggesting that firms engage in strategic adjustments to their disclosure practices over time in response to evolving external expectations.

Table 4. Two independent samples *t*-tests for each measure of UK disclosure

$CERQTY_{jt}$	2018[(b)]	2019[(a), (b)]	Total[(b)]
Word count, W_{jt}			
Minimum	50.00	42.00	42.00
Maximum	39,435.00	32,228.00	39,435.00
Mean	4,726.76**	5,199.62***	4,963.19***
Std. Dev.	6,102.54	5,621.10	5,841.89
Line count, L_{jt}			
Minimum	8.00	7.00	7.00
Maximum	8,874.00	6,905.00	8,874.00
Mean	1,649.96***	1,767.76***	1,708.86***
Std. Dev.	2,145.31	1,917.88	2,025.34
Paragraph count, P_{jt}			
Minimum	1.00	1.00	1.00
Maximum	2,104.00	2,332.00	2,332.00

$CERQTY_{jt}$	2018[(b)]	2019[(a), (b)]	Total[(b)]
Mean	310.78***	338.52**	324.65***
Std. Dev.	437.23	480.18	457.10
Sentence count, S_{jt}			
Minimum	2.00	1.00	1.00
Maximum	2,156.00	658.00	2,156.00
Mean	196.68**	170.80***	183.74***
Std. Dev.	317.09	147.65	246.43
Proportion of pages (%), PP_{jt}			
Minimum	0.70	0.53	0.53
Maximum	61.80	68.75	68.75
Mean	21.74***	21.93**	21.84***
Std. Dev.	16.06	16.62	16.26
Observations	50	50	100

[(a)] $CERQTY_{jt}$ mean significantly different from that of 2018 according to the two independent samples *t*-test at the 10% level (*), at the 5% level (**) and at the 1% level (***).

[(b)] $CERQTY_{jt}$ mean significantly different from that of the US firms according to the two independent samples *t*-test at the 10% level (*), at the 5% level (**) and at the 1% level (***).

Table 5. Two independent samples *t*-tests for each measure of US disclosure

$CERQTY_{jt}$	2018	2019[(a)]	Total
Word count, W_{jt}			
Minimum	45.00	811.00	45.00
Maximum	39,711.00	37,083.00	39,711.00
Mean	9,844.20	10,418.38	10,131.29
Std. Dev.	7,981.79	8,422.58	8,168.70
Line count, L_{jt}			
Minimum	24.00	130.00	24.00
Maximum	14,938.00	32,606.00	32,606.00
Mean	3,339.98	3,707.76	3,523.87
Std. Dev.	3,833.07	5,261.48	4,583.44
Paragraph count, P_{jt}			
Minimum	3.00	21.00	3.00
Maximum	2,504.00	3,773.00	3,773.00
Mean	612.88	673.20	643.04
Std. Dev.	632.46	721.32	675.59
Sentence count, S_{jt}			
Minimum	10.00	37.00	10.00
Maximum	2,052.00	1,698.00	2,052.00
Mean	420.16	427.54	423.85
Std. Dev.	407.58	378.90	391.53
Proportion of pages (%), PP_{jt}			
Minimum	1.28	4.25	1.281
Maximum	94.81	93.18	94.81

$CERQTY_{jt}$	2018	2019[(a)]	Total
Mean	33.55	32.07	32.81
Std. Dev.	24.86	22.49	23.59
Observations	50	50	100

[(a)] $CERQTY_{jt}$ mean significantly different from that of 2018 according to the two independent samples *t*-test at the 10% level (*), at the 5% level (**) and at the 1% level (***).

Table 2 highlights statistically significant differences in environmental disclosure volume between UK and US firms at the 1% level across all volumetric measures. On average, US firms report nearly double the number of words, lines, paragraphs, and sentences compared to UK firms. Furthermore, the average proportion of environmental information to total report pages is approximately one-third higher in the USA (32.81 percent) than in the UK (21.84 percent). These findings are consistent across both 2018 and 2019. These results empirically support hypothesis H_3 and can be interpreted through the lens of regulatory, cultural, and customary influences on corporate disclosure practices. The US regulatory environment, being rules-based and legally stringent, likely encourages firms to provide extensive, detailed environmental disclosures. In contrast, the UK's principles-based system promotes more concise and flexible reporting, leading to significantly lower volumetric disclosure metrics. From a cultural perspective, the US emphasis on litigation risk and investor protection motivates firms to include detailed, precautionary information. Meanwhile, UK firms may focus more on strategic narratives that satisfy broad stakeholder expectations within a less prescriptive regulatory setting. These regulatory and cultural norms influence firms' strategic choices in structuring their environmental disclosures, as reflected in the significant disparities in word count, line count, and other disclosure measures.

By grounding our interpretation of statistical findings in legitimacy theory and contextual literature (e.g., Akhter et al., 2022; Bhatia & Tuli, 2018; Saha & Kabra, 2020; Senn & Giordano-Spring, 2020), we strengthen the theoretical justification for accepting H_3. These volumetric differences serve as quantitative indicators of the distinct environmental accountability expectations embedded in the reporting cultures of each country, confirming that regulatory, cultural, and customary pressures significantly shape the magnitude and nature of environmental disclosure practices.

5. Discussion

The analysis of environmental disclosure among a sample of the top 50 companies listed on prominent stock exchanges such as the LSE, NYSE, and NASDAQ, reveals significant insights into firms' strategic reporting behaviors in differing regulatory environments. Results show a moderate average proportion of environmental disclosure content (approximately 27.32 percent), with US firms consistently providing significantly higher volumes of disclosure across all measured dimensions, words, lines, paragraphs, sentences, and proportion of pages, compared to their UK counterparts. Notably, although 2018 was the year immediately preceding the mandatory implementation of the updated GRI Standards (GRI, 2016), there appeared to be a slight decline in environmental information disclosure in 2019. This could reflect a strategic transitional response as firms adjusted their disclosure practices in

anticipation of our response to evolving reporting guidelines. This finding explicitly supports H_1, highlighting that firms strategically manipulate the volumetric level of environmental disclosures. Specifically, overall voluntary disclosure practices observed do not solely focus on environmental issues but strategically encompass broader ESG dimensions, consistent with legitimacy theory (Lindblom, 1994, Tilling & Tilt, 2010). Firms manage their disclosures not only to inform but also to shape stakeholder perceptions, thereby enhancing corporate legitimacy and responding dynamically to stakeholder expectations and changing regulatory landscapes. Although this study emphasizes environmental reporting, the textual context of many disclosures occasionally referenced social concerns such as community engagement and labor conditions as well as governance themes, including ethical oversight and board responsibilities. These elements were often embedded within broader sustainability sections, reflecting an integrated presentation of ESG components. This suggests that firms may prioritize non-environmental dimensions in their overall sustainability communication, highlighting the interconnected nature of ESG reporting.

The substantial difference observed between UK and US firms in disclosure magnitude can be attributed primarily to their distinct regulatory frameworks – the UK's principles-based versus the US's rules-based systems. Under the US SEC Regulation S-K (SEC, 2008), firms are pressured to disclose detailed environmental information extensively, driven largely by litigation risks and strict regulatory oversight. Consequently, US firms strategically employ comprehensive environmental disclosures as proactive legal and stakeholder management tools. Conversely, the UK's Section 417 of the Companies Act 2006 (Great Britain, Companies Act 2006) permits greater reporting discretion, encouraging firms to adopt more concise, focused disclosures that strategically integrate environmental information within broader ESG reporting. These regulatory-driven disclosure strategies are consistent with findings from prior research (e.g., Akhter et al., 2022; Bhatia & Tuli, 2018; Michelon et al., 2015; Saha & Kabra, 2020; Senn & Giordano-Spring, 2020), reaffirming that national regulatory environments profoundly shape firms' strategic approaches to environmental reporting and corporate transparency.

The strategic variations between UK and US firms' reporting practices extend beyond regulatory factors and reflect deeper cultural and institutional nuances. For instance, the more concise and targeted disclosure strategy observed in UK firms might be attributed not only to their principles-based regulatory environment but also to cultural preferences emphasizing succinctness and directness in corporate communication (Gray & Vint, 1995). In contrast, the detailed and expansive disclosures by US firms align with the country's institutional context, characterized by higher litigation risks, rigorous stakeholder scrutiny, and explicit demands for transparency (Bhatia & Tuli, 2018; Saha & Kabra, 2020). Such cultural and institutional dynamics further reinforce the strategic nature of corporate disclosures, whereby firms consciously adjust their communication patterns to manage their perceived legitimacy and stakeholder relationships effectively.

To further unpack these findings through a theoretical lens, the support for hypothesis H_1 can be more precisely understood using Suchman's (1995) three mechanisms of legitimacy: pragmatic, moral, and cognitive legitimacy. The higher disclosure volumes among US firms suggest a pragmatic legitimacy strategy, aimed at satisfying the expectations of key stakeholders, particularly investors and regulators who demand detailed and standardized reporting. This approach aligns with the USA's rules-based regulatory environment, where

legal accountability and financial transparency are emphasized. Conversely, UK firms' comparatively concise disclosure may reflect a strategic pursuit of moral legitimacy, prioritizing ethical responsibility and narrative coherence over disclosure length. This approach is consistent with the UK's stakeholder-oriented governance model, which values principle conduct and social responsibility. Cognitive legitimacy is also evident in both contexts, as firms appear to shape their reporting practices in line with socially accepted norms and institutional framework within their jurisdictions. By embedding environmental disclosure within culturally and institutionally resonant formats, firms reinforce their perceived legitimacy as environmentally responsible actors. These differentiated applications of legitimacy theory offer a deeper understanding of the cross-national variance in disclosure style, highlighting how firms strategically manage legitimacy through tailored sustainability reporting.

Moreover, the observed variations in disclosure magnitude provide insights into strategic shifts as companies prepare for evolving global reporting expectations, such as those introduced by the IFRS S1 and IFRS S2 standards (ISSB, 2023a, 2023b). The anticipation of these international standards may have subtly influenced corporate reporting behaviors during the transitional period studied. Firms might have preemptively adapted their disclosure volumes, balancing stakeholder expectations with strategic discretion, which could explain the minor overall decline in environmental disclosures observed in 2019. These adjustments, indicative of strategic adaptation and anticipation of regulatory changes, underscore the proactive role firms play in navigating the evolving landscape of sustainability reporting, thus highlighting the dynamic and anticipatory nature of corporate disclosure strategies.

Understanding these variations and strategic adaptations carries important practical implications for multinational corporations. Firms operating across multiple regulatory jurisdictions must recognize the strategic dimensions inherent in voluntary disclosure practices and develop reporting strategies that accommodate both global expectations and local regulatory nuances. Such awareness not only helps companies enhance their legitimacy and manage stakeholder relationships effectively but also prepares them for forthcoming global standards. The following analysis of correlations and temporal trends in disclosure practices elucidates how multinational corporations strategically align their reporting behaviors within diverse and evolving regulatory frameworks.

5.1 Correlations and the trend over time of the measures of disclosure

Consistent with previous studies by Hasseldine et al. (2005), Buniamin (2010), and Michelon et al. (2015), this research identifies strong positive relationships among the five volumetric disclosure measures, confirming their reliability and validity as proxies for disclosure magnitude. However, notably weaker positive correlations emerged between the proportion of pages devoted to environmental information and other measures (word, line, paragraph, and sentence counts). This indicates that, despite a general increase in environmental disclosures, firms, particularly industry leaders in the UK and USA, strategically prioritize diverse content over extensive environmental reporting. Such strategic content management aligns with legitimacy theory, suggesting that corporations may adjust their disclosure profiles to address evolving external expectations and stakeholder pressures strategically.

Further examination reveals notable geographic differences in disclosure trends. Among UK firms, correlations between word, line, and paragraph counts with sentence counts weakened

slightly from 2018 to 2019. This trend was statistically supported by the results of Fisher's *Z*-tests, which showed a significant reduction in the correlation between word and sentence counts in UK disclosures ($Z = 3.350$, $p < 0.05$), confirming that the coherence between reporting dimensions weakened over the two-year period. This weakening suggests a deliberate strategic shift, characterized by increasing verbosity (words, lines, and paragraphs) accompanied by fewer sentences. Such a trend, supported by statistically significant weakening correlations in key disclosure dimensions, indicates that UK firms may be adopting more complex sentence structures, possibly to obfuscate or dilute the clarity of disclosed environmental information. This strategic approach aligns with defensive legitimacy management, wherein firms attempt to manage stakeholder perceptions by introducing complexity or ambiguity into their reports.

Conversely, US firms demonstrated strengthened positive correlations between sentence counts and other volumetric measures such as words, lines, and paragraphs over the two-year period. The Fisher's *Z*-tests further reinforced this finding, showing a statistically significant enhancement in the correlation between word and sentence counts ($Z = -1.799$, $p < 0.10$) and between paragraph and sentence counts ($Z = -1.983$, $p < 0.05$) among US firms, indicating a move toward greater internal consistency in disclosure practices. This improved alignment suggests an increasingly consistent and clear reporting style within US firms' environmental disclosures. Accompanied by overall increases in volumetric disclosure metrics, these changes likely reflect strategic adaptations driven by stringent regulatory oversight, litigation risks, and explicit stakeholder expectations prevalent in the US business environment. The clearer and more coherent disclosures observed in US reports appear strategically designed to proactively mitigate legal risks and manage stakeholder relationships, thereby reinforcing corporate legitimacy within the rules-based US regulatory framework. As recent studies have shown, stakeholder expectations continue to evolve, with institutional investors placing increasing emphasis on ESG transparency as a marker of long-term viability and trust (Amel-Zadeh & Serafeim, 2018; Tamimi & Sebastianelli, 2017). This shift reinforces the importance of disclosure quality and coherence, especially for firms operating in globally scrutinized environments like the USA and UK.

According to Lindblom's (1994) legitimacy strategies, companies strategically utilize disclosures not only to inform and educate stakeholders about their environmental initiatives but also to influence perceptions regarding their environmental performance. Thus, the divergent disclosure strategies between UK and US firms likely reflect distinct cultural, regulatory, and market dynamics influencing corporate communication practices. The observed variations provide fertile ground for future research exploring corporate motivations behind disclosure strategies, shaped by diverse stakeholder pressures and institutional frameworks.

Moreover, the emphasis of the revised GRI Standards (GRI, 2016) on higher disclosure quality and accountability likely prompted UK firms to shift their strategic focus from disclosure quantity towards enhancing the quality and relevance of reported information. This strategic realignment could temporarily reduce the overall disclosure volume as firms refine their reporting approaches to meet higher transparency standards effectively.

The empirical findings, combined with theoretical insights from legitimacy and stakeholder theories, underscore the complexities inherent in multinational corporations' disclosure strategies. This is increasingly evident as firms are now expected to satisfy a growing range of regulatory and market-driven demands, particularly with the global trend toward mandatory

ESG disclosure frameworks (Ioannou & Serafeim, 2019; KPMG, 2022). These external pressures shape how firms tailor disclosure content, structure, and frequency, especially during periods of regulatory transition, such as the adoption of the revised GRI Standards. The contrasting trends, weakening correlations in the UK and strengthening correlations in the USA, highlight the significant influence of regulatory contexts, stakeholder expectations, and strategic legitimacy management on corporate environmental reporting practices. These nuanced insights call for continued research into how multinational corporations adapt disclosure strategies to manage legitimacy and navigate the complexities of global and local regulatory landscapes.

5.2 Different regulations and disclosure

Building on the observed strategic variations identified in subsection 5.1, where shifts in the internal consistency of disclosure practices were noted within both UK and US firms, this study further uncovered substantial differences in environmental reporting volumes between the two countries. These findings highlight the significant impact of differing accounting regimes on environmental disclosure practices. The results reveal that almost all forms of reporting magnitudes, which are word, line, paragraph, and sentence counts, in UK disclosures are statistically significantly lower than those in US disclosures. Moreover, the proportion of pages devoted to environmental information in UK firms is one-third smaller than that of US firms, raising important questions about the underlying drivers of these differences. These findings align with more recent evidence suggesting that disclosure quantity and transparency are highly influenced not only by regulatory structures but also by national compliance cultures and stakeholder engagement dynamics (Benlemlih et al., 2018; Drempetic et al., 2020). As noted by Akhter et al. (2022) and Saha & Kabra (2020), stringent regulatory environments can compel firms to increase their mandatory disclosures, which in turn may catalyze more comprehensive voluntary disclosures as organizations seek to manage stakeholder perceptions and reinforce their legitimacy. In developed countries, listed firms may use sustainability disclosures to align with or exceed the standards set by influential guidelines like the GRI, even when these guidelines are not mandatory. For multinational corporations, these findings underscore the critical importance of understanding and adapting to local regulatory expectations when navigating different jurisdictions. Firms that are well-versed in the regulatory, cultural, and market dynamics of their operating environments can strategically use sustainability disclosures as tools for mitigating uncertainty, managing stakeholder perceptions, and building long-term trust with global investors and other key constituencies.

The increasing concentration of environmental information in US disclosures over the years, marked by a greater number of words and sentences, while simultaneously minimizing the depth of environmental information, supports the notion that US firms may employ disclosure as a strategic response to regulatory pressures. This is consistent with the findings of Bhatia & Tuli (2018), which provide a contrast to the earlier observations by Holland & Foo (2003) and Eakpisankit (2012), thereby underscoring the dynamic nature of sustainability reporting in the world's most advanced economies. Contrasting the findings with Ho & Taylor (2007), who reported more extensive social and environmental reporting among Japanese firms than among US firms, this study's results suggest that principles-based systems may discourage comprehensive quantitative environmental disclosures. In a rules-based system, firms tend to provide extensive voluntary information to ensure full compliance and to avoid any penalties

associated with non-compliance. Conversely, in a principles-based system, where there is less prescriptive detail, there may be less compulsion to provide extensive voluntary information beyond the stipulated requirements.

These findings reaffirm that regulatory differences between the UK and US accounting systems significantly influence sustainability reporting and disclosure levels. Recent research (e.g., Ioannou & Serafeim, 2019; KPMG, 2022) underscores that evolving mandatory disclosure requirements increasingly shape corporate strategies, complementing classical insights by Holland & Foo (2003) and Adams & Kuasirikun (2000). This influence extends to the formats used for disclosure, suggesting that the structure of voluntary reports is as important as their content (Benlemlih et al., 2018; Drempetic et al., 2020). The study provides practical guidance for firms seeking to navigate diverse accounting systems, including those that are either rules-based or principles-based, and for those that fall somewhere in between. Furthermore, the study reveals that the strategic use of sustainability disclosure is not confined to a few leading companies but is a widespread practice. This has significant implications for global stakeholders and investors, who must recognize these strategic underpinnings when using sustainability disclosures to assess firm performance and compliance (Benvenuto et al., 2023).

Prior research, including that by Triyani et al. (2020), has recognized the profound impact of regulatory frameworks on the quality and transparency of environmental disclosures. While these studies provide essential insights into how different regulatory contexts shape disclosure practices, they often do not delve into the detailed quantitative analysis of disclosures across contrasting regulatory regimes like the UK and USA. This oversight highlights a critical gap in the literature, where the broader implications of such metrics are not fully explored, particularly in how they reflect underlying regulatory and strategic differences between regions like the UK and the USA. Our study builds on this foundation, employing quantitative approaches to uncover deeper insights into the strategic adaptation of disclosure practices in response to evolving global standards (Senn & Giordano-Spring, 2020).

These dynamics indicate that multinational corporations must be adept at adjusting their disclosure strategies to meet not only the explicit demands of various regulatory regimes but also the implicit expectations of stakeholders in different jurisdictions. The forthcoming regulations, such as IFRS S1 (ISSB, 2023a) and IFRS S2 (ISSB, 2023b), are likely to further shape these strategies by creating a more uniform expectation for environmental disclosure, potentially reducing discrepancies between different regulatory frameworks. Policymakers can also glean insights from this study to tailor their regulatory approaches to encourage more comprehensive and meaningful environmental disclosures. Encouraging transparency through clear, actionable guidelines could help bridge the gap observed between different regulatory regimes and enhance the global comparability of disclosure practices.

These regulatory and institutional differences can also be interpreted through the lens of legitimacy theory. Specifically, the higher volumetric disclosures observed in US firms may reflect a pragmatic legitimacy strategy, where transparency served to directly address stakeholder expectations in a regulatory based context. In contrast, the UK's more flexible, principles-based regulatory environment may foster a focus on moral legitimacy, with firm emphasizing ethical responsibility and accountability through more narrative-driven and concise reporting. Cognitive legitimacy underpins both approaches, as firms seek to conform the socially embedded norms and institutional expectations within their respective jurisdictions.

Interpreting these variations through Suchman's (1995) three legitimacy mechanisms adds a nuanced theoretical perspective on how regulatory environments shape corporate disclosure behavior.

By exploring these regulatory nuances and their implications, this study contributes to the broader discourse on how multinational corporations can effectively manage their environmental disclosure strategies to meet diverse global standards. It also provides a foundation for future research into the evolving landscape of environmental reporting and governance.

6. Conclusion

This study provides valuable empirical insights into corporate environmental reporting practices within the UK and USA, focusing on how regulatory environments shape disclosure behaviors. By examining volumetric measures across two consecutive years, the research highlights strategic patterns in disclosure practices, emphasizing the influence of differing accounting and regulatory frameworks.

While the findings are insightful, several limitations should be acknowledged. First, although the statistical power analysis confirms the sufficiency of the sample size for detecting meaningful differences and trends, the selection of firms, restricted to the top 50 companies by market capitalization within major indices (FTSE100 and S&P100), may limit the generalizability of the results. These large, market-leading firms are likely to have more mature and institutionalized disclosure practices compared to smaller or mid-sized companies. Thus, while the sample enables robust comparative analyses between two leading economies, it may not fully capture the diversity of disclosure behaviors across the broader corporate landscape. Future research should extend the analysis to include firms of varying sizes, industries, and levels of regulatory exposure to ensure broader applicability of findings.

Secondly, the manual data collection process, although conducted with meticulous care and with inter-coder reliability protocols, inherently introduces potential for coder subjectivity. Moreover, the study relies predominantly on quantitative volumetric measures, which, while effective for assessing disclosure breadth, may not fully capture disclosure quality, substance, or strategic nuances. Future investigations could benefit from integrating qualitative content analysis or linguistic metrics to better assess the richness and credibility of disclosed information. Additionally, while this study captures a critical transitional period surrounding the full implementation of the updated GRI Standards (GRI, 2016), the short two-year timeframe limits the ability to infer longer-term adaptations to evolving global disclosure norms. Extending the analysis longitudinally would provide richer insights into how firms' reporting evolves in response to regulatory shifts, stakeholder pressures, and sustainability-driven market dynamics.

For policymakers and regulatory bodies, this study reinforces the need to develop clearer, actionable guidelines that balance flexibility with comparability, encouraging firms not only to expand the volume but also to enhance the substantive quality of their environmental disclosures. Practical steps could include mandating core disclosure elements and promoting standardized frameworks that address both global standards, such as IFRS S1 and IFRS S2 (ISSB, 2023a; ISSB, 2023b), and jurisdiction-specific expectations. From a managerial perspective, firms, particularly multinational corporations, are advised to strategically align

their disclosure practices with both international benchmarks and local regulatory nuances. Doing so will strengthen stakeholder trust, support legitimacy management efforts, and help navigate evolving global expectations regarding transparency and accountability. Building on these implications for practice and policy, the present study also contributes to the academic discourse by offering new empirical insights into sustainability reporting dynamics.

This study advances the academic understanding of how regulatory frameworks and strategic corporate behavior influence environmental disclosure practices across jurisdictions. By highlighting both the complexities and the evolving nature of disclosure patterns within developed economies, it establishes a critical foundation for future empirical inquiry, regulatory development, and corporate practice enhancement. As the global landscape of sustainability reporting continues to mature, these findings offer important implications for scholars, practitioners, and policymakers seeking to foster greater transparency, accountability, and comparability in corporate environmental communications. In sum, this research contributes to the broader discourse on sustainability governance and underscores the necessity of continued investigation into the dynamic interactions between regulation, corporate strategy, and stakeholder expectations.

Supplemental material

Appendix 1

Coding manual for environmental disclosure

1. Overview

To ensure consistency and transparency in data collection, a structured coding manual was developed and applied throughout the content analysis process. The manual was designed to guide the identification and measurement of environmental disclosure content in corporate reports using volumetric indicators.

2. Development of the coding manual

The coding manual was developed based on an extensive review of the environmental disclosure literature, specifically drawing on the frameworks proposed by Michelon et al. (2015) and the operationalizations outlined in Akhter et al. (2022). It was also closely aligned with the environmental disclosure categories defined in the Global Reporting Initiative's G4 Guidelines (GRI, 2013) and the updated GRI Standards (GRI, 2016). Particular attention was given to disclosures categorized under topic codes beginning with "300", which include, but are not limited to:

- GRI 301 – Materials
- GRI 302 – Energy
- GRI 303 – Water and effluents
- GRI 304 – Biodiversity
- GRI 305 – Emissions
- GRI 306 – Waste
- GRI 307 – Environmental compliance
- GRI 308 – Supplier environmental assessment

In addition to these specific topics, the coding framework also encompassed other relevant content that addressed corporate environmental responsibility in a broad sense.

3. Volumetric disclosure measures

The following five volumetric metrics were used to quantify the magnitude of environmental disclosure ($CERQTY_{jt}$):

- Word count (W_{jt}): The total number of words in the environmental section.
- Line count (L_{jt}): The total number of lines of text.
- Paragraph count (P_{jt}): The total number of paragraphs.
- Sentence count (S_{jt}): The total number of sentences.
- Proportion of pages (PP_{jt}): The percentage of report pages devoted to environmental topics.

4. Coding process and coders

The coding was independently conducted by three coders (the first author and two trained research assistants). All coders received training using the finalized coding manual and discussed sample cases before formal data collection.

5. Pilot testing and revisions

A pilot study was carried out using a sample of ten reports from firms (five UK and five US firms) outside the final sample and study years, which were independently coded by all three researchers. Discrepancies were reviewed collectively, and ambiguities in definitions were clarified. This pilot stage lasted four weeks and resulted in refinements to coding rules to ensure interpretive consistency.

6. Inter-Coder Reliability

To verify consistency in coding, inter-coder reliability checks were conducted at three key phases:

1. After the first 10 percent of reports were coded.
2. At the midpoint of data collection (50 percent).
3. Upon completion of full coding but before final data cleaning.

At each stage, 10 percent of the sample was randomly double-coded. Krippendorff's alpha (α) was calculated, and values for all variables remained above the recommended threshold of 0.667 (Krippendorff, 2004), indicating satisfactory inter-coder agreement. Minor updates to definitions were made after each check to maintain alignment.

7. Example of Coding Categories

To operationalize environmental disclosure for quantitative analysis, specific content items were classified under relevant GRI topic categories. Each identified environmental disclosure instance was quantified using the five volumetric measures defined in section 3. Table A1.1 below illustrates examples of coded content and corresponding measurement techniques.

Table A1.1. Examples of coded content and corresponding measurement techniques

GRI topic	Disclosure content example	Measurement applied
GRI 301 – Materials	Recycled input materials used in our manufacturing process reached 42% this year.	Word, line, paragraph, and sentence counts (W_{jt}, L_{jt}, P_{jt}, and S_{jt}); proportion of pages (PP_{jt})
GRI 305 – Emissions	Our total Scope 1 and Scope 2 GHG emissions decreased by 8% compared to last year.	Word, line, paragraph, and sentence counts (W_{jt}, L_{jt}, P_{jt}, and S_{jt}); proportion of pages (PP_{jt})
General environmental policy	Our approach to environmental sustainability emphasizes continuous improvement and compliance.	Word, line, paragraph, and sentence counts (W_{jt}, L_{jt}, P_{jt}, and S_{jt}); proportion of pages (PP_{jt})

Each disclosure instance was included if it related to GRI topic codes beginning with "300" as defined in the GRI Standards (2016), such as GRI 302 – Energy, GRI 306 – Waste, or GRI 307 – Environmental compliance). Coders were instructed to include only text explicitly addressing environmental matters, as defined by the GRI-based coding categories, and to exclude brief or generic mentions that did not pertain to specific environmental topics. The coding focused strictly on disclosure volume rather than on evaluating the strategic or qualitative depth of the content. Where environmental discussions were embedded within broader ESG narratives, only the portions directly related to environmental issues were coded.

Appendix 2: Sensitivity analyses by sectoral clusters

To assess whether the observed differences in disclosure practices between UK and US firms could be confounded by sectoral composition, sensitivity analyses were conducted by comparing mean disclosure volumes across broad sectoral groupings. Companies in the sample were categorized according to five aggregated sectors based on the International Standard Industrial Classification of All Economic Activities (ISIC), Rev. 4 (United Nations, 2008). These sectors include: (1) Agriculture, forestry, and fishing, (2) Manufacturing, (3) Construction, (4) Mining and quarrying; Electricity, gas and water supply, (5) Market services (Trade; Transportation; Accommodation and food; and Business and administrative services), and (6) Non-market services (Public administration; Community, Social and other services and activities). The dataset does not include firms from the agriculture, forestry, and fishing, or construction sectors. The sectoral classification for each company was manually assigned by aligning firm activities with ISIC Section-level concordance guidelines provided by the International Labour Organization.

Using these clusters, mean values for the five volumetric disclosure indicators, word count (W_{jt}), line count (L_{jt}), paragraph count (P_{jt}), sentence count (S_{jt}), and the proportion of report pages (PP_{jt}), were compared across the sectoral categories using one-way ANOVA. The analysis was performed on combined UK-US samples, as well as separately for UK-only, US-only, and year-specific samples (2018 and 2019).

As shown in Table A2.1, although some differences in disclosure magnitude across sectoral groupings were observable in certain indicators (e.g., PP_{jt} for the samples in 2018, and W_{jt}, S_{jt}, and PP_{jt} for the combined UK-US sample), the overall results do not suggest a systematic bias attributable to sectoral composition. In most tests, the F-statistics did not reach conventional levels of statistical significance, particularly for the pooled 2018 and 2019 samples. This reinforces the validity of the cross-country comparisons presented in the main analysis, suggesting that differences in disclosure volume between UK and US firms are more plausibly linked to institutional and regulatory factors than to sectoral distribution effects.

As shown in Table A2.1, some differences in disclosure magnitude across sectoral groupings were statistically significant, particularly for the UK sample in the pooled 2018 – 2019 period. For this subsample, all five volumetric indicators (W_{jt}, L_{jt}, P_{jt}, S_{jt}, and PP_{jt}) exhibited significant variation across sectors, suggesting that sectoral context may influence disclosure practices within the UK. However, in the combined UK-US sample and most other subgroup analyses, including the pooled 2018 and 2019 datasets, the F-statistics did not consistently reach conventional levels of statistical significance. These findings indicate that while sector-specific dynamics may play a role in certain national contexts, the observed cross-country differences in disclosure volume are not systematically attributable to sectoral composition alone. Instead, institutional and regulatory influences remain the more plausible explanatory factors.

These results support the robustness of the findings in the absence of industry stratification and confirm that the use of top firms by market capitalization across countries did not inadvertently skew results due to uneven sectoral representation.

Table A2.1. Sensitivity analyses by sectoral clusters

Sample	$CERQTY_{jt}$	Mean				*F*-statistic
		Manufacturing	Mining and quarrying; Electricity, gas and water supply	Market services	Non-market services	
UK US Combined years (2018 – 2019)	W_{jt}	8447.75	10136.08	5959.58	8631.83	2.793**
	L_{jt}	3077.66	2231.33	2228.73	3325.22	1.016
	P_{jt}	556.82	537.71	373.57	687.72	2.164*
	S_{jt}	319.16	393.21	237.27	459.17	2.953**
	PP_{jt}	0.32	0.30	0.21	0.37	5.185***
	$n = 200$	68	24	90	18	
UK Combined years (2018 – 2019)	W_{jt}	5674.32	10566.88	2515.32	7100.33	10.649***
	L_{jt}	2033.64	2534.81	1075.74	3266.67	4.337***
	P_{jt}	385.18	577.69	172.90	632.00	5.104***
	S_{jt}	211.54	404.69	95.10	203.50	7.963***
	PP_{jt}	0.26	0.30	0.15	0.39	9.276***
	$n = 100$	28	16	50	6	
US Combined years (2018 – 2019)	W_{jt}	10389.15	9274.50	10264.90	9397.58	0.076
	L_{jt}	3808.485	1624.38	3669.98	3354.50	0.521
	P_{jt}	676.98	457.75	624.40	715.58	0.284
	S_{jt}	394.50	370.25	414.98	587.00	0.822
	PP_{jt}	0.36	0.30	0.29	0.35	0.564
	$n = 100$	40	8	40	12	
Pooled 2018 samples	W_{jt}	8000.91	10293.67	5800.95	7994.44	1.368
	L_{jt}	3181.27	2291.25	1877.42	3261.67	1.275
	P_{jt}	559.24	528.17	338.11	624.00	1.390
	S_{jt}	295.44	485.58	236.76	479.56	2.088
	PP_{jt}	0.34	0.29	0.21	0.38	3.466**
	$n = 100$	34	12	45	9	
Pooled 2019 samples	W_{jt}	8894.59	9978.50	6118.20	9269.22	1.432
	L_{jt}	2974.06	2171.42	2580.04	3388.78	0.211
	P_{jt}	554.41	547.25	409.02	751.44	0.885
	S_{jt}	342.88	300.83	237.78	438.78	1.405
	PP_{jt}	0.30	0.31	0.22	0.36	1.881
	$n = 100$	34	12	45	9	

Notes: $CERQTY_{jt}$ means compared by broad sectoral clusters using one way ANOVA *F*-tests. Statistical significance is denoted as follows: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Broad sectoral groupings (e.g., (1) Agriculture, forestry, and fishing, (2) Manufacturing, (3) Construction, (4) Mining and quarrying; Electricity, gas and water supply, (5) Market services (Trade; Transportation; Accommodation and food; and Business and administrative services), and (6) Non-market services (Public administration; Community, Social and other services and activities)) for each company referring to the broad sector concordance with International Standard Industrial Classification of All Economic Activities (ISIC), Rev. 4 (United Nations, 2008)

Appendix 3: Sensitivity analyses of standardized disclosure metrics

1. Standardized disclosure metrics

To address potential formatting biases due to variations in report structure, layout, and length, each disclosure measure was standardized on a per-report basis. The volumetric disclosure metrics were normalized by dividing each value by the total number of pages in the respective report to produce density-based metrics. The standardized variables used in this analysis are defined as follows:

- Standardized word count $(SW_{jt}) = \frac{W_{jt}}{Total\ number\ of\ pages_{jt}}$
- Standardized line count $(SL_{jt}) = \frac{L_{jt}}{Total\ \ number\ of\ pages_{jt}}$
- Standardized paragraph count $(SP_{jt}) = \frac{P_{jt}}{Total\ number\ of\ pages_{jt}}$
- Standardized sentences count $(SS_{jt}) = \frac{S_{jt}}{Total\ \ number\ of\ pages_{jt}}$
- Proportion of pages addressing environmental topic $(PP_{jt}) = \frac{Total\ number\ of\ pages\ devoted\ to\ environmental\ topics_{jt}}{Total\ \ number\ of\ pages_{jt}}$ (unchanged)

This standardization method enabled a fairer comparison across firms by controlling for formatting differences (e.g., font size, visual layout), allowing assessment of disclosure intensity relative to document length.

2. Statistical methods

To examine the robustness of our findings, we applied both parametric and non-parametric statistical tests:

- Two-independent sample *t*-tests and Mann-Whitney tests were used to compare standardized disclosure densities between independent groups (e.g., UK vs. US firms, or pooled 2018 vs. 2019 samples).
- Paired sample *t*-tests and Wilcoxon signed-rank tests were conducted for within-country year-on-year comparisons (e.g., 2018 UK vs. 2019 UK and 2018 US vs. 2019 US).

All tests were two-tailed, with significance levels reported at 10%, 5%, and 1% thresholds where applicable.

3. Results

3.1 Results summary

The results are summarized in Tables A3.1 and A3.2. Across all comparisons, US firms demonstrated significantly higher disclosure density than UK firms on all five standardized metrics, particularly in sentence and word counts per page. These differences remained consistent across years and statistical approaches (*t*-tests and Mann-Whitney tests), confirming the robustness of the observed patterns. No statistically significant changes were detected between 2018 and 2019 for either the UK or US subsamples. Although some marginal increases were observed in UK disclosures, none reached significance levels after adjusting for formatting.

Table A3.1. Cross-national comparisons (UK vs. US)

Comparison	*n* (UK vs. US)	Metric	UK Mean	US Mean	*t*-statistic	*z*-statistic
Combined years (2018 – 2019)	100 vs. 100	SW_{jt}	79.62	103.22	-2.263**	-3.123***
		SL_{jt}	30.70	37.82	-1.287*	-1.864**
		SP_{jt}	5.71	7.23	-1.548*	-2.074**
		SS_{jt}	2.87	4.23	-3.114***	-3.790***
		PP_{jt}	0.22	0.33	-3.828***	-3.548***
2018	50 vs. 50	SW_{jt}	74.62	104.04	-2.010**	-2.378**
		SL_{jt}	28.58	38.41	-1.203	-1.751*
		SP_{jt}	5.11	7.32	-1.634*	1.544
		SS_{jt}	2.89	4.32	-2.202**	-2.627***
		PP_{jt}	0.22	0.34	-2.821***	-2.527**
2019	50 vs. 50	SW_{jt}	84.62	102.40	-1.187	-2.027**
		SL_{jt}	32.81	37.23	-0.586	-0.931
		SP_{jt}	6.31	7.14	-0.578	-1.310
		SS_{jt}	2.85	4.15	-2.183**	-2.764***
		PP_{jt}	0.22	0.32	-2.562**	-2.516**

Notes: Standardized metrics are computed by dividing each volumetric measure by the total report pages). The proportion of pages devoted to environmental topics is calculated as the share of total report pages. *t*-statistics refer to two independent or paired samples *t*-tests, depending on the comparison. *z*-statistics refer to Mann-Whitney or Wilcoxon signed-rank tests, depending on the comparison. Statistical significance is denoted as follows: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A3.2. Cross-year comparisons (2018 vs. 2019)

Comparison	*n* (2018 vs. 2019)	Metric	2018 Mean	2019 Mean	*t*-statistic	*z*-statistic
Pooled samples	100 vs. 100	SW_{jt}	89.33	93.51	-0.395	-0.578
		SL_{jt}	33.49	35.02	-0.275	-0.805
		SP_{jt}	6.22	6.72	-0.514	-0.650
		SS_{jt}	3.60	3.50	0.235	-0.125
		PP_{jt}	0.28	0.27	0.216	-0.012
UK	50 vs. 50	SW_{jt}	74.62	84.62	-1.524	-0.357
		SL_{jt}	28.58	32.81	-1.029	-0.409
		SP_{jt}	5.11	6.31	-1.897*	-0.415
		SS_{jt}	2.89	2.85	0.104	-0.169
		PP_{jt}	0.22	0.22	-0.152	-0.011
US	50 vs. 50	SW_{jt}	104.04	102.40	0.195	-0.158
		SL_{jt}	38.41	37.23	0.261	-0.115
		SP_{jt}	7.32	7.14	0.219	-0.244
		SS_{jt}	4.32	4.15	0.486	-0.023
		PP_{jt}	0.34	0.32	0.595	-0.05

Notes: Standardized metrics are computed by dividing each volumetric measure by the total report pages). The proportion of pages devoted to environmental topics is calculated as the share of total report pages. *t*-statistics refer to two independent or paired samples *t*-tests, depending on the comparison. *z*-statistics refer to Mann-Whitney or Wilcoxon signed-rank tests, depending on the comparison. Statistical significance is denoted as follows: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

4. Conclusion

The sensitivity analyses confirm the robustness of the original findings presented in the main text. After adjusting for formatting artifacts by standardizing disclosure volumes relative to report length, the

patterns of differences between UK and US firms persisted. Across all standardized metrics, US firms consistently exhibited higher environmental disclosure density than their UK counterparts, reinforcing the substantive nature of the observed differences. Similarly, comparisons within each country across the two years (2018 vs. 2019) showed no significant distortions in the temporal trends initially reported. These results suggest that the reported differences in disclosure practices primarily reflect genuine variations influenced by national regulatory and institutional contexts rather than superficial report formatting features.

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