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Biodiversity reporting: Comparing listed entities in the United Kingdom and South Africa

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Purpose: This research conducts an analysis of biodiversity reporting among a sample of companies listed on the stock exchanges of South Africa (SA) and the United Kingdom (UK). The aim is to present empirical evidence on how organisations address and report on biodiversity-related matters to their stakeholders and investors.

Design/methodology/approach: A disclosure schematic is developed and applied to the selected companies using content analysis to analyse their biodiversity-related disclosures and draw comparisons between the two jurisdictions.

Findings/results: Results indicate that South African organisations demonstrate a higher level of visibility in their biodiversity reporting when compared to their UK counterparts. The primary reason for this is because of a higher biodiversity ranking and hosting more biodiversity hotspots, which impact South African organisations. However, UK companies tend to provide more quantitative and valuation-based disclosures because of their advanced management information systems, professional standards network support and access to financial resources. In general, it is observed that biodiversity reporting is still in its nascent stage in both jurisdictions and offers limited insight into the understanding of biodiversity by organisations and their ability to incorporate direct and indirect impacts into their business models, risk assessment and strategy implementation.

Practical implications: The disclosure schematic serves as a valuable tool for evaluating biodiversity reporting in different national contexts and provides a framework for companies developing biodiversity action plans. The findings help stakeholders assess organisations' progress in achieving biodiversity objectives and integrating biodiversity considerations into business operations.

Originality/value: This study makes two unique contributions to the literature. First, it provides one of the first comparative analyses of biodiversity reporting between a developing and developed economy, offering novel insights into how different jurisdictional contexts influence reporting practices. Second, it develops and applies a comprehensive disclosure schematic that enables evaluation of both symbolic and substantive biodiversity reporting approaches, advancing our understanding of how organisations integrate biodiversity considerations into their reporting and operations.

Keywords: biodiversity; nature-related disclosures; sustainability reporting; South Africa; United Kingdom.

Introduction

An organisation cannot generate financial returns sustainably for its providers of financial capital if it ignores social and environmental inputs on which its business model is, directly and indirectly, dependent (Buchling & Atkins, 2020). Biodiversity[1] is a key example (FSB, 2023), with its management and reporting becoming increasingly critical for corporate accountability and stakeholder engagement.

This research employs stakeholder theory to examine how organisations in different jurisdictions approach biodiversity reporting. Stakeholder theory suggests that organisational practices, including reporting, are shaped by the relationships between organisations and their stakeholders (Freeman, 1984; Mitchell et al., 1997). These relationships vary between developed and developing

1.Biodiversity is defined as 'variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part: this includes diversity within species, between species and of ecosystems'. CBD (1992).

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economies because of different institutional contexts, stakeholder expectations and resources (De Villiers & Van Staden, 2006). In the context of biodiversity reporting, stakeholder theory helps explain why organisations in different jurisdictions might adopt different approaches – from purely symbolic responses aimed at managing impressions to substantive engagement that influences organisational strategy and operations (Rodrigue et al., 2013).

Biodiversity loss and species extinction have numerous causes (see Hassan et al., 2020). There has been a significant (68%) reduction in population sizes as a result of humanity's expansion into wilderness areas (World Wide Fund [WWF], 2020) and there is little evidence of the rate of biodiversity loss slowing (Gaia & Jones, 2017). In this context, both government and non-governmental organisations play an important role in biodiversity reporting by implementing policies and regulations (Potdar et al., 2016). However, their efforts and actions alone are insufficient. Corporations also have an increasingly important role in raising awareness about biodiversity loss and implementing changes to preserve or conserve ecosystems (Potdar et al., 2016). The explicit relationship between the natural and business world can no longer be denied (Atkins & Atkins, 2019).

Biodiversity challenges impact organisations differently depending on the context in which they operate. For example, developing countries, which are often more vulnerable to climate change and the consequences of natural capital degradation, can benefit from environmental accounting and a better understanding of biodiversity management (Siddiqui, 2013). However, a lack of technical expertise and financial resources often hinders the operationalisation of environmental accounting in these regions (Siddiqui, 2013). Conversely, biodiversity and environmental accounting concepts have become mainstream in developed countries where funding and information systems are able to support engagement on related issues (Siddiqui, 2013; Van Liempd & Busch, 2013). Further, given the growing focus on an integrated logic being promoted as a solution to long-term sustainable value creation (Dimes & De Villiers, 2023), organisations are required to understand their impact on natural capital, including biodiversity, to factor this into their risk assessments, strategies, decision-making and operations.

The current study examines biodiversity reporting across industries in South Africa (SA) and the United Kingdom (UK) which were intentionally selected for their contrasting biodiversity levels and economic contexts. While some findings may appear self-evident, this comparison provides valuable insights into how different geographic and economic contexts shape reporting practices and stakeholder responses. As part of this, understanding how organisations report on biodiversity-related information is important. Different types of reports deal with extra financial information and have different names depending on the jurisdiction.

As part of this, understanding how organisations report on biodiversity-related information is important. Different types of reports deal with extra financial information and have different names depending on the jurisdiction. Examples include corporate reports, integrated reports, sustainability reports and corporate social responsibility reports. For the purposes of this article, the report that deals with non-financial reporting with a multi-capital perspective and value generation for a broader stakeholder group will be referred to collectively as 'corporate reports'. Regardless of the naming convention, this study aims to assess the reporting suite broadly to identify the biodiversity-related disclosures and consider the context of the reporting under the respective country's corporate governance frameworks. The organisation's materiality determination process will impact the type and extent of information disclosed and the analysis accounts for the fact that this is influenced by double materiality versus a more traditional financial materiality. Double materiality considerations underline the need to examine a full suite of corporate reports, including financial and non-financial reporting.

This research does not aim to generalise the findings to all industries or jurisdictions but rather to provide insights into biodiversity reporting. Doing so makes, at least, four important contributions. Firstly, while biodiversity-related impacts and reporting have received significant attention from both the academic (see, e.g., Blanco-Zaitegi et al., 2022; Hassan et al., 2020) and practitioner communities (see, e.g., International Sustainability Standards Board [ISSB], 2021; National Biodiversity and Business Network, 2021), few studies provide a comprehensive review of the nature and extent of 'biodiversity reporting'. The current article consolidates earlier work on biodiversity reporting to provide a more complete assessment of different practices in SA and the UK.

Secondly, the prior research has focussed mainly on developed nations including Australia (Hossain, 2017), Denmark (Van Liempd & Busch, 2013), New Zealand (Schneider et al., 2014) and Sweden (Rimmel & Jonäll, 2013). Other studies focussed on the Global top 200 companies (Hassan et al., 2020, 2022). Limited studies consider the UK. The focus is predominantly on reporting conservation activities by local government (Gaia & Jones Michael, 2019) or specific case studies (Sobkowiak, 2023) rather than a broad assessment of corporate entities. Although South African organisations have received more attention than their UK counterparts, the studies focussed only on selected industries and were conducted when biodiversity reporting was still emerging (e.g. Mansoor & Maroun, 2016; Maroun et al., 2018). This study offers a broader analysis across sectors and timeframes, comparing developed and developing economy approaches to stakeholder engagement.

Thirdly, the proposed disclosure schematic can be used as a guideline for organisations wanting to develop a biodiversity action plan and explain its implementation as part of a

sustainability or integrated report while integrated thinking and reporting continue to evolve (Bridges & Yeoman, 2020). Many organisations begin with compliance-based approaches before developing more sophisticated systems (Dimes & De Villiers, 2021). Despite potential impression management limitations (Haji & Anifowose, 2016), the schematic provides a valuable structure for evaluating disclosures, complementing approaches such as Locate, Evaluate, Assess, Prepare (LEAP) approach (FSB, 2023) and ecosystem services analyses (The Economics of Ecosystems and Biodiversity [TEEB], 2012).

Lastly, this research is particularly relevant given the work of the Task Force on Nature-Related Financial Disclosures (TNFD) and the ISSB to develop guidance on environmental issues, including biodiversity and can be factored into an organisation's business model and inform reporting to investors. At the same time, stakeholders, with limited public access to the organisations, can use the schematic to gauge the extent and progress of an organisation's biodiversity management. Policymakers may also find the tool useful for examining how organisations are reporting on biodiversity-related matters.

The remainder of the article is structured as follows: theoretical framework and biodiversity reporting themes examines the prior literature focused on biodiversity reporting and presents the schematic adopted for this research. The methodology section explains the research approach, followed by Results and discussion. The article concludes with recommendations and areas for future research.

Theoretical framework and biodiversity reporting themes

While prior research has applied various theoretical frameworks to explain corporate biodiversity reporting, including impression management (Boiral, 2016), greenwashing (Hassan et al., 2020) and legitimacy (Adler et al., 2018), no comprehensive theoretical model exists which explains the motivation for companies to identify a strategy for species protection (Barter & Bebbington, 2013). This research employs stakeholder theory to examine how organisations navigate stakeholder relationships through biodiversity reporting.

Stakeholder theory provides a framework for understanding how organisations manage their relationships with various stakeholders who can affect or are affected by the organisation's activities (Freeman, 1984). In the context of biodiversity reporting, two key perspectives within stakeholder theory are particularly relevant. The normative perspective suggests organisations have an ethical obligation to consider all stakeholders' interests in their biodiversity management and reporting practices (Donaldson & Preston, 1995). This approach often leads to more substantive reporting that genuinely integrates biodiversity considerations into organisational strategy and operations. In contrast, the managerial perspective focusses on strategic stakeholder management, where organisations may prioritise certain stakeholders based on their power, legitimacy and urgency (Mitchell et al., 1997). This can result in more symbolic reporting practices focussed on managing impressions rather than driving substantial change.

These theoretical perspectives manifest differently in developed versus developing economies. In developed markets like the UK, sophisticated stakeholder networks, strong institutional pressures and well-developed regulatory frameworks often drive a managerial approach focussed on meeting specific stakeholder demands through standardised reporting practices (Gray et al., 1995). In developing markets like SA, different stakeholder priorities and emerging regulatory frameworks may lead to a more normative approach, where organisations balance environmental responsibilities with broader social priorities (De Villiers & Van Staden, 2006). The quality and nature of biodiversity reporting can, therefore, be understood as a reflection of how organisations respond to, and engage with, their stakeholders. This engagement exists on a spectrum from symbolic (surface-level consultation with limited integration of feedback) to substantive (genuine dialogue that influences decision-making) (Thomson & Bebbington, 2005). The level of engagement often depends on factors such as stakeholder pressure, organisational resources and institutional context.

Various environmental (e.g. climate change, biodiversity loss, deforestation, water scarcity and resource depletion) (Maroun & Atkins, 2021) and social (such as, e.g., working policies, digital access, new technologies and employee health) (Maniora, 2015) issues have necessitated an integrated approach to managing risk assessments, strategies and operations. Zoonotic diseases such as coronavirus disease 2019 (COVID-19) also iterate that there is inequality in various components of the economy in both developed and developing countries which exacerbates the environmental and social issues (Myeza et al., 2023). At the same time, increased regulatory focus on sustainability-related issues necessitates a change in approach by organisations (Ecim & Maroun, 2024). The combination of various crises and regulations helped organisations to understand the need for synchronisation of stakeholders with the business instead of focussing on profit factors only. Biodiversity reporting forms an important, if often neglected, aspect of addressing sustainability risks and responses (Rimmel & Jonäll, 2013). By understanding the type of biodiversity reporting organisations are making, further insights into how these organisations are addressing valid environmental and climate risks can be obtained to understand how they are responding to stakeholders and whether these responses are substantive or symbolic in nature (Haji & Anifowose, 2016).

Frameworks for biodiversity reporting

Currently, there is no universally accepted framework for reporting on biodiversity matters. Studies have explored how to evaluate and recognise the economic value of biodiversity and ecosystem services by highlighting the financial benefits and the cost of biodiversity loss (TEEB,

2012). The goal is to incorporate biodiversity-related considerations into an organisation's risk assessments, strategic decision-making, business model and operations to meet evolving stakeholder expectations (Maroun & Ecim, 2024; TEEB, 2012).

The concept of Biodiversity Ecosystem Services (BES), promoted by the TEEB process, has made biodiversity more practical for businesses to understand and manage. The TEEB studies, funded by the EU, United Nations Environment Programme (UNEP) and International Union for Conservation of Nature (IUCN) as a follow-up to the Millennium Ecosystem Assessment, emphasise the importance of ecosystem services in addition to biodiversity (Bishop, 2013). This approach recognises that biodiversity underpins the provision of ecosystem services, which are crucial for business operations and human well-being, and maintaining relationships with diverse stakeholder groups (TEEB, 2010). The TEEB studies have been instrumental in paving the way for initiatives such as the Natural Capital Protocol and the TNFD, highlighting the growing importance of integrating biodiversity and ecosystem services into business decision-making and reporting frameworks (Sukhdev et al., 2014).

As noted by TEEB (2012), the foundational step of this process is to understand and recognise the spectrum of holistic value provided by biodiversity. Thereafter, this value must be quantified to demonstrate the operability and measurability of incorporating biodiversity-related matters into the organisation's day-to-day activities (Hassan et al., 2020). To do so, a robust management information system to collect, analyse and report on the extra-financial data is required to meet the information needs of different stakeholder groups (Bui & De Villiers, 2018). The extra-financial data can then be incorporated into policies, actions and performance incentives to promote the sustainable management of resources that the organisation uses and impacts (Maroun et al., 2023). This can lead to more sustainable outcomes that balance both economic and environmental interests while addressing diverse stakeholder expectations (TEEB, 2012). Organisations can develop internal policies to recognise, demonstrate and capture the value of biodiversity reporting and promote an integrated logic to approach the management of biodiversity in an organisational context.

Several bodies have developed frameworks that include biodiversity reporting in their coverage to guide biodiversity reporting in response to growing stakeholder demand for standardised environmental disclosures. The more prominent and widely recognised included the Integrated Reporting Framework (IIRC, 2021), the Carbon Disclosure Project (CDP, 2020), the Task Force on Climate-related Financial Disclosures (TCFD) and Task Force on Nature-related Financial Disclosures (TNFD) (FSB, 2017, 2023) and the Global Reporting Initiative (GRI, 2019). The Capitals Coalition, which includes the Natural Capital Protocol, aim to create a standardised framework for organisations to measure and value natural capital and incorporate it more broadly into decision-making (Whitaker, 2018). More recently, the ISSB published standards dealing with the importance of sustainability-related factors at the strategic level; the identification, management and mitigation of associated risks; the establishment of suitable metrics or targets for guiding and reporting on performance and the role played by governing bodies in enabling long-term sustainability (see ISSB, 2021). However, the guidance is still conceptual and relies largely on existing frameworks such as the TCFD (FSB, 2017) and will also follow up with new recommendations set by the TNFD and ensure operability and harmonisation with the Greenhouse Gas (GHG) Protocol, CDP and GRI (ISSB, 2021).

Supranational frameworks and guidance such as the United Nations Sustainable Development Goals (SDGs) (Adams et al., 2020) and the Convention on Biological Diversity (CBD, 2018, 2020) provide frameworks for governments to follow to achieve sustainability and biodiversity targets. Despite these guidelines aimed at country and macro-level policies, organisations can also find these useful for developing internal policies, goals and metrics to align with international best practices and stakeholder expectations at different jurisdictional levels.

That businesses must play their part to contribute to biodiversity protection has become axiomatic (Adler et al., 2018). Organisations may utilise their biodiversity reporting as a communitarian accountability tool aimed at raising awareness of the importance of biodiversity and risk management (Gaia & Jones, 2017). However, this reporting is often dominated by an anthropocentric approach facilitated by impression management (Grabsch et al., 2012), as a means of self-justification rather than as a reflection of meaningful, ongoing change (Boiral, 2016). Given the fact that biodiversity reporting, in relation to traditional financial reporting, is still in its infancy and that impression management cannot be precluded, it is necessary to understand what organisations are reporting and how this can be interpreted by stakeholders.

Following the approach used by Adler et al. (2018), Grabsch et al. (2012), Van Liempd and Busch (2013) and Maroun and Ecim (2024), a holistic view of biodiversity is adopted to analyse biodiversity reporting. To assess this, the following disclosure themes are adopted: (1) scene-setting (SS), (2) species-related (SR), (3) social engagement (SE), (4) performance evaluation (PE), (5) risk (R), (6) internal management (IM), (7) external reports (ER) and (8) valuation (V). These themes serve as the basis for the disclosure schematic. The principles highlighted by the bibliometric analysis were incorporated into each of the eight themes as applicable.

Scene-setting refers to an organisation's definition of biodiversity and how it introduces reporting on biodiversity. Species-related disclosures include the number and type of species affected (including the fauna, flora and ecosystem services) by the organisation and efforts to conserve those species. Social engagements include partnerships with

TABLE 1: Biodiversity disclosures.

Scene-setting (SS)		
Definition	• The company defines biodiversity and its components	(Van Liempd and Busch, 2013)
Mission statement	• Reporting of any biodiversity-related mission statement	(Weir, 2019)
	• Existence of a biodiversity policy statement	
Motivation	• Mention of the World Economic Forum's ranking of biodiversity risk	(Hassan et al., 2020; Roberts et al., 2021; Van Liempd and Busch, 2013; WEF, 2019)
	• The company provides ethical motivation to work with protecting biodiversity, protecting species and preventing extinction	
	• The company states why protecting biodiversity is important for the company and its stakeholders	
	• CEO and/or Chairperson letter refers to biodiversity	
Species-related (SR)		
Site-specific	• Reporting of biodiversity information relating to specific sites	(Atkins et al., 2019; Hassan et al., 2020; Roberts et al., 2021)
	• The company discloses specific habitats and/or ecosystems (land, marine, wetlands, rivers, etc.) affected	
Specific species	• The company provides information about specific species affected at the sites where the company operates	(Atkins and Maroun, 2018; Van Liempd and Busch, 2013)
	• The company reports on potential risks and/or impacts on these specific species arising from the company's operations	
	• The company reports flora and faunal wealth around its operating area	
	• The company discloses which species are indigenous	
	• Company reports regular assessments of species populations in areas affected by corporate operations	
IUCN Red list	• Mention of the IUCN Red List	(Atkins and Maroun, 2018; Hassan et al., 2022)
	• The company provides a list of endangered plant and animal species whose habitats are affected by the company's activities	
	• Incorporates images (photos or drawings) of threatened species to further educate stakeholders, promote awareness, evoke emotional responses, engage a broader audience and serve as a symbolic tool to communicate stewardship practices	
	• The company reports biodiversity or species loss because of its operations	
	• The company reports operations with activities in IUCN-protected areas	
Surveys	• The company has included references to CDP questionnaires	(ACCA, 2015)
	• Reporting of biodiversity assessments and/or surveys conducted	
Social engagement (SE)		
Partnerships	• Disclosures of partnerships with biodiversity organisations or NGOs helping with biodiversity conservation	(Roberts et al., 2021; Russell et al., 2017; Van Liempd and Busch, 2013)
	• Company reports details of partnership engagements between wildlife or nature or conservation organisations and the company which aim to address corporate impacts on endangered species	
	• Disclosures of which NGOs are working on biodiversity conservation in the areas where the company operates	
	• The company provided a donation which contributed to the conservation or protection of biodiversity	
	• The company participates in biodiversity associations to improve biodiversity practices in the community	
	• Collaborations with key advisers across professions and progress with ecologists, scientists, humanities scholars and other experts	
Awards	• The company discloses awards or recognition received for biodiversity conservation or restoration	(Hassan et al., 2020)
Stakeholder engagements	• The company reports steps taken for creating biodiversity awareness among its employees or in the community	(Atkins and Maroun, 2018; Usher and Maroun, 2018; Van Liempd and Busch, 2013)
	• The company reports on the education and/or training of all employees delivered on extinction accounting to all employees	
	• Information provided about social media interaction regarding biodiversity	
	• Disclosures of the feedback from stakeholders on biodiversity issues within the company	
	• The company discusses the relationship between local communities and biodiversity at the sites where the company operates	
	• The company provides specific examples of stakeholder engagement	
	• Provide education on extinction initiatives to schools in future	
	• Update shareholders and/or stakeholders quarterly with progress and future actions	

Table 1 continues on the next page →

TABLE 1 (Continues...): Biodiversity disclosures.

Performance evaluation (PE)		
Targets	• The company discloses biodiversity goals and/or targets for future years	(Adams, 2017)
	• The company describes current biodiversity goals	
	• Reference to UN SDG 14 or 15 and respective targets	
	• Reference to CBD post-2020 framework goals	
	• Reports strategy for the future development and improvement of actions and/or initiatives	
Performance	• Discussion of biodiversity-related performance and achievement of targets	(Atkins and Maroun, 2018; Hassan et al., 2020)
	• The company provides assessment and reflection on the outcome of partnerships and decisions taken about changes to initiatives going forward	
	• The company assesses whether the company's actions are effective in conserving biodiversity and preventing extinction	
	• Pictorial evidence of successful conservation is provided	
Costs	• The company reports the amount spent on biodiversity conservation and/or restoration	(Roberts et al., 2021)
	• The company discloses details and the value of any fines or claims relating to biodiversity loss or damage	
	• The company reports the potential liabilities relating to future possible fines and/or claims	
	• Includes a discussion of ways in which the company is working to prevent future liabilities related to harming endangered species	
Risk (R)		
Risk	• The company reports and assesses biodiversity risk	(Van Liempd and Busch, 2013)
	• The company describes business opportunities created by biodiversity	
	• The company uses tools to measure both positive and negative impacts of biodiversity	
	• The company identifies areas which require biodiversity action plans	
Risk management	• The company provides information relating to systems and/or processes developed to manage or mitigate biodiversity risk	(Usher and Maroun, 2018)
	• The company has researched methods to reduce its impact on biodiversity	
	• The company discloses the use of ecosystem services assessment tools such as In VEST	
Incidents	• The company reported any specific incidents and/or accidents which impacted biodiversity.	(Atkins and Maroun, 2018; Van Liempd and Busch, 2013)
	• The company provides pictorial evidence of incidents	
	• The company outlines a plan for the rehabilitation and restoration of areas affected by the incidents	
Materiality	• The company classifies biodiversity as a material risk for the company	(IIRC, 2021; Van Liempd and Busch, 2013)
	• The company provides materiality assessments on biodiversity issues	
Internal management (IM)		
Biodiversity action plans	• The company discloses information relating to biodiversity action plans	(Bui and De Villiers, 2018; Ecim, 2024)
	• The company reports biodiversity in top-level management plans and details management's approach to biodiversity	
	• The company provides details of land management or rehabilitation activities	
	• The company reports biodiversity projects undertaken to enhance biodiversity in and around the areas of operation	
	• The company provides details about its involvement in afforestation activities	
	• The company reports its involvement in the protection and/or conservation of 'Ecological corridors' in and around areas of operation	
Biodiversity officer	• A biodiversity officer is identified and his responsibilities are outlined	(Van Liempd and Busch, 2013)
	• The company identifies to whom the biodiversity officer reports	
Products and value-chain	• Disclosures around the impact of the company's products and activities on biodiversity	(Atkins and Maroun, 2018; Van Liempd and Busch, 2013)
	• Information about whether the company's processes contribute to the mitigation, restoration or improvement of biodiversity	
	• The company details the importance of biodiversity as a foundation for natural capital in the value-creation process	
	• Description of how natural capital and biodiversity loss affect the other capitals	

Table 1 continues on the next page →

TABLE 1 (Continues...): Biodiversity disclosures.

External reports (ER)		
GRI, IRF and other frameworks	• The company reports on international conventions for biodiversity conservation and restoration • Reference to GRI reporting, International Integrated Reporting Council (IIRC) framework or other relevant frameworks • The company mentions that the extra-financial report is printed on recycled or sustainably sourced paper	(Roberts et al., 2021)
Valuation (V)		
Quantitative, Qualitative or Monetary measurement attempts	• The company performs a cost-benefit analysis for biodiversity projects • The company partakes in a biodiversity offsetting scheme • The company develops a natural inventory account • The company refers to NCA or any biodiversity valuation frameworks • The company provides biodiversity productivity or efficiency ratios	(Atkins and Macpherson, 2019; Endangered Wildlife Trust, 2020; GRI, 2019; Jones and Solomon, 2013; Van Liempd and Busch, 2013)

Note: See the full reference list of this article, Mata, D.D., Lai, T., Ecim, D., Maroun, W., & Cerbone, D. (2025). Biodiversity reporting: Comparing listed entities in the United Kingdom and South Africa. *South African Journal of Business Management, 56*(1), a4713. https://doi.org/10.4102/sajbm.v56i1.4713 for more information.

CDP, carbon disclosure project; GRI, global reporting initiative; SDG, sustainable development goal; CBD, convention on biological diversity; NGO, nongovernmental organisation; IUCN, International union for conservation of nature; NCA, Natural capital accounting.

nongovernmental organisations (NGOs), universities or governments and engagements with stakeholders on biodiversity issues. Performance evaluation encompasses the biodiversity targets set by organisations, the evaluation of their performance in line with those targets and the costs associated with those targets. Organisations should also report on biodiversity risks and their assessment of these risks. Internal management relates to the internal structures that ensure that action plans are successful, together with the value creation process. External reports consist of the accepted reporting frameworks used to report on biodiversity. Finally, valuation includes the relevant techniques to quantify biodiversity impacts (see Table 1).

Methodology

The study employs an interpretive approach using qualitative content and thematic analysis to evaluate biodiversity reporting according to the schematic presented in Table 1. Data are analysed informed by stakeholder theory's understanding of how organisations interact with and report to various stakeholder groups (Deegan, 2002; Freeman, 1984).

Sample

The study examines the Top 50 companies listed on both the Johannesburg Stock Exchange (JSE) and the London Stock Exchange (LSE) by market capitalisation. This sample controls for factors such as access to resources and governance structures while representing organisations facing significant stakeholder pressures (see, e.g., Mitchell et al., 1997). Limiting the study to the Top 50 organisations in each jurisdiction controls for factors such as access to resources, availability of expertise and the absence of formal governance structures impacting how organisations report on biodiversity. The sample included 34 sub-sectors which avoids results from being limited to a specific industry and builds on earlier work focussing primarily on the food, retail, mining and public sectors (Gaia & Jones Michael, 2019; Mansoor & Maroun, 2016; Maroun et al., 2018).

The relatively small sample is consistent with the fact that the objective of this study is not to extrapolate findings but to explore the level of biodiversity reporting in corporate reports of dominant SA- and UK-listed entities for a defined period of 2019–2021. Additionally, this allows for an in-depth analysis of how these organisations engage with and respond to various stakeholder groups through their reporting practices (O'Dwyer et al., 2005). Separate checklists, interim results, investor presentations and companies' webpages were not included in the analysis unless they were directly referenced in the corporate report. This is a limitation but governing bodies are not necessarily required to review and take responsibility for non-financial information included outside of the primary reports to stakeholders. The period selected ensures that organisations have had time to develop systems to collect, analyse and report on biodiversity-related data.

Data collection and analysis

Content analysis was used to collect and analyse data because of its suitability for dealing with material that is not consistently formatted while highlighting trends and investigating both text and graphic disclosures (Krippendorff, 2013). This method allows us to examine how organisations communicate with different stakeholder groups and balance competing stakeholder demands (Thomson & Bebbington, 2005). For South African companies, both Integrated Reports and separate Sustainability Reports (where available) were analysed. For UK companies, we examined Annual Reports and Sustainability Reports. We acknowledge that these different report types may contain varying levels of detail on biodiversity matters and may target different stakeholder groups with varying information needs (Adams & McNicholas, 2007). Part of our analysis considers the potential differences in reporting requirements and practices between the two countries, including the more established integrated reporting tradition in SA.

Each report for each entity and financial year under review was categorised into sub-sections dealing with biodiversity and environmental issues. Each section was further disaggregated into individual paragraphs which serve as the unit of analysis to avoid overlooking context and misinterpreting content. This detailed approach allows us to distinguish between substantive and symbolic stakeholder engagement in biodiversity reporting (Rodrigue et al., 2013). Additional reports dealing specifically with biodiversity-related disclosures were also considered where relevant. If the information was repeated between different reports, this was not included to avoid double-counting. Identified disclosures were coded and grouped according to the indicators outlined in the schematic (Table 1). Images were not included unless they were specifically cross-referenced to other content in the reports. This was to avoid coding, for example, pictures included in an annual report which may have been used for aesthetic purposes but do not provide context-specific information on biodiversity-related matters.[2] To ensure the complete collection of biodiversity-related disclosures, keywords[3] were also searched to ensure that all relevant disclosures had been identified.

The quality of disclosures was scored and recorded in a frequency table (according to one or more disclosure themes). A score of '0' was awarded for no disclosure at all. A score of '1' was awarded when the disclosure relating to a particular item was minimal, vague and/or completely general. A score of '2' was awarded when disclosures contained objective, verifiable and current data. A score of '3' was awarded when disclosure included all the components of code '2', as well as providing specific information identifying the site/operating facility, affected species and/or the number of affected flora/fauna; a description of specific measures taken and/or amount of money spent; a discussion of trend information; and/or a linking of the data presented to a company strategy, aim performance measure, target, incident or accident (scoring as per Adler et al., 2018; Hassan et al., 2020). The content scores were determined per indicator and averaged based on the number of disclosures per company per year and are at least ordinal.

All 81 items on the disclosure checklist have a score range of 0–3. As a result, the maximum quality score is 243 (81 × 3) per company per year. All repeat disclosures were counted and scored; however, only the highest score per disclosure item (Table 1) is used to avoid conflating repetition and disclosure quality.

Specific disclosures are provided to contextualise the findings. Statistical tests including Kruskal–Wallis (H), Jonckheere–Terpstra (JT) and Mann–Whitney *U* tests are used to determine if biodiversity scores vary with the level of the grouping variables outlined in Table 2.[4]

We recognise the TNFD's LEAP approach as a comprehensive framework for biodiversity management that emphasises stakeholder engagement throughout the assessment process (KPMG, 2022; TNFD, 2022). While our schematic focusses on disclosures, we acknowledge that effective biodiversity management should inform these disclosures. The LEAP approach provides a structured way for organisations to assess nature-related risks and opportunities, which can then be reflected in their reporting (KPMG, 2022). Our study, while centred on the outputs of reporting, indirectly captures aspects of this management approach through the quality and comprehensiveness of disclosures.

Steps were taken to ensure the accuracy and reliability of the coding and the scoring. The schematic in Table 1 has been interpretively developed using current reporting frameworks as well as prior literature. To ensure accuracy and completeness, each of the elements included in the disclosure checklist has been grounded in the relevant prior research (see 'Theoretical framework and biodiversity reporting themes' section). The scoring system has also been adapted from prior literature to reduce researcher bias.

Firstly, the same researcher was responsible for the initial round of coding to ensure consistency. As disclosures were coded, field notes were kept which guided how the researcher was assigning each disclosure to one or more selective codes.[5] Secondly, the remaining researchers reviewed the coding for logic. Rather than computing inter-coder reliability scores, differences were flagged and resolved by the research team. Thirdly, the coding of the disclosures and preliminary results was presented at three working groups/seminars to receive feedback from the academic and practitioner community. This limited the use of researcher judgement, ensuring that the coding had structure and provided a rational basis for organising and presenting results in the 'Results and discussion' section.

2.Where pictures were included as part of an analysis/explanation of biodiversity in a paragraph, subjection or table in the applicable report, the content of the picture was summarised and included as part of that analysis/explanation.

3.The primary words included, for example: 'Extinct', 'extinction', 'protection', 'preservation', 'wildlife', 'habitat', 'species', 'biodiversity', 'forest', 'ecosystem', 'flora', 'fauna', 'endangered', 'threatened', 'vulnerable', 'rehabilitation', 'conservation', 'marine', 'ecology', 'SDG', 'ocean' and 'IUCN'.

4.These tests are used because data are not normally distributed.

5.The research instrument was also initially piloted with 10 listed companies from South Africa and 10 listed companies from the UK to calibrate the use of the checklist and to resolve uncertainties with regard to the allocation of scores.

We acknowledge the limitations of using disclosure analysis to assess biodiversity management. While more comprehensive disclosures may indicate better management and stakeholder engagement, this is not always the case (Boiral, 2013). Our schematic attempts to differentiate between substantive and symbolic disclosures but cannot completely eliminate the possibility of greenwashing or impression management (Cho et al., 2015). The scores assigned to disclosures aim to capture the depth and specificity of the information provided, which may reflect the robustness of underlying management practices. However, we recognise that disclosures alone may not fully represent an organisation's actual biodiversity management practices or outcomes, or the true nature of its stakeholder engagement (O'Dwyer et al., 2005).

Ethical consideration

Ethical clearance to conduct this study was obtained from the University of the Witwatersrand School of Accountancy Ethics Committee (reference no.: WSOA-2022-11-15W).

Results and discussion

Descriptive statistics (Table 3) show SA-listed entities are reporting more across the disclosure themes (4.03) than UK-listed entities (2.36) over the 3-year period. For both jurisdictions, there is an overall increase in biodiversity reporting, suggesting that organisations are responding to growing stakeholder pressure for environmental accountability (Freeman, 1984). While both jurisdictions show increased reporting over time, overall biodiversity reporting remains limited, with varying levels of stakeholder engagement ranging from symbolic to substantive responses (Usher & Maroun, 2018; Van Liempd & Busch, 2013; Hassan et al., 2020).

South African companies outperform across most disclosure themes except valuation (SA = 0.17; UK = 0.47) and external reports (SA = 2.06; UK = 5.21). This pattern reflects different stakeholder priorities and institutional contexts in developing versus developed economies (De Villiers & Van Staden, 2006). United Kingdom organisations' stronger performance in valuation and external reporting likely stems from more sophisticated stakeholder networks and

TABLE 2: Summary of variables to be used in the statistical analysis.

Variables	Assessment
Grouping variables	
Year	Disclosure scores are aggregated according to each separate year (2019, 2020 and 2021)
Industry	A code of 0 is allocated to entities in financial services, insurance and real estate (least environmentally sensitive), 1 is allocated to entities in retail, technology, pharmaceuticals and personal goods while a score of 2 is allocated to entities in mining, mineral extraction, forestry, electricity, chemicals and construction (most environmentally sensitive) (Michelon et al., 2015)
Size	Company size is measured by market capitalisation with companies grouped by quartile
Environmental, social and governance (ESG) performance	Companies' ESG Performance Ratings are extracted from (S&P Global, 2022). High-performing companies are coded '3', Medium-performing companies are coded '2' and Low-performing companies are coded '1'. S&P's Global ESG performance scores are developed utilising a combination of verified company disclosures. This ESG metric is built on a company's practices and response to critical ESG factors, including its performance and activities in managing biodiversity loss (S&P Global, 2022)
Biodiversity partnership	Companies are allocated a value of '0' where no evidence of a biodiversity partnership exists, and a score of '1' where a biodiversity partnership exists
Measures of the level of biodiversity disclosures	
Total biodiversity score per disclosure theme	Each of the disclosure items has a score threshold of '0' to '3'. The highest score per disclosure item per company was aggregated to obtain a total disclosure score per disclosure theme for each company and year
Total biodiversity score	The total disclosure score per theme (above) was aggregated to get a total aggregate disclosure score per company per year

Note: Please see reference list of this article , Mata, D.D., Lai, T., Ecim, D., Maroun, W., & Cerbone, D. (2025). Biodiversity reporting: Comparing listed entities in the United Kingdom and South Africa. *South African Journal of Business Management, 56*(1), a4713. https://doi.org/10.4102/sajbm.v56i1.4713 for more information.

TABLE 3: Descriptive statistics for the number of disclosures across the eight themes.

Statistic	SS	SR	SE	PE	R	IM	ER	V	All themes
Panel A: South Africa									
Mean	**1.26**	**3.16**	**4.86**	**8.93**	**4.65**	**7.12**	**2.06**	**0.17**	**4.03**
2019	0.84	2.66	3.58	7.38	3.34	4.02	1.72	0.12	2.96
2020	1.34	3.12	5.68	8.74	4.98	7.98	2.04	0.14	4.25
2021	1.60	3.70	5.32	10.66	5.64	9.36	2.42	0.26	4.87
Max	**12.00**	**39.00**	**41.00**	**53.00**	**49.00**	**59.00**	**9.00**	**5.00**	**53.00**
2019	7.00	39.00	33.00	38.00	40.00	41.00	6.00	3.00	41.00
2020	12.00	15.00	41.00	28.00	41.00	45.00	8.00	4.00	45.00
2021	12.00	36.00	37.00	53.00	49.00	59.00	9.00	5.00	59.00
Min	-	-	-	-	-	-	-	-	-
Panel B: United Kingdom									
Mean	**1.15**	**2.73**	**1.99**	**1.91**	**1.59**	**3.83**	**5.21**	**0.47**	**2.36**
2019	0.72	236	1.08	1.16	0.66	2.18	4.76	0.28	1.65
2020	1.06	2.38	2.14	1.72	1.48	3.92	5.30	0.52	2.32
2021	1.68	3.44	2.76	2.86	2.62	5.40	5.56	0.62	3.12
Max	**7.00**	**25.00**	**19.00**	**14.00**	**18.00**	**18.00**	**9.00**	**6.00**	**25.00**
2019	4.00	15.00	11.00	8.00	7.00	13.00	9.00	3.00	15.00
2020	8.00	9.00	19.00	7.00	11.00	15.00	9.00	6.00	19.00
2021	7.00	25.00	14.00	14.00	18.00	18.00	9.00	6.00	25.00
Min	-	-	-	-	-	-	-	-	-

SS, scene-setting; SR, species-related; SE, social engagements; PE, performance evaluation; IM, internal management; ER, external reports; R, risk; V, valuation.

institutional pressures for standardised reporting (Gray et al., 1995). South African reports are often weaker on quantitative disclosure because of the valuations being more complex and resource-intensive. Obtaining the quantitative data is often also expensive which is a further challenge for organisations operating in developing economies where financing may be strained because of social and political hurdles (Cowden et al., 2014). Despite regulations existing in both territories, UK companies have a generalised approach by way of a broader suite of sustainability frameworks while South African organisations focus on multi-capitals and provide more explicit guidance, particularly for environmentally sensitive industries.

Given the higher levels of biodiversity flora and fauna in SA (Endangered Wildlife Trust, 2020), it follows that organisations will have a deeper impact on biodiversity and will disclose more information related to these impacts than entities operating in the UK with lower biodiversity levels. However, this also holds true when assessing the mean number of disclosures per company.

South African organisations also have more experience with the preparation of integrated reports than their UK counterparts.[6] This may leave the former better placed to deal with biodiversity reporting because the IIRC provides a framework for incorporating 'natural capital' into business models and how information is reported to stakeholders (IIRC, 2021). Although an integrated report is not the only type of sustainability or non-financial report, it is telling that SA's experience in non-financial reporting has resulted in a higher biodiversity content score despite organisations in the UK having more access to financial and other resources. The UK does publish equivalent content in strategic reports or annual reviews but SA's status as a leading extra-financial reporting pioneer appears to have provided an advantage in understanding, integrating and reporting on biodiversity-related matters.

Figure 1 supports the assertion that the extent of biodiversity reporting has increased in both jurisdictions (SA = 65% increase; UK = 89% increase). This is likely the result of increased environmental and social issues coupled with increased regulation, institutional and stakeholder pressure as well as the growing demand for organisations to be seen as responsible corporate citizens (Mitchell et al., 1997). In the UK, the increase appears driven by a managerial approach, prioritising powerful stakeholders' demands for standardised reporting and quantitative metrics. In SA, the normative approach emphasises ethical obligations to a broader range of stakeholders, resulting in more narrative-based disclosures addressing diverse stakeholder concerns. Figure 2 details the specific disclosure themes reported.

For South African organisations, PE (28%) is the most dominant theme while valuation (1%) metrics are addressed the least. This emphasis on PE suggests a focus on demonstrating accountability to stakeholders through concrete actions and outcomes (Thomson & Bebbington, 2005). South African organisations have detailed the relevant biodiversity targets and have framed them in relation to the SDGs, reflecting alignment with both local and global stakeholder expectations. Sustainable development goals are, however, often focussed on national and supranational objectives. Companies may find it difficult to set performance targets that align with the objectives of the SDGs. Nevertheless, given that the SDGs provide a framework for addressing financial, social and environmental objectives, companies are incorporating this in PE points to the proactive management of biodiversity.

Valuation-related aspects are disclosed the least, with most reports lacking a cost-benefit analysis, valuation frameworks, natural inventory accounts or productivity and efficiency ratios. This gap might indicate a disconnect between stakeholder demands for quantitative information and organisations' capability to provide it (O'Dwyer et al., 2005). This is one area where UK companies perform better than their SA counterparts (UK = 3%; SA = 1%), possibly because of access to financial and other resources. United Kingdom companies also score better on external reporting (UK = 28%, SA = 6%), mainly because of their adoption of a wider range of sustainability-related frameworks in response to institutional stakeholder pressures and support from local professional sustainability accounting networks.

Although PE and IM are two of the best-disclosed themes in both jurisdictions, less than 15% of companies provided disclosures on issues which negatively impacted biodiversity. This selective disclosure suggests potential impression management tactics (Cho et al., 2015) and raises questions about the authenticity of stakeholder engagement. In both jurisdictions, the disclosures mainly focus on positive information with little context provided on the extent of the damage caused by the organisation, which illustrates that balance is lacking as a key reporting principle. For example:

> 'Growing Together started with employees from both companies working together to plant more than 4,000 trees at [the] mine in March 2020.' (SA Company 5, Integrated Report, 2020)

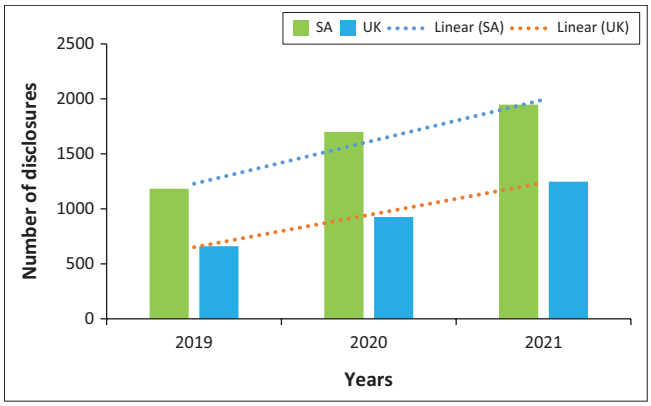
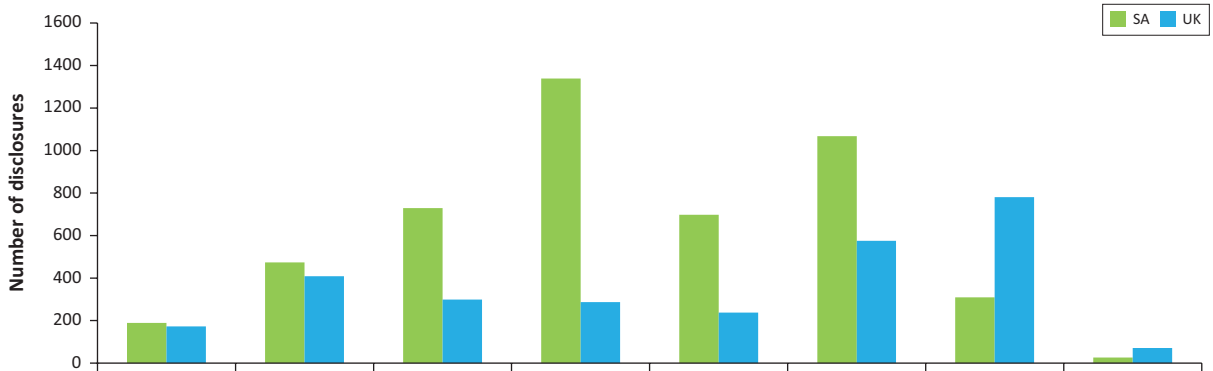


FIGURE 1: Average number of disclosures over a 3-year period.

6.As per the IFRS Foundation adoption statistics (https://www.integratedreporting.org/when-advocate-for-global-adoption/find-out-what-is-happening-in-your-region/), SA has 262 organisations and 1906 integrated reports while UK has 60 organisations and 204 integrated reports.



	Scene setting (SS)	Species related (SR)	Social engagement (SE)	Performance evaluation (PE)	Risk (R)	Internal management (IM)	External reports (ER)	Valuation (V)
SA	189	474	729	1339	698	1068	309	26
UK	173	409	299	287	238	575	781	71
SA % composition of total	4	10	15	28	14	22	6	1
UK % composition of total	6	14	11	10	8	20	28	3

SA, South Africa; UK, United Kingdom.

FIGURE 2: Average number of disclosures per theme over the 3-year period.

The disclosure mentions that the company is attempting to return the mined land to a suitable condition for agricultural use; however, the report stops short of specifying and quantifying the extent of the damage to the biodiversity leading to a largely symbolic disclosure. This exemplifies what Rodrigue et al. (2013) describe as ceremonial stakeholder engagement, where positive actions are highlighted without providing stakeholders the contextual information needed to assess the overall impact (see also Van Zijl et al., 2017). Without detailed information on the damage caused to the land, stakeholders cannot assess if the rehabilitation actions taken by the company are sufficient. This might give stakeholders the false impression that the negative impacts on biodiversity are sufficiently managed and corrected by the company, highlighting the tension between transparency and impression management in stakeholder communications (Boiral, 2016).

With regard to external reporting, some companies provided highly detailed disclosures. For example:

> 'Our Biodiversity Conservation Practice guideline ensures that we integrate biodiversity conservation into all aspects of mine life … we subscribe to the International Council on Mining & Metals (ICMM) Position Statement on Mining and Protected Areas, which includes a commitment to respect protected areas and an undertaking not to explore or mine in World Heritage listed sites. Biodiversity considerations are incorporated into our integrated mine closure and progressive rehabilitation processes. Two examples indicating our commitment to biodiversity are …' (SA Company 16 Integrated Report, 2018)

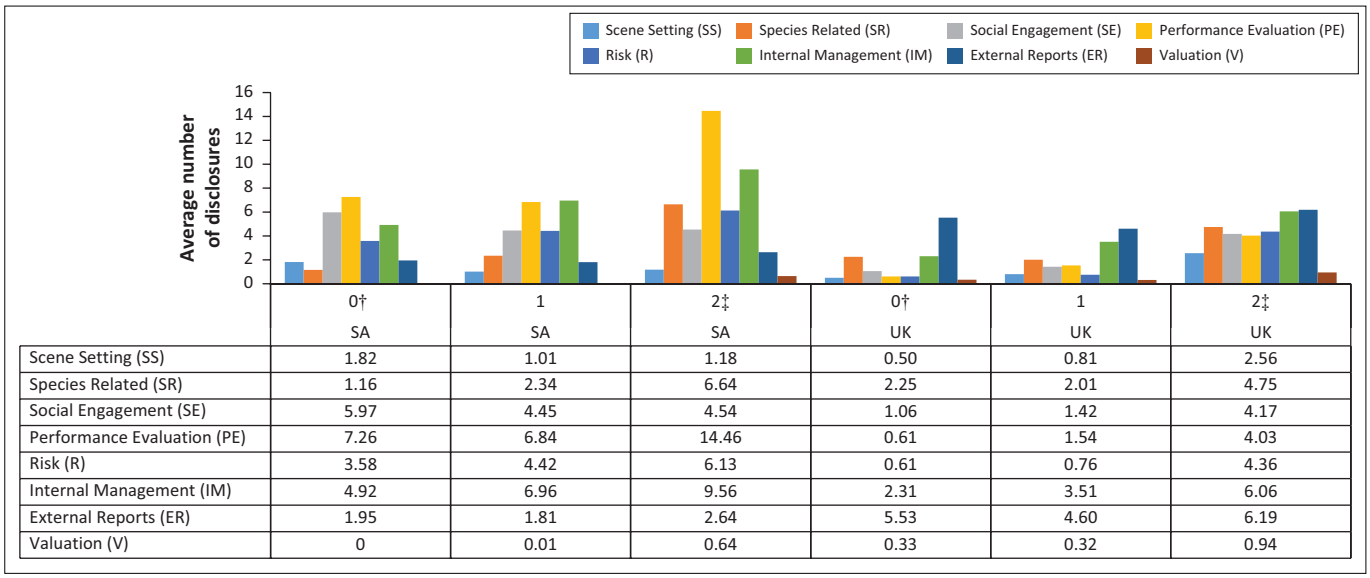
The detailed and substantive nature of the disclosure represents what Thomson and Bebbington (2005) describe as genuine stakeholder dialogue, where organisations provide comprehensive information that enables stakeholders to assess both commitments and actions. However, the quality of disclosures often varies depending on the organisation's industry, indicating different levels of stakeholder importance across sectors (Mitchell et al., 1997).

Figure 3 stratifies the disclosures per industry which have been ranked from least environmentally sensitive (0) to those that are most environmentally sensitive (2) (Michelon et al., 2015). As expected, entities in environmentally sensitive industries which have high impacts on biodiversity include the most disclosures, reflecting greater stakeholder pressure and scrutiny in these sectors (Freeman, 1984; Gray et al., 1995).

In SA, industries that have a lower environmental impact focus on PE but disclosures are mainly qualitative and symbolic, suggesting a managerial approach to addressing stakeholder concerns without substantial engagement (Friedman & Miles, 2002). Companies in these industries stop short of reporting detailed performance variances, potentially indicating less stakeholder pressure for comprehensive environmental accountability. In contrast, UK industries with a lower environmental impact focus on external reports and complying with established ESG frameworks to support biodiversity impact, reflecting institutional stakeholder pressures for standardised reporting (De Villiers & Van Staden, 2006). The most environmentally sensitive industries have a better spread of disclosures across the eight themes with more substantive disclosures incorporated, indicating more comprehensive stakeholder engagement driven by both ethical obligations and strategic necessity.

Non-parametric tests

Table 4 presents the non-parametric results for the relationships between the biodiversity content score and the grouping variables per Table 2, namely industry, company size, ESG performance and biodiversity partnerships.



	0† SA	1 SA	2‡ SA	0† UK	1 UK	2‡ UK
Scene Setting (SS)	1.82	1.01	1.18	0.50	0.81	2.56
Species Related (SR)	1.16	2.34	6.64	2.25	2.01	4.75
Social Engagement (SE)	5.97	4.45	4.54	1.06	1.42	4.17
Performance Evaluation (PE)	7.26	6.84	14.46	0.61	1.54	4.03
Risk (R)	3.58	4.42	6.13	0.61	0.76	4.36
Internal Management (IM)	4.92	6.96	9.56	2.31	3.51	6.06
External Reports (ER)	1.95	1.81	2.64	5.53	4.60	6.19
Valuation (V)	0	0.01	0.64	0.33	0.32	0.94

SA, South Africa; UK, United Kingdom.
†, 0 = least environmentally sensitive; ‡, 2 = most environmentally sensitive.

FIGURE 3: Average disclosures per industry.

TABLE 4: Results of non-parametric tests.

Element	Industry		Size		ESG performance		Biodiversity partnership
	H	J-T	H	J-T	H	J-T	U
Panel A: SA							
Scene-setting	9.636*	2.728*	4.720	0.398	165.000*	9.242*	2117.000*
Species-related	14.512*	3.878*	5.414	0.444	986.000*	4.778*	1227.500*
Social engagement	10.342*	3.175*	1.739	-0.378	1218.500*	3.803*	26.000*
Performance evaluation	38.605*	6.216*	15.673*	1.912	1253.500*	3.388*	1088.000*
Risk	27.289*	5.129*	4.847	0.323	741.500*	5.792*	1478.000*
Internal management	23.070*	4.736*	0.475	0.176	639.500*	6.133*	1103.500*
External reports	12.780*	3.267*	8.705	1.995	1151.000*	4.094*	2118.000*
Valuation	13.993*	3.507*	7.882	2.072	1966.000	0.584	2574.000
Number of disclosures	39.202*	6.335*	7.466	-0.345	1170.500*	3.762*	1382.000*
Panel B: UK							
Scene-setting	0.094	0.307	15.014**	0.395	15.724**	3.168**	1702.500**
Species-related	0.819	-0.905	9.891*	-1.568	2.727	-1.350	2886.500**
Social engagement	1.074	1.036	18.610**	-0.688	13.600**	1.547	351.500**
Performance evaluation	4.781*	2.187*	31.153**	-1.255	4.231	0.711	1610.000**
Risk	0.028	0.168	8.411*	0.012	9.441*	2.731**	1993.000**
Internal management	1.875	1.369	19.994**	0.353	5.168	1.587	1275.000**
External reports	7.455**	-2.730**	44.311**	2.124*	5.249	1.875	3534.500*
Valuation	0.461	0.679	21.368**	-0.813	5.542	2.076*	3273.500**
Number of disclosures	39.130**	5.023**	31.723**	0.426	4.636	1.493	973.500**

SA, South Africa; ESG, environmental, social and governance; UK, United Kingdom.
*, significant at the 5% level; **, significant at the 1% level; statistical tests included: Kruskal–Wallis (H), Jonckheere–Terpstra (JT) and Mann–Whitney U (U) tests.

There is a statistically significant and positive relationship between industry and biodiversity disclosures (UK: H = 39.13, $p < 0.01$; JT = 5.023; $p < 0.01$; SA: H = 39.202, $p < 0.05$; JT = 6.335; $p < 0.05$). This finding aligns with stakeholder theory's prediction that companies facing greater environmental risks will experience stronger stakeholder pressure for comprehensive biodiversity reporting (Adler et al., 2018, Grabsch et al., 2012). The longer narratives in disclosures may be used to mitigate reputational risk and ensure that they retain their social licence to operate, reflecting both normative and instrumental motivations for stakeholder engagement (Donaldson & Preston, 1995).

United Kingdom companies have a statistically significant positive relationship between company size and biodiversity disclosures (H = 31.723, $p < 0.01$; JT = 0.426, $p > 0.1$) while South African organisations show no statistical significance (H = 7.466, $p > 0.1$). This divergence may reflect different stakeholder expectations and institutional contexts in developed versus developing economies (De Villiers & Van Staden, 2006). The only significant statistical difference is noted on the PE theme (H = 15.673, $p < 0.05$).

The results suggest that, although larger companies generally face greater stakeholder pressure for ESG disclosure (Drempetic et al., 2020), this may not be the case with biodiversity, especially in a South African context. This indicates that UK companies are likely to be allocating more financial resources and technical expertise to implement

multiple biodiversity-related disclosure frameworks, quantify biodiversity impacts and hire technical experts to manage biodiversity information.

For South African companies, ESG performance is closely linked to biodiversity disclosures ($J = 1170.5$, $p < 0.05$; $JT = 3.762$, $p < 0.05$). This suggests that South African organisations adopt a more holistic approach to stakeholder engagement, where biodiversity reporting is integrated into broader sustainability commitments (Adams & McNicholas, 2007) and indicates that organisations place a specific premium on biodiversity risks, impacts and PE as part of the broader natural capital strategy. Overall, it reflects a normative stakeholder approach that emphasises ethical obligations to both society and the environment.

In contrast, UK companies focus on ESG performance in the context of SS, social engagement and risk disclosures but not necessarily on a total basis ($H = 4.636$, $p > 0.05$). This more targeted approach aligns with the managerial stakeholder perspective, where organisations strategically respond to specific stakeholder demands rather than pursuing comprehensive environmental accountability. This points to the fact that biodiversity-specific concerns may not be impacting UK organisations to the same extent as other, more biodiversity-rich countries, resulting in other environmental factors forming part of natural capital strategies. The difference in approaches between jurisdictions reflects the contextual nature of stakeholder relationships, where local conditions and stakeholder expectations shape reporting practices (Friedman & Miles, 2002).

Finally, for both SA ($U = 1382$, $p < 0.05$) and UK ($U = 973.5$, $p < 0.01$) organisations, biodiversity partnerships lead to increased disclosure. This finding supports stakeholder theory's emphasis on the value of collaborative relationships in enhancing environmental management and reporting (Thomson & Bebbington, 2005). As organisations are able to utilise the expertise and resources offered by biodiversity partners (such as NGOs) to bolster their understanding of the link between biodiversity and business models, representing what O'Dwyer et al. (2005) describe as substantive stakeholder engagement that leads to organisational learning and improved reporting practices.

However, South African corporates often prioritise social issues over environmental issues as there is increased pressure to focus on human capital considerations given the socio-political sphere in which organisations operate. This prioritisation indicates that organisations must balance competing stakeholder claims within their specific context (Mitchell et al., 1997). The emphasis on social issues in SA demonstrates how stakeholder salience can vary by jurisdiction, with certain stakeholder groups wielding greater influence based on local conditions and historical context (De Villiers & Van Staden, 2006). This emphasises the pressure that organisations face from external factors which may drive the specific stakeholder interactions and materiality assessments conducted.

Conclusion

This study examines biodiversity-related disclosures of a sample of SA and UK-listed companies' corporate reports to provide empirical details on how prominent organisations engage with, and are reporting on, biodiversity-related issues to investors and other stakeholders. A schematic is developed that frames biodiversity as a policy consideration and in terms of the actions taken to conserve biodiversity. The schematic is applied to SA and UK organisations with the use of content analysis to analyse the biodiversity-related disclosures and compare the disclosures between a developing and developed economy. The use of stakeholder theory frames the discussion pertaining to the relationship between organisations and stakeholders.

Our findings suggest that South African companies tend towards a more normative stakeholder approach, treating biodiversity as an ethical obligation, while UK companies lean towards a managerial view, pragmatically addressing stakeholder demands (Donaldson & Preston, 1995). However, both approaches include a mix of substantive and symbolic legitimation strategies (Deegan, 2002). The normative approach in SA may be driven by the country's rich biodiversity context and strong corporate governance traditions (Maroun & Cerbone, 2020), leading to a sense of ethical responsibility towards biodiversity conservation. In contrast, the UK's approach appears more influenced by regulatory frameworks and investor expectations, resulting in a more pragmatic stance. This distinction helps explain the differences in reporting practices observed between the two countries, while also highlighting the complex interplay between ethical considerations and strategic responses to stakeholder pressures in biodiversity reporting.

Biodiversity reporting is more prominent in South African organisations compared to their UK counterparts. This is primarily driven by a higher biodiversity ranking and more biodiversity hotspots impacting South African organisations, creating stronger stakeholder expectations for environmental stewardship. However, UK organisations tend to provide more quantitative, valuation-based disclosures owing to advanced management information systems, professional standards network support and access to financial resources, reflecting their response to institutional stakeholder demands. Although the overall biodiversity reporting by SA and UK companies is increasing, it is at a slow pace and lacks the level of detail necessary to effectively contribute to the conservation, restoration and sustainable use of biodiversity. Most companies currently maintain a relatively low level of disclosure to avoid additional attention and scrutiny from stakeholders, suggesting strategic management of stakeholder relationships rather than comprehensive accountability.

Overall, biodiversity reporting is still developing in both jurisdictions and offers little insight into how organisations understand biodiversity and incorporate direct and indirect impacts into business models, risk evaluation and strategy implementation. Few organisations are setting detailed biodiversity-related performance targets linked clearly to operational plans, risk assessments and key performance indicators, indicating a gap between stakeholder expectations and organisational practices. There is a lack of post-implementation reviews of conservation initiatives and biodiversity is not always being factored into valuations, cost assessments and project appraisals indicating that it is often not seen as part of the core business model but rather an ancillary matter used for legitimising or managing impressions.

This article contributes to understanding how stakeholder theory can be used to interpret different approaches to biodiversity reporting. The comparison of biodiversity reporting practices in SA and the UK illustrates that there is a spectrum of corporate approaches with regard to responding to stakeholder pressures and whether biodiversity practices are substantive or symbolic (Deegan, 2002; Haji & Anifowose, 2016). On the one hand, substantive practices fundamentally impact how the organisation approaches risk management, decision-making, strategies, operations and developing appropriate management control systems. On the other hand, symbolic practices infer that the reporting is prioritised and focussed on predominantly positive outcomes and meeting regulations. Normatively, stakeholders may expect to all be treated fairly while a managerial approach iterates that organisations adopt a pragmatic and materiality consideration of stakeholders based on their relative power and urgency (Friedman & Miles, 2002). South African and UK companies navigate these views differently which is shaped by the jurisdictional context of each territory.

In a South African context, biodiversity reporting is guided by environmental movements and strong corporate accountability and governance in response to the country's rich biodiversity context. A normative approach is exhibited where organisations perceive an ethical obligation to respond to biodiversity-related concerns. For organisations in environmentally sensitive industries such as mining and agriculture, reporting is often substantive and framed in quantitative terms as biodiversity loss has a direct impact on financial and operational matters. Biodiversity considerations are incorporated into risk assessments, strategies and operations. Put simply, an integrated approach is adopted to managing the financial and extra-financial resources that the organisation depends on, uses and impacts. Organisations in less environmentally sensitive industries, such as finance, tend to have symbolic reporting, which is aligned with impression management tactics. These organisations may focus on philanthropic initiatives or environmental projects which may often be far removed from their business models. Philanthropic work may not necessarily be indicative of improved biodiversity performance but rather a strategic business case approach. Despite improvements in the natural capital returns, this strategy may not be representative of a truly integrated approach to managing biodiversity. Symbolic disclosures are often found that rely on pictures as well as donations to illustrate positive impacts. These legitimisation techniques are often used to focus on predominantly positive outcomes, manage external pressures such as regulatory compliance akin to a tick box approach or imitate best practices from a qualitative perspective while lacking measurable outcomes (Alrazi et al., 2015). Doing so prioritises short-term reputational benefits over long-term value creation and sustainability.

In the UK, biodiversity reporting is predominantly driven by sustainability-related frameworks and guidance, such as, for example, the TNFD, GRI and the EU's Corporate Sustainability Reporting Directive (CSRD). United Kingdom organisations, therefore, benefit from natural capital accounting work promoted since the early 2000s by Accounting for Sustainability (A4S) (Slinger, 2022). As a result, UK companies adopt more of a managerial approach to biodiversity reporting that aligns with the needs and expectations of investors, regulators and international standards. In particular, stakeholders are demanding measurable and defined metrics and performance incentives for managing biodiversity. While this suggests a substantive approach, it may also simply be a response to the heightened stakeholder pressure. The findings of this article indicate that there is, in fact, a mix of both substantive and symbolic disclosures with some organisations demonstrating a genuine commitment to biodiversity that adopts an integrated and data-driven approach to biodiversity considerations. Others continue to report on biodiversity from a compliance perspective that promotes a sustainability narrative and surface-level engagement rather than substantive engagement and action.

The distinction between substantive and symbolic reporting is important in assessing the quality of corporate reporting. There is, in fact, an interplay between the normative and managerial approaches as organisations use biodiversity reporting both for genuine stakeholder engagement and operational change as well as for impression management and legitimacy. The variations in South African and UK reporting do reveal novel insights into how different jurisdictional contexts influence the approach to biodiversity matters. Organisations that have adopted an integrated thinking logic will also more easily integrate these considerations into the day-to-day decision-making and strategies and provide more substantive disclosures to a broader stakeholder group. This distinction between substantive and symbolic engagement can guide future assessments of corporate biodiversity reporting quality and provide insights into how organisations can better manage, report and mitigate their impacts on biodiversity.

As a result, the biodiversity reporting schematic provides a useful tool for organisations aiming to improve their reporting of biodiversity considerations. The tool will also

provide a useful guide for organisations aiming to align themselves with principles included in sustainability-related frameworks such as the TCFD, TNFD and GRI. It also allows stakeholders the opportunity to evaluate the progress made by organisations on biodiversity reporting.

Despite SA being an emerging economy, with less financial resources and increased adverse impacts of economic, political and social issues, organisations tend to disclose more on biodiversity than companies in the UK. This is a result of the higher biodiversity context in which South African organisations operate and place emphasis on the reporting environment being a key driver of being able to address biodiversity issues. Given SA's experience with integrated reporting, it has allowed organisations to leverage existing management information systems to manage biodiversity data.

Organisations are recommended to implement committees with suitable expertise in dealing with biodiversity matters. This will help organisations to better implement strategies and management-level approaches to address their impact on biodiversity. Staff members with these specific skill sets will also be able to develop formal biodiversity reporting approaches which is an essential step in the long-term goal of saving the natural world and using natural capital sustainably. These should be supported with suitable recruitment strategies of a Chief Value Officer (CVO) and/or a Chief Stakeholder Relations Officer with biodiversity-specific knowledge and experience (King & Atkins, 2016). It is important to support the management and integration of biodiversity considerations into internal control and risk management and communicate with stakeholders on an ongoing basis to learn and understand their legitimate biodiversity needs, interests and expectations. How these positions and boards impact biodiversity management and reporting is an area for future research.

Future research can apply the schematic to a larger sample of organisations across multiple years and jurisdictions. This also includes exploring the biodiversity reporting of non-listed entities, state-owned enterprises or even biodiversity NGOs. Future research may also investigate biodiversity reporting from both an institutional and sector-based perspective. For example, at the sector level, are there differences in how particular sectors or industries approach and disclose biodiversity-related risks and dependencies in line with the nature of the natural capital they consume? How do environmentally sensitive industries such as those in the mining industry manage and report on biodiversity-related issues and how can this be applied by organisations in less environmentally sensitive industries without simply being symbolic or superficial in nature? At an institutional level, what responsibilities do biodiversity framework institutions, regulators, academic institutions and professional bodies have in advancing the quality and transparency of biodiversity disclosures?

On a regulatory level, future studies may also investigate the benefits and disadvantages of mandatory disclosure on environmental areas like biodiversity within both developed and developing economies and how this affects the transparency and accountability applied within corporate reporting. Where there is a gap in assessing an organisation's progress on an objective and comparable level (with respect to biodiversity plans and initiatives), future studies can investigate and develop proxy measures, adopted for an organisation's context, to gauge effectively how effective their respective biodiversity initiatives are.

The biodiversity schematic can be expanded to include other factors which might affect biodiversity disclosures. In particular, the integration of additional sustainability-related frameworks, such as the ISSB's S1 and S2 standards, merits further exploration. How the new requirements and recommendations of the TCFD/TNFD, including the ecosystem services taxonomy, will be factored into the ISSB's agenda for standard interoperability and harmonisations also merits further exploration in the context of how this will impact biodiversity-related reporting. Additionally, integrating recommendations from past processes such as TEEB and the LEAP approach with the current article's frameworks will allow future researchers and practitioners to integrate a broader and more comprehensive approach to biodiversity risk assessment, management and strategies.

Finally, from an integrated thinking perspective, future studies may investigate how biodiversity factors are managed simultaneously at the strategic, management and operational levels to explore how integrated thinking can be utilised by an organisation's stakeholders in holding the entity accountable for its purpose of driving long-term value. Future studies may also investigate instances of how organisations have transformed their related environmental risks into viable opportunities and what factors contributed to the underlying motivation of these initiatives (i.e. advancing financial and/or reputational objectives).

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Authors' contributions

D.D.M. and T.L. formulated separate literature reviews for the jurisdictions of SA and the UK. D.D.M. was the primary data collector, while T.L. conducted a review of the collected data. When discrepancies were identified, all researchers were involved in resolving the issues. D.E. synthesised the separate literature reviews and drafted the initial version of the article. W.M. provided overall supervision and formal analysis of the collected data. The results chapter was drafted by D.E., and W.M. and D.C. drafted the methodology section and reviewed and edited multiple versions of the article alongside D.E. to complete the manuscript. Each author contributed approximately 20% of the article, with the primary ideation coming from D.D.M. and T.L.

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Data availability

The data that support the findings of this study is available from the corresponding author, D.C., upon reasonable request.

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