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Research article

Identifying motivations, measures and challenges to implement corporate biodiversity management and reporting: A systematic review across sectors and regions

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ABSTRACT

Biodiversity loss has intensified in significant ways in recent years, with human activities identified as the primary cause. The loss of biodiversity has far-reaching consequences, as it is the fundamental basis for human life and business operations by providing precious natural resources. However, research that provides a detailed overview of companies implementing biodiversity management and reporting is still missing. For this reason, this paper carries out a systematic review across sectors and regions to determine which factors motivate companies to implement biodiversity management and reporting, which measures are used for this purpose, and which challenges arise. This paper identified external drivers, such as maintaining social acceptance and ensuring competitiveness, which are predominantly found as essential factors. Although some measures, such as stakeholder collaboration and the use of certifications, have been researched and are applicable, companies oftentimes lack the external pressure from agreed policies and regulations to take effective action. Furthermore, the findings provide evidence that companies face several challenges in implementing biodiversity actions. Significant barriers include understanding the complex nature of biodiversity and lack of resources due to high costs and time. This paper concludes that only a small number of companies have invested in biodiversity conservation to date and calls for further research and practical actions in this field.

1. Introduction

In recent decades, the decline in biodiversity attributed to human activities has increased dramatically, with warnings that the sixth major mass extinction in Earth's history has already begun (IPBES, 2019). This loss of biodiversity threatens ecosystems functioning and global sustainability (Tilman et al., 1996). Biodiversity loss was recognized by 193 governments signing the 1992 Convention on Biological Diversity (CBD, 2011).

The World Economic Forum estimated that more than 50 percent of global GDP depends to a high or moderate degree on ecosystem services (IPCC, 2022). Several reports show how essential it is for businesses to monitor and respond to recent biodiversity issues in order to avoid financial losses (e.g., KPMG, 2022; TEEB, 2010; World Economic Forum, 2020). For example, a report published by the International Union for Conservation of Nature (IUCN) showed the impacts of the apparel industry on biodiversity throughout the value chain, indicating biodiversity could bring high risks to the industry (Aiama et al., 2016). Furthermore, Addison et al. (2020) brought up an example of a multinational apparel company with a long supply chain to show the importance of cooperating with suppliers and the possibility of measuring as well as reporting biodiversity impacts together with stakeholders (Addison et al., 2020). However, although some companies have started considering biodiversity conservation as an essential part of sustainability, studies found that biodiversity reporting is not common (e.g. Bhattacharya and Managi, 2013; Reale et al., 2019; Rimmel and Jonäll, 2013; Van Liempd and Busch, 2013). Even within the Fortune Global Companies, biodiversity issues were not substantially reported on (Adler et al., 2018; Addison et al., 2019). The lack of biodiversity practices from companies shows the insufficient knowledge of intentions, approaches, and challenges in implementing biodiversity management in business operations. To the authors' best knowledge, there is still only a small number of studies in the management literature exploring the implementation of biodiversity management and reporting by companies. Furthermore, studies use different methodological

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approaches to identify motivations, measures and challenges to implement corporate biodiversity management and reporting. There is no systematic review that addresses the corporate intention for biodiversity management implementation.

For this reason, the aim of this work is to examine the current state of knowledge on the implementation of biodiversity management and biodiversity reporting in companies across sectors and regions. The focus is on identifying motivations, measures and challenges for companies to protect biological diversity. To fulfill the purpose of the paper, the following research questions (RQs) have been derived:

RQ1: What are the motivations that bring companies to establish biodiversity management and biodiversity reporting?
RQ2: Which measures for biodiversity management and biodiversity reporting are available to companies?
RQ3: Which challenges often prevent the successful implementation of biodiversity management and biodiversity reporting?

This paper aims to contribute to the current state of research and discourse on corporate biodiversity management and biodiversity reporting. Motivations, measures and challenges explored in the literature are highlighted to present the current state of research. Furthermore, outlooks on future research can be derived from the findings to provide academic and practical implications.

Following the introduction, a research framework with definitions of important terms covering biodiversity, biodiversity management and biodiversity reporting is presented. Extending from the concepts, the methodological process of the systematic review is provided in detail. The results section answers the research questions and is followed by a discussion section afterward. Finally, a conclusion is drawn, the limitations of this paper are discussed and an outlook for future research is given.

2. Research framework: the concepts of biodiversity, biodiversity management and biodiversity reporting

Protecting ecosystems is crucial to ensure the delivery of ecosystem services provided by biodiversity. It is a key factor in supporting resilient, productive and functioning ecosystems and forms the basis for the provision of ecosystem services (CBD, 2011). A decline in biodiversity can reduce the stability of these ecosystem services (Millennium Ecosystem Assessment, 2005), with a negative impact on human well-being. They affect livelihoods, health, and the local and national economy. The main reasons for biodiversity loss and mass extinction include overexploitation of land and sea, pollution, habitat change and exploitation, emissions, the introduction of invasive species (neobiota), and the consequences of climate change (IPBES, 2019; Smeets and Weterings, 1999).

Biodiversity accounting and management can be considered as the operationalization of environmental management and accounting (Jones, 2003; Schaltegger, 2018). Biodiversity management helps companies manage their environmental impacts while protecting and enhancing biodiversity. Biodiversity management includes the systematic design of processes, products and projects that ensure the company's success, but at the same time protect biodiversity (Schaltegger and Beständig, 2010). In the course of biodiversity management, the effects of corporate activities on biodiversity and the relevant formal and social framework conditions are analyzed systematically. Based on these findings, targeted measures can be taken to promote the sustainable development of companies and society. Implementation is carried out by various operational functional areas such as procurement, production or marketing, which plan and implement biodiversity conservation measures in specific fields of action.

Biodiversity reporting is a tool for communicating these efforts to the public and stakeholders (Schaltegger et al., 2022). It includes methods of data collection and disclosure of the impact of business activities on biodiversity. This includes areas such as resource use, pollution, supply chain and land use (GRI, 2024; IUCN, 2018). By evaluating these data, companies can assess their own biodiversity performance, identify potential risks and take action to reduce negative impacts (GRI, 2024; Usher and Maroun, 2018; van Liempd and Busch, 2013). At the same time, companies can present their successes and progress in terms of protecting ecosystems and communicate their commitment to sustainability and responsible behavior to stakeholders and the public. The Global Reporting Initiative (GRI), for example, is a standard promoting corporate biodiversity reporting (GRI, 2024). As an internationally recognized organization, it offers guidelines and standards for sustainability reporting. The GRI guidelines encourage reporting on various biodiversity indicators. These indicators are designed to provide detailed information on the identification, assessment and management of a company's impact on biodiversity (GRI, 2024; Usher and Maroun, 2018). Corporate biodiversity reporting involves reporting on the species and habitats that are affected by a company's activities (van Liempd and Busch, 2013). Particular focus is placed on animal populations and ecosystems that are threatened by human activities (Atkins and Maroun, 2018). In addition, specific disclosures can be provided that explain the company's understanding of biodiversity, its biodiversity mission or policy, and ties to relevant environmental groups, non-governmental organizations (NGOs), or research communities (Maroun et al., 2018; van Liempd and Busch, 2013). Companies have the option to provide additional information about specific engagements with these stakeholders. This includes partnerships, nature conservation initiatives and recommendations for making business models more sustainable and biodiversity-friendly. Stakeholder cooperation with indigenous communities, governments and consumer groups could be reported (Kristina and Rimmel, 2016).

3. Methodology

To investigate the motivations, measures and challenges of biodiversity management and biodiversity reporting a comprehensive literature review is conducted. The systematic literature search is a structured approach to identifying relevant literature. With the help of this methodology, the current state of research can be presented in a targeted manner and the research questions can be answered precisely. The literature research is based on the five following steps (Brocke et al., 2009).

Phase 1. Definition of the research framework

First, the research subject needs to be clearly defined. Literature relevant to motivations, measures and challenges of corporate biodiversity management and reporting were examined. The systematic literature research therefore followed the three research questions:

1.) What are the motivations that bring companies to establish biodiversity management and biodiversity reporting?
2.) Which measures for biodiversity management and biodiversity reporting are available to companies?
3.) Which challenges often prevent the successful implementation of biodiversity management and biodiversity reporting?

Phase 2. Conceptualization of the topic

The second phase includes the organization of the analysis (Brocke et al., 2009). In this step, databases were defined in which a targeted search for relevant literature is carried out using selected search terms (Brocke et al., 2009). The databases Business Source Complete, Web of Science, Scopus and Emerald were included in this systematic literature search. These databases were chosen since they provide access to an extensive collection of peer-reviewed business journals, spanning several thousand publications (EBSCO, 2023; Elsevier, 2023).

In order to filter for matching results in the selected databases, suitable search terms were defined (Brocke et al., 2009). The search terms are based on suitable keywords for the research questions and have been supplemented with possible synonyms. These search terms

can be divided into three categories "biodiversity management", "companies" and "motivations, measures and challenges". Connectors such as "OR" and "AND" were used, combined with truncations, such as *, so that different terms with the same root can be included (e.g. "motivat*" for "motivation", "motivations", "motivating"). The full search string is shown in Table 1.

In addition, exclusion and inclusion criteria were defined that limit the search results. Since only high-quality scientific literature should be included in the search, the inclusion criterion "peer-reviewed" is used. Due to the dominant role of English language literature on this topic, only English language studies and articles were included in the literature search. We included publications starting from 2009, based on the assumption that literature before the chosen published year is adequately reflected in the included literature. No further exclusion criteria were specified in order to include a broad selection of publications.

Phase 3. Literature search

The third phase involves the actual search for relevant literature. For this purpose, the search string presented in phase two was used in the four selected databases with the exclusion and inclusion criteria. Using these criteria, the literature search yielded 398 publications, of which 83 were duplicates. To organize and manage the literature for the systematic review, the program Rayyan was used in this work, revealing the 315 publications that could be systematically reviewed. The procedure of literature selection was done in three steps. First, the titles of the 315 publications were viewed and filtered according to relevance about answering the research questions. Titles were defined as relevant if they contained keywords such as "biodiversity", "biodiversity management", "biodiversity reporting" or synonyms. Article titles in which the connection to biodiversity was not given or the reference to the corporate level was missing were excluded.

After reviewing the titles, 222 publications were excluded. For the remaining 93 publications, the abstract was analyzed (Fig. 1). Here, it was checked whether the publication dealt with the analysis of biodiversity management or biodiversity reporting in companies. Among them, 45 publications were further selected by the abstract screening. In a third step, the complete texts of these 45 publications were analyzed. To include a study, it was necessary that the paper had a clear focus on motivations, measures or challenges to implement corporate biodiversity management and reporting by taking a company's perspective. Based on the full-text analysis, 20 studies were excluded because they could not contribute to clarifying at least one of the research questions (see last column in Table 2). Thus, 25 relevant publications were included in the literature review. As a final step, a snowballing technique was performed, identifying four extra publications with significant findings relevant to the research (Addison et al., 2019; Bishop et al., 2009; Hassan et al., 2020; Overbeek et al., 2013). Thus, the complete systematic review comprised 29 relevant publications that serve to answer the research questions (Table 2).

Table 1
Categories of the search string of the literature search with associated search terms.

Category	Search terms
"Biodiversity Management and Biodiversity Reporting"	"biodiversity management" OR "biodiversity strategy " OR "biodiversity reporting"
"Company"	firm* OR compan* OR corporat* OR business*
"Motivations, Challenges and Measures"	challeng* OR motivat* OR driver* OR barrier* OR practic* OR measur*

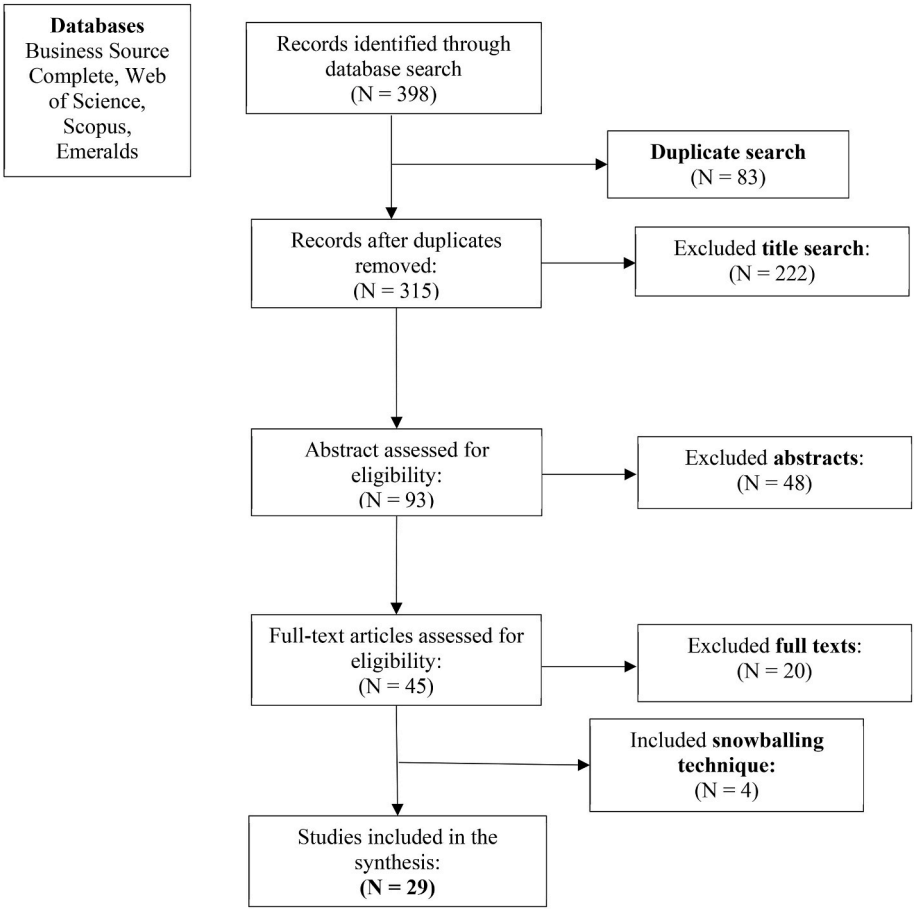

Fig. 1. Documentation of the literature selection.
Source: Own representation

Table 2
Selected publications after the literature search.

Numbering	Authors (year of publication)	Title	Journal	Country/ Region	Sector/Industry	Methodology	Covered RQ(s)
1	Addison et al. (2019)	Using conservation science to advance corporate biodiversity accountability	Conservation Biology	–	–	Content analysis	RQ2
2	Addison et al. (2020)	Bringing sustainability to life: A framework to guide biodiversity indicator development for business performance management	Business Strategy and the Environment	–	–	Conceptual paper	RQ2
3	Adler et al. (2018)	Biodiversity and threatened species reporting by the top Fortune Global companies	Accounting, Auditing & Accountability Journal	–	–	Content analysis and regression analysis	RQ2; RQ3
4	Adler et al. (2017)	United Nations Decade on Biodiversity-A study of the reporting practices of the Australian mining industry	Accounting, Auditing & Accountability Journal	Australia	Mining industry	Content analysis and interview study	RQ1
5	Atkins and Maroun (2018)	Integrated extinction accounting and accountability: Building an Ark	Accounting, Auditing & Accountability Journal	–	–	Conceptual paper	RQ2
6	Atupola and Gunarathne (2022)	Institutional pressures for corporate biodiversity management practices in the plantation sector: Evidence from the tea industry in Sri Lanka	Business Strategy and the Environment	Sri Lanka	Plantation sector, in particular tea industry	Interviews, field visits and document analysis	RQ1; RQ2
7	Bishop et al. (2009)	New Business Models for Biodiversity Conservation	Journal of Sustainable Forestry	–	Agriculture, forestry, tourism, financial services	Conceptual paper	RQ1; RQ2
8	Blanco-Zaitegi et al. (2022)	Biodiversity accounting and reporting: A systematic literature review and bibliometric analysis	Journal of Cleaner Production	–	–	Systematic literature review and bibliometric analysis	RQ1; RQ2
9	Boiral (2016)	Accounting for the Unaccountable: Biodiversity Reporting and Impression Management	Journal of Business Ethics	–	Mining industry	Content analysis	RQ2
10	Boiral and Heras-Saizarbitoria (2017a)	Corporate commitment to biodiversity in mining and forestry: Identifying drivers from GRI reports	Journal of Cleaner Production	–	Mining industry and forestry industry	Content analysis	RQ1; RQ2
11	Boiral and Heras-Saizarbitoria (2017b)	Managing Biodiversity Through Stakeholder Involvement: Why, Who, and for What Initiatives?	Journal of Business Ethics	–	Mining industry and forestry industry	Content analysis	RQ1; RQ2
12	Boiral and Heras-Saizarbitoria (2017c)	Best practices for corporate commitment to biodiversity: An organizing framework from GRI reports	Environmental Science and Policy	–	Mining industry and forestry industry	Content analysis	RQ2
13	Boiral et al. (2018)	Corporate Biodiversity Management through Certifiable Standards	Business Strategy and the Environment	–	Interviewees from the mining, energy and automotive industries	Interview study	RQ2; RQ3
14	Boiral et al. (2019)	Improving corporate biodiversity management through employee involvement	Business Strategy and the Environment	–	Interviewees from the forestry, mining and energy industries	Interview study	RQ2; RQ3
15	Feger and Mermet (2017)	A blueprint towards accounting for the management	Accounting, Auditing & Accountability Journal	–	–	Conceptual paper	RQ2
16	Feger and Mermet (2022)	New Business Models for Biodiversity and Ecosystem Management Services: Action Research With a Large Environmental Sector Company	Organization & Environment	France	Water industry	Case study	RQ2
17	Fernández-Casatejada and Santamaría (2018)	Biodiversity Management in an Oil and Gas Company: From Theory to Practice	SPE International Conference and Exhibition on Health, Safety, Security, Environment, and Social Responsibility	Spain	Oil and gas industry	Case study	RQ1; RQ2
18	Gerwanski (2020)	Managers' incentives and disincentives to engage with integrated reporting or why managers might not adopt integrated reporting: an	Qualitative Research in Accounting & Management	Germany	–	Interview study	RQ1; RQ3

(*continued on next page*)

Table 2 (*continued*)

Numbering	Authors (year of publication)	Title	Journal	Country/ Region	Sector/Industry	Methodology	Covered RQ(s)
		exploratory study in a nascent setting					
19	Hassan et al. (2020)	Exploring factors relating to extinction disclosures: What motivates companies to report on biodiversity and species protection?	Business Strategy and the Environment	–	–	Content analysis and regression analysis	RQ1
20	Jones and Solomon (2013)	Problematising accounting for biodiversity	Accounting, Auditing & Accountability Journal	–	–	Conceptual paper	RQ3
21	Mansi et al. (2014)	Biodiversity reporting in India: a view from the top	Corporate Ownership and Control	India	–	Content analysis	RQ2
22	Maroun et al. (2018)	Biodiversity reporting and organised hypocrite-The case of the South African food and retail industry	Qualitative Research in Accounting & Management	South Africa	Food and retail industry	Content analysis	RQ1; RQ2
23	Overbeek et al. (2013)	Biodiversity and the Corporate Social Responsibility Agenda	Journal of Sustainable Development	Netherlands	Interviewees from the cosmetic, energy & chemistry, retail, transport, and food industries	Interview study	RQ1; RQ2; RQ3
24	Panwar et al. (2022)	The uncomfortable relationship between business and biodiversity: Advancing research on business strategies for biodiversity protection	Business Strategy and the Environment	–	–	Conceptual paper	RQ2
25	Schaltegger et al. (2022)	Managing and accounting for corporate biodiversity contributions. Mapping the field	Business Strategy and the Environment	–	–	Conceptual paper	RQ2; RQ3
26	Torelli and Balluchi (2022)	Biodiversity management approaches in small and innovative businesses: insights from a systems thinking perspective	Social Responsibility Journal	Italy	Food industry	Case study	RQ1
27	van Liempd and Busch (2013)	Biodiversity reporting in Denmark	Accounting, Auditing & Accountability Journal	Denmark	–	Content analysis	RQ2
28	Weir (2018)	The purposes, promises and compromises of extinction accounting in the UK public sector	Accounting, Auditing & Accountability Journal	United Kingdom	Public Sector	Interview study	RQ3
29	White et al. (2021)	Using technology to improve the management of development impacts on biodiversity	Business Strategy and the Environment	–	–	Online survey and interview study	RQ2

Phase 4. Literature Analysis

In the fourth phase, the analysis of the selected literature from Phase 3 took place, using predefined categories to extract relevant content (Brocke et al., 2009).

The definition of the categories followed an inductive method (Mayring, 2015). Here, about 30 percent of the selected papers were analyzed to form categories that were condensed and restructured and the rest of the data material was processed. Furthermore, this allows the analysis of the articles and the systematic creation of the categories without an existing theory framework (Mayring, 2015). At the beginning of the literature review, the categories “motivations”, “measures”, and “challenges” were formed based on the research questions. The following subcategories could then be assigned to each of the three main categories:

Motivations of companies to establish biodiversity management and biodiversity reporting:

- Maintaining social acceptance (7 studies)
- Improvement of the corporate image (5 studies)
- Sense of responsibility (3 studies)
- Improvement of stakeholder relations (4 studies)
- Securing competitiveness (4 studies)

Measures taken by companies to establish biodiversity management and biodiversity reporting:

- Collaboration with relevant stakeholder groups (13 studies)
- Employee engagement (4 studies)
- Implementation of biodiversity management systems (7 studies)
- Use of certifications and standards (3 studies)
- Implementation of biodiversity management strategies (4 studies)
- Application of technologies, tools and processes (5 studies)

Challenges for companies to establish biodiversity management and biodiversity reporting:

- Complexity of the understanding of biodiversity (4 studies)
- Lack of accounting and management approaches (6 studies)
- Lack of resources (3 studies)

Phase 5. Documentation of the research results

In the last phase, the results of the literature analysis were systematically compiled (Brocke et al., 2009), with results based on the analysis grid (phase 4). Accordingly, this section is divided into the items "Motivations of companies to establish biodiversity management and reporting", "Measures of companies to establish biodiversity

management and reporting", and "Challenges of companies to establish biodiversity management and reporting", which is beneficial in answering the research questions. The evaluation of the results of the individual sub-headings is based on a top-down approach, according to which the results are evaluated from the general to the specific.

4. Results

4.1. Context

Table 2 includes contextual information of the 29 included studies. Studies span diverse regions, such as Australia, Sri Lanka, France, Spain, Germany, India, Netherlands, Denmark, UK, and Italy. Many studies lack a specific geographical focus. The majority of the final analyzed studies were European.

Key industries in the selected studies were mining, forestry, oil & gas, plantation, water, food, and retail. Mining and forestry are notably well-represented. Although some of the papers did not focus on a specific industry, the sector-specific studies might be useful for companies to improve their sector-specific biodiversity practices.

Concerning methodologies, there is a mix of content analyses (10), conceptual papers (8), case studies (4), and interview studies (7). Overall, there is a limited use of advanced mixed methods and quantitative approaches. Several conceptual papers offer innovative approaches to integrating biodiversity into business strategies. The case studies and interview studies provide more practical insights, such as recommendations for biodiversity management actions.

4.2. Motivations for establishing biodiversity management and biodiversity reporting

4.2.1. Maintaining social acceptance

Maintaining social legitimacy serves as a significant motivation for companies engaging in biodiversity management and reporting with organizations seeking disclosure of their environmental actions to maintain societal trust (Adler et al., 2017). In a study on Australian mining companies, Adler et al. (2017) confirm this motivation, noting increased biodiversity disclosure in larger companies facing greater external pressures. Bishop et al. (2009) and Adler et al. (2017) both affirm legitimacy pursuit as a key driver, especially in resource-dependent industries that require operating licenses, which are especially essential for attracting investors and business partners (Bishop et al., 2009).

Moreover, recent studies by Boiral et al. (2019) and Blanco-Zaitegi et al. (2022) also reveal that the primary motivation for companies reporting on biodiversity performance is to gain social legitimacy. Maroun et al. (2018) also highlight legitimacy as a significant factor in biodiversity reporting for South African food manufacturers, focusing on successful action plans and risk mitigation strategies. This motivation shows the recognition of the value of biodiversity reporting in building trust and meeting stakeholder needs (Gerwanski, 2020). Looking at the motivations for biodiversity management, Atupola and Gunarathne (2022) find that plantation farms engaging in biodiversity practices are driven by the need for corporate legitimacy, particularly concerning interest groups and regulators.

4.2.2. Improvement of the corporate image

Companies are motivated to enhance their image with stakeholders (Maroun et al., 2018; Gerwanski, 2020). Maintaining corporate image, for example, is a key driver in the oil and gas sector, where biodiversity measures are employed to counteract damage to the company's reputation through media and NGO campaigns (Fernández-Casatejada and Santamaría, 2018). However, Maroun et al. (2018) find that some companies may exaggerate their pro-environmental practices, driven by the pursuit of market advantages or meeting stakeholder expectations.

Boiral (2016) identifies four strategies companies use in interpreting biodiversity reports to enhance their reputation, i.e. claiming a positive or neutral net impact, denying significant impacts, distancing from impacts, and diluting accountability. Companies may justify biodiversity concerns by asserting a net positive or neutral impact, denying the existence of significant impacts, opting out of reported impacts, or attributing responsibility to other actors and circumstances (Boiral, 2016). The study from Hassan et al. (2020) aligns with the findings of Boiral (2016), revealing that companies are motivated to protect biodiversity primarily for reputation benefits and stakeholder impressions, reflecting a self-interested rather than moral or ethical approach to biodiversity accounting (Hassan et al., 2020). While enhancing corporate image is generally positive, it is important to remain critical and precise with the published information, or the risk of greenwashing may appear (Boiral, 2016).

4.2.3. Sense of responsibility

Ethical motivation drives companies across sectors towards environmentally conscious and sustainable practices. Overbeek et al. (2013) identify a sense of responsibility as a significant source for corporate biodiversity efforts. Companies implementing measures to protect biodiversity emphasize that their actions are not driven by societal pressure, but are a recognition of the importance of sustainability and biodiversity conservation within organizational practices (Overbeek et al., 2013). Boiral and Heras-Saizarbitoria (2017a) examine the mining and forestry sector and also stress that ethical concerns and a commitment to sustainable business practices are the primary motivations for biodiversity management initiatives. Companies are convinced that ecological responsibility plays a crucial role in business operations and emphasize the significance of biodiversity preservation (Boiral and Heras-Saizarbitoria, 2017a).

Similarly, Torelli and Balluchi (2022) study small and medium-sized enterprises in the bakery sector and indicate ecological and ethical responsibility as the main motivation. Entrepreneurs in the study prioritize personal values intertwined with professional values, and their ethical dimensions form the basis for defining long-term strategies to protect the environment. These companies actively seek to act sustainably and challenge established practices in the industrial world, with a vision of playing a role in protecting natural dynamics and creating value without pursuing legitimacy or improved reputation (Torelli and Balluchi, 2022).

4.2.4. Improvement of stakeholder relations

One of the other motivations for corporate biodiversity management and reporting is to improve relationships with key stakeholder groups (Bishop et al., 2009; Overbeek et al., 2013; Adler et al., 2017; Boiral and Heras-Saizarbitoria, 2017a). Bishop et al. (2009) and Overbeek et al. (2013) explore the enhancement of relationships with stakeholder groups as a motivation for corporate environmental investments in biodiversity conservation. Overbeek et al. (2013) stress the importance of positive relationships with primary stakeholders like suppliers, governments, and shareholders, as well as with secondary stakeholders such as environmental NGOs, as NGOs have the power to impact a company's reputation, which motivates companies to engage in biodiversity conservation (Overbeek et al., 2013).

Bishop et al. (2009) point out that employees are another crucial stakeholder group. An environmentally friendly and biodiversity-centered company improves employees' work ethic and enhances their commitment, especially when shared personal values align with the company's environmental goals (Bishop et al., 2009). Moreover, Adler et al. (2017) indicate that stakeholders can act as external drivers, particularly in mining companies where key stakeholders have high expectations for increased disclosure. Stakeholders are viewed as important sources of financing, and companies that emphasize transparency and integrity in reporting can increase their trustworthiness. Contractual obligations related to operating licenses further add external pressure, motivating companies to report certain

dates and targets related to biodiversity impacts (Adler et al., 2017).

Furthermore, Boiral and Heras-Saizarbitoria (2017a) reveal that organizations aim to enhance their attractiveness to stakeholders by engaging in biodiversity initiatives. These efforts often involve collaboration with other stakeholders such as NGOs, government agencies, or indigenous communities. Companies' reports usually emphasize positive partnerships with diverse stakeholder groups, such as their participation in biodiversity conservation to strengthen relationships and to contribute to obtaining the "license to operate" (Boiral and Heras-Saizarbitoria, 2017a).

4.2.5. Securing competitiveness

Corporate biodiversity management and reporting are discussed as potential sources to secure competitiveness by studies from Bishop et al. (2009), Boiral and Heras-Saizarbitoria (2017a), Fernández-Casatejada and Santamaría (2018), and Torelli and Balluchi (2022). Boiral and Heras-Saizarbitoria (2017a) point out that economic opportunities could be a motivation for biodiversity measures. Mining companies, for example, face lower market pressures, so they show less motivation than forestry companies. Forestry industries, on the other hand, dependent on sustainable practices for market demands, often require products from certified sources like the Forest Stewardship Council, which tend to enhance competitiveness through certification and meeting market expectations (Boiral and Heras-Saizarbitoria, 2017a).

Studies from Bishop et al. (2009) and Fernández-Casatejada and Santamaría (2018) show that economic benefits drive the implementation of biodiversity measures. In the gas and oil sector, Fernández-Casatejada and Santamaría (2018) highlight that biodiversity measures enable cost savings by better assessing risks and staying competitive. In a recent study by Torelli and Balluchi (2022), they present a case where economic motivation implicitly influences business actions by offering high-quality and biodiversity-respecting products to customers in order to be competitive in the market.

4.3. Measures to establish biodiversity management and biodiversity reporting

4.3.1. Cooperation with relevant stakeholder groups

Cooperation with stakeholders is a prevalent and essential approach in corporate biodiversity management (Overbeek et al., 2013; Boiral and Heras-Saizarbitoria, 2017b; Feger and Mermet, 2022). It is the most cited measure that companies apply to introduce biodiversity management and reporting. Boiral and Heras-Saizarbitoria (2017b) stress the importance of stakeholder involvement in biodiversity initiatives, highlighting benefits such as improved social legitimacy, knowledge sharing, conflict avoidance, regulations compliance, and enhanced economic goals. They further identify key stakeholder groups to implement biodiversity management: NGOs, authorities, experts, universities, and business associations as crucial stakeholder groups. Indigenous peoples and NGOs are particularly important to enhance corporate legitimacy and provide expertise. Experts and scientists also play a significant role due to the complex nature of biodiversity (Boiral and Heras-Saizarbitoria, 2017b). Public bodies, business coalitions, sectoral advisory bodies, and networks are also important stakeholders in biodiversity management (Boiral and Heras-Saizarbitoria, 2017b). These collaborations help companies stay informed, influence industry positions, and contribute to sustainable production patterns.

Collaboration with stakeholders allows for the precise identification of environmental risks, the development of comprehensive solutions, and the establishment of protected areas (Atkins and Maroun, 2018; Boiral and Heras-Saizarbitoria, 2017a, 2017c; van Liempd and Busch, 2013). Several other studies also emphasize the importance of such stakeholder collaboration (Adler et al., 2018; Boiral, 2016; Feger and Mermet, 2017; Maroun et al., 2018; van Liempd and Busch, 2013). Feger and Mermet (2022) emphasize the role of businesses in providing assessment services, fostering trust, and encouraging local biodiversity projects through collaborative communities. Forming partnerships is another way to collaborate with stakeholders. Examples are given through partnerships with NGOs, the World Wide Fund for Nature, the IUCN, and government bodies mentioned in biodiversity reports of leading companies, highlighting the significance of stakeholder collaboration for obtaining a social license to operate (Addison et al., 2019; Overbeek et al., 2013). Participation in networks enables companies to learn about existing instruments for biodiversity management, establish standards, and receive guidelines for dealing with biodiversity and its assessment (Schaltegger et al., 2022). Strengthening relationships with stakeholders through donations, sponsorship, and engagement measures like committees and public hearings further promotes stakeholder participation in biodiversity initiatives (Boiral and Heras-Saizarbitoria, 2017c).

4.3.2. Employees engagement

Employee commitment is a crucial factor for successful biodiversity management within organizations (Boiral et al., 2019). The adoption of biodiversity practices is significantly influenced by employee participation and the creation of environmentally friendly workplaces (Boiral and Heras-Saizarbitoria, 2017a). Without employee engagement, biodiversity practices remain symbolic and superficial since they lack internalization of daily activities (Boiral et al., 2019). Various forms of engagement, such as knowledge sharing, proposing waste reduction solutions, and representing the organization at environmental conferences, are crucial and should be voluntary and promoted.

In the mining, forestry, and energy sectors, 65 % of respondents consider employee engagement crucial for effectively implementing biodiversity standards (Boiral et al., 2018). Raising staff awareness through training and communication is considered essential for internalizing biodiversity practices and reducing dependency on external consultants (Boiral et al., 2018). Boiral et al. (2019) also stress that the effectiveness of internal biodiversity conservation initiatives depends on employee involvement, which is challenging for most organizations. Employee commitment can be enhanced through personal training, prior experience, or non-professional interest in ecosystems at the workplace (Boiral et al., 2019). Blanco-Zaitegi et al. (2022) emphasize the importance of involving employees as a key interest group in companies, supporting arguments from the studies of Boiral et al. (2018, 2019). These studies indicate the importance of employee engagement in practice.

4.3.3. Implementation of biodiversity management systems

The implementation of biodiversity management systems is one of the potential measures (Boiral and Heras-Saizarbitoria, 2017b). The term "biodiversity management system" is still infrequently used in reports. However, over two-thirds of the investigated company reports by Boiral and Heras-Saizarbitoria (2017b) provide information on biodiversity management practices similar to those proposed by environmental management systems like ISO 14001. Approximately a quarter of the reports in the same study mention specific biodiversity action plans, detailing information on endangered species, conservation goals, resources, and employee training programs, and only a few reports elaborate on the use of specific biodiversity conservation measures (Boiral and Heras-Saizarbitoria, 2017c).

Setting environmental targets with detailed measures to address biodiversity loss is also cited by Boiral et al. (2019), Maroun et al. (2018), and Addison et al. (2020) as a means of promoting positive biodiversity action. These targets involve prioritizing biodiversity protection, understanding the impact of business activities, and setting goals that align with emerging standards like the TNFD Disclosure Framework and the ESRS E4 Draft Standard on Biodiversity and Ecosystems (Addison et al., 2020; EFRAG, 2023; Schaltegger et al., 2022; TNFD, 2023).

Assessing the impact of business activities on biodiversity is crucial for effective action (Boiral et al., 2018). Schaltegger et al. (2022) stress

the involvement of external advisory groups, and frameworks are suggested to capture both direct and indirect impacts of business activities on biodiversity. The framework spans the entire value chain and provides valuable guidance for assessing biodiversity impacts (Schaltegger et al., 2022). Also, a control phase is essential for a biodiversity-friendly management system (Atkins and Maroun, 2018; Schaltegger et al., 2022). This phase involves monitoring and evaluating the effectiveness and efficiency of management actions, ensuring necessary adjustments, and aligning with the Science Based Target Network's new action framework that includes measures like avoid, reduce, regenerate, restore, and redesign (Atkins and Maroun, 2018; Schaltegger et al., 2022).

4.3.4. Use of certifications and standards

Market-based mechanisms differentiate products based on their social and environmental impacts, with companies anticipating increased demand and higher prices for sustainably certified products (Bishop et al., 2009). Biodiversity certifications and standards are integral for organizational management systems, driven by motivations such as enhancing social acceptance and addressing market pressures (Boiral et al., 2018). Certification serves as a tool to showcase commitment to biodiversity conservation, especially in regions with limited regulations. For example, in the study of Atupola and Gunarathne (2022), they focus on Rainforest Alliance certification's positive impact on biodiversity in Sri Lankan plantation companies. Certification in this case influences various biodiversity-promoting measures, including afforestation, hunting bans, protective barriers, water management, invasive species control, reduced chemical use, biodiversity-friendly supply chains, and climate change adaptation (Atupola and Gunarathne, 2022).

However, challenges of certifications include high costs, uncertain economic benefits, symbolic acceptance, complexity, and intangible results (Boiral et al., 2018). Implementation demands resources that may be challenging for smaller enterprises. Economic benefits are uncertain, as consumers may be unfamiliar with specific standards or unwilling to pay more for certified products. The proliferation of certifications adds complexity for stakeholders with limited knowledge (Boiral et al., 2018).

4.3.5. Implementation of biodiversity management strategies

Various biodiversity management strategies are discussed in the study of Panwar et al. (2022), which include conservation, compensation, restoration, and reparation. The conservation strategy aims to prevent biodiversity loss through eco-friendly practices, often driven by external pressures like legislation or market demands. However, achieving zero biodiversity loss is often impractical due to unavoidable commercial activities. Compensation involves offsetting biodiversity loss by implementing conservation measures elsewhere, with the goal of zero net loss or a net positive impact, yet this strategy may allow companies to continue harmful activities in one location while compensating elsewhere (Panwar et al., 2022). The restoration strategy focuses on restoring ecosystems to their pre-intervention state after biodiversity loss, either through government regulations or voluntary corporate actions. However, complete restoration is challenging. The reparation strategy involves compensating for damage caused by entrepreneurial activities, either legally or voluntarily (Panwar et al., 2022). Despite potential corruption risks in developing countries, this strategy, particularly afforestation programs, is frequently employed by companies (Panwar et al., 2022; Mansi et al., 2014; Adler et al., 2018).

White et al. (2021) advocate an effective mitigation hierarchy—prioritizing avoidance, followed by minimization, recovery, and compensation—to manage biodiversity impact. This framework is now integral to financing decisions to provide guidelines for achieving goals like "no net loss" or "net gain" (Equator Principles, 2020).

4.3.6. Application of technologies, tools and procedures

Several technologies and tools are used to support implementing biodiversity management and reporting. For instance, blockchain technologies offer a means to trace and validate the environmental performance of products across the supply chain, facilitating effective mitigation. White et al. (2021) emphasize its application in tracking biodiversity assets, particularly in compensation and equalization programs. Other than that, computing technology plays a crucial role in managing biological diversity by enabling the storage, distribution, and processing of environmental data. Online databases like the IUCN Red List serve as valuable resources, supporting informed decision-making and mitigation measures. White et al. (2021) advocate the use of computing tools to address data gaps and enhance knowledge in corporate biodiversity management.

Van Liempd and Busch (2013) recommend biodiversity tools like the Initial Biodiversity Assessment Tool (IBAT) for accessing biodiversity information. Fernández-Casatejada and Santamaría (2018) and Schaltegger et al. (2022) also endorse IBAT, which aids in biodiversity screening and raises managerial awareness. Furthermore, natural capital frameworks and tools are suggested as a means to improve companies' understanding of biodiversity and ecosystem services, aiding informed decision-making (Feger and Mermet, 2017). White et al. (2021) identify additional technologies beneficial for biodiversity management, including remote sensing and survey technologies. Remote detection technologies help identify risks early in project planning and monitor mitigation actions. Survey technologies, such as cameras or thermal imaging cameras, aid in monitoring protective measures. These technologies can be implemented throughout project development, operation, or termination, encompassing environmental impact assessments, biodiversity conservation, technological solutions, and habitat creation (Boiral and Heras-Saizarbitoria, 2017c).

4.4. Challenges to establish biodiversity management and biodiversity reporting

4.4.1. Complexity of the understanding of biodiversity

The studies from Overbeek et al. (2013), Boiral et al. (2018, 2019), and Schaltegger et al. (2022) identify the complexity of understanding biodiversity as a significant challenge in the implementation of measures to protect biodiversity and thus hinder the reporting on it. Schaltegger et al. (2022) highlight the difficulty in capturing the intricacy of biodiversity due to its abstract, multifaceted nature. Defining a natural extinction rate and distinguishing problematic extinctions also pose challenges. The global variability of ecosystem services and the potential negative aspects of diversity, such as invasive species, further complicate the issue (Schaltegger et al., 2022).

In addition, the measurability of biodiversity poses a challenge for companies due to its complexity (Adler et al., 2018). Despite the recognition of the importance of biodiversity, Overbeek et al. (2013) identify a challenge in incorporating biodiversity into business plans. Boiral et al. (2018) also underscore a deficiency in internal knowledge and ongoing support, resulting in a symbolic implementation of standards due to limited involvement of managers and employees. Insufficient knowledge among employees hinders the identification of specific issues and suitable responses. External experts are often brought in due to a lack of expertise, restricting biodiversity management knowledge to specific individuals and inadequately integrating relevant measures into practical field activities (Boiral et al., 2018). Integrating biodiversity practices and fostering employee initiatives require a challenging learning process, exacerbated by inadequate training, unclear communication, and organizational commitment (Boiral et al., 2019). Limited understanding of the connection between companies and biodiversity, focus on specific areas, and a need for information and awareness highlight the struggle to improve biodiversity management in organizations (Boiral et al., 2019; Overbeek et al., 2013).

4.4.2. Lack of accounting and management approaches

Another significant obstacle, closely related to the complexity of

understanding biodiversity, is the lack of pragmatic and effective approaches to accounting and management (Boiral et al., 2018, 2019; Gerwanski, 2020; Jones and Solomon, 2013; Schaltegger et al., 2022; Weir, 2018). Jones and Solomon (2013) identify a major obstacle in the absence of clear regulations and methods for collecting biodiversity data, specifically noting the dearth of research in accounting or finance focused on flora, fauna, habitats, or biodiversity. Boiral et al. (2018) elaborate on reasons for this challenge, citing the lack of measurability and the intangible results of biodiversity initiatives as implementation obstacles. Biodiversity's contextual and qualitative nature, coupled with the absence of standardized indicators, hinders progress measurement, financial evaluation, and stakeholder communication. Environmental management systems like ISO 14001 do not adequately consider biodiversity, resulting in unimplemented programs and procedures (Boiral et al., 2018, 2019).

Weir (2018) further emphasizes the lack of biodiversity reporting approaches. Gerwanski (2020) supports the findings, emphasizing the lack of dynamism in biodiversity reporting. Business executives criticize the uniform approach applied to all industries and business models, advocating for more targeted and tailored reports for diverse stakeholders and industries (Gerwanski, 2020). Moreover, Schaltegger et al. (2022) argue that research on biodiversity conservation measures in corporate governance and accounting is still insufficient, hindering the establishment of operational biodiversity management.

4.4.3. Lack of resources

The scarcity of resources, particularly in terms of costs, expertise, and human resources, poses other significant challenges to implementing biodiversity management and reporting (Boiral et al., 2019). Biodiversity conservation often requires costly organizational changes, including the implementation of compensation programs, activity reduction or relocation, and employee training (Boiral et al., 2019). Small and medium-sized enterprises with limited resources, therefore, frequently exhibit hesitance in implementing such measures, while considering associated challenges and resource constraints. Organizations often tend to implement biodiversity management through partnerships, driven by a lack of in-house expertise or a dedicated biodiversity manager. Boiral et al. (2019) affirm this trend, highlighting the crucial role of a responsible person for effective implementation.

The findings from Gerwanski (2020) align with the study of Boiral et al. (2019), as executives express concerns about the high administrative burden and costs associated with establishing infrastructure for corporate biodiversity reporting, particularly burdensome for small and medium-sized enterprises with limited financial resources. The lack of specific expertise and time further complicates the effort (Gerwanski, 2020). Weir (2018) also reinforces these points, underscoring the economic challenges in aligning corporate economic and ecological goals due to the high costs associated with biodiversity management and reporting.

5. Discussion

5.1. Context

The studies included in this review span diverse regions, but the dominance of European samples highlights a geographical bias, likely driven by the region's stronger regulatory frameworks and corporate responsibility culture. On the other hand, the limited representation of regions like Africa, South America, and Southeast Asia – despite their critical biodiversity significance – underscores the need for more research in these areas. Future studies could address this imbalance by investigating biodiversity practices in biodiversity-rich but underrepresented regions to provide a more comprehensive global perspective.

Looking at the focused sectors, both mining and forestry sectors are particularly well-represented. This aligns with their significant biodiversity impacts, making them natural focal points for corporate biodiversity research. However, the inclusion of emerging industries, such as the plantation (tea) and water sectors, demonstrates an expanding interest in diverse industries. Research that lacks focus on a specific sector still contributes valuable cross-sector insights. Nevertheless, there are still several industries such as technology, manufacturing, and pharmaceuticals remain underexplored. Addressing these gaps could provide a broader understanding of how different sectors perceive and act upon biodiversity challenges.

The methodological diversity – ranging from content analyses to conceptual papers, case studies, and interview studies – illustrates the multifaceted nature of corporate biodiversity research. Content analyses dominate, reflecting an emphasis on examining reporting practices, while conceptual papers provide theoretical frameworks and future directions for integrating biodiversity into business strategies. Case studies and interview studies, though fewer in number, offer actionable insights and practical implications, highlighting real-world challenges and solutions. However, the limited use of mixed methods and advanced quantitative approaches represents a potential research gap. Mixed methods could bridge the gaps between theory and practice, while quantitative studies could validate findings across larger samples, strengthening the generalizability of the research. Incorporating these methodologies in future studies could lead to a more robust understanding of corporate biodiversity management and reporting.

The systematic results show that motivations to implement biodiversity management and reporting are more researched in the selected publications compared to the other two research questions. In particular, companies are motivated by the gain of social acceptance and the improvement of corporate image. The identified motivations can be further categorized into extrinsic and intrinsic directions. For the measures for biodiversity management and reporting, cooperation with relevant stakeholders and building networks are the most applied methods. The most mentioned challenge for the implementation is the complex nature of biodiversity. However, current studies rarely address the potential challenges in the implementation of biodiversity measures and disclosures by companies. This can be because corporate biodiversity management and reporting are still relatively new research areas. A more detailed discussion of extrinsic and intrinsic motivations and corresponding measures is further presented below.

5.2. Extrinsic motivations and corresponding measures

Maintaining societal acceptance was cited as the first extrinsic motivation for biodiversity management and biodiversity reporting in the selected literature (Blanco-Zaitegi et al., 2022; Boiral et al., 2019). Accordingly, an organization acts in a way that is desirable and appropriate according to norms, values and beliefs (Suchman, 1995). Environmental performance, including biodiversity performance, helps secure moral legitimacy (Matejek and Gössling, 2014; Suchman, 1995). Several studies confirm this type of motivation with regard to biodiversity actions (Adler et al., 2017; Atupola and Gunarathne, 2022; Bishop et al., 2009; Blanco-Zaitegi et al., 2022; Boiral et al., 2019; Gerwanski, 2020; Maroun et al., 2018).

In addition to social acceptance and the resulting environmentally friendly behavior of companies, several studies have shown that striving for a positive corporate image towards interest groups is another extrinsic motivation. In this context, communicating green values, ideals and principles to stakeholders is crucial to building a responsible image (Boiral, 2016; Gerwanski, 2020; Maroun et al., 2018). Furthermore, this motivation aims to counter possible damage to the corporate reputation by media or NGO campaigns (Fernández-Casatejada and Santamaría, 2018). However, research has shown that companies sometimes try to improve their reputation by over-promoting pro-environmental practices and values, thereby masking inconsistent behavior (Boiral, 2016; Hassan et al., 2020; Maroun et al., 2018).

Compliance with legal requirements is cited as an external source of pressure and thus as an extrinsic motivation for companies to take action

to protect biodiversity. This motivation is discussed in the study of Boiral and Heras-Saizarbitoria (2017a) from the perspective of the mining and forestry sectors. Legal requirements are of course not only relevant for these sectors. Other industries also face similar pressures (e.g., agriculture, construction, and energy). Furthermore, compliance with legal requirements, including local planning and mitigation regulations, forms a complex interplay of external pressures and corporate strategies. However, the effectiveness of these regulations in encouraging biodiversity conservation might depend on their integration into broader governance frameworks. Governance norms and international guidelines, such as the CBD or the Kunming-Montreal Global Biodiversity Framework, have been instrumental in nudging companies to incorporate biodiversity management into their operations. Nevertheless, the adoption of these frameworks varies globally.

Another extrinsic motivation is to improve relationships between companies and stakeholders as a result of external pressure. For example, companies meet certain stakeholder requirements because they are interested in funding (Adler et al., 2017). This is particularly important when a lack of resources and high costs are an obstacle to protecting biodiversity. The protection of ecosystems often requires significant and costly changes in companies through the implementation of compensation programs, the reduction or relocation of activities and the development of training plans. Stakeholder engagement can be particularly important for small and medium-sized enterprises with limited resources (Boiral et al., 2019).

Not only through cooperation with important stakeholder groups resulting from external pressure, but also through competitive pressure or economic benefits, firms can be motivated to implement biodiversity measures (Bishop et al., 2009; Boiral and Heras-Saizarbitoria, 2017a; Fernández-Castejada and Santamaría, 2018; Torelli and Balluchi, 2022). Accordingly, the protection of biodiversity should generate added value for companies, which reduces existing market weaknesses and future costs as far as possible (Bishop et al., 2009; Fernández-Casatejada and Santamaría, 2018). With these cost savings, it is of great importance to be able to better assess potential risks and thus reduce their extent and cause. Indicators that lead to the deterioration of ecosystems due to business activities must be uncovered and remedied. Measures such as the creation of biodiversity strategies and a biodiversity management system, as well as the use of technologies, are important for this (Boiral and Heras-Saizarbitoria, 2017c; Fernández-Casatejada and Santamaría, 2018; Panwar et al., 2022; Schaltegger et al., 2022).

Other measures associated with extrinsic drivers include the use of certifications and compliance with certain standards, as well as working with relevant stakeholder groups or networks. In the study of Boiral et al. (2018), the majority of respondents mentioned increasing social acceptance as a motivation for using certifications and standards. Certifications can be used to verify the organization's actual commitment to biodiversity conservation. In this way, certified organizations signal to interest groups that corporate activities are subject to proper monitoring. This gives the organizations a certain credibility toward stakeholders (Boiral et al., 2018). Working with stakeholders can continue to build credibility and support for implementing biodiversity initiatives. In addition, this measure can be used to avoid or resolve potential conflicts with interest groups (Boiral and Heras-Saizarbitoria, 2017b).

Furthermore, biodiversity management strategies such as preservation strategy or restoration strategy can be viewed as further measures resulting from extrinsic motivation, as they are often motivated by external pressures such as legislation or market demands. When implementing such strategies, the loss of biological diversity should be avoided, restored or compensated for through specific measures (Panwar et al., 2022).

5.3. Intrinsic motivations and corresponding measures

Improving relationships with stakeholder groups can be an intrinsic driver to invest in biodiversity conservation (Adler et al., 2017; Bishop et al., 2009; Boiral and Heras-Saizarbitoria, 2017a; Overbeek et al., 2013). This may be due to a desire to work with different stakeholders such as NGOs, government agencies, and indigenous communities, as biodiversity promotion initiatives are often developed in conjunction with them. This endeavor stems from a desire to ensure broad support and collaboration for such biodiversity initiatives. From this motivation, stakeholders can be seen as partners and not as a source of external pressure (Boiral and Heras-Saizarbitoria, 2017a). However, such public-private partnerships can lead to potential greenwashing with unclear biodiversity involvement.

Corporate environmental responsibility is discussed in the literature examined. This is not based on external pressures but on intrinsic values and the belief that environmental responsibility plays a significant role in corporate values (Boiral and Heras-Saizarbitoria, 2017a; Overbeek et al., 2013; Torelli and Balluchi, 2022). Motivation gains particular relevance in small and medium-sized companies, in which environmentally friendly values are firmly integrated into the corporate philosophy or the personal values of the business executives (Torelli and Balluchi, 2022). Businesses driven by this ethical motivation take concrete actions to implement biodiversity management strategies. In addition, they actively seek cooperation with environmental NGOs or networks (Boiral and Heras-Saizarbitoria, 2017b, 2017c).

A further measure of intrinsic motivation is the commitment of employees. The engagement of this interest group is crucial for the successful implementation of biodiversity measures. It can take forms such as sharing knowledge about environmental and biodiversity conservation, or training in pro-environmental behavior (Boiral et al., 2019). Such training for employees can, in turn, counteract the obstacle of the complex understanding of biodiversity (Boiral et al., 2019). The implementation of biodiversity management systems can also be assigned to intrinsic motivation. Here, companies anchor goals for the protection of biological diversity without the pressure from interest groups. The companies assess the impact of their activities on ecosystems and assess the effectiveness and efficiency of management actions (Schaltegger et al., 2022).

6. Conclusion, limitations and outlook

Through a systematic review, this paper provides a thorough examination of motivations, measures, and challenges, offering a consolidated overview of the current state of knowledge in the field of biodiversity management and biodiversity reporting.

Drivers to implement biodiversity management and reporting results mainly from social acceptance and corporate image improvement. This insight contributes to a nuanced understanding of the motivational landscape. In the identified studies, extrinsic motivational drivers such as maintaining social acceptance and improving corporate image were named most frequently. A promising avenue for future research could involve exploring the long-term impact of these motivations on the integration of biodiversity management measures, with a specific focus on intrinsic motivation. In practical application, policymakers could refer to the results that companies' motivation for biodiversity management and reporting is often derived from external factors for future biodiversity policies. This also presents an opportunity for organizations to reconsider their strategic approaches and incorporate intrinsic motivations more prominently to foster long-term commitment and success in biodiversity practices.

Measures for the implementation of biodiversity management and reporting include cooperation with relevant stakeholders, which is the primary applied measure. The result provides an overview of possible measures so that future research can delve into how various measures interact and which combinations prove the most effective. On a practical level, companies could reassess their implementation approaches, ensuring that targeted collaboration with stakeholders remains central to their strategies.

The studies examined also highlight potential challenges in the

implementation of biodiversity measures. In comparison to the measures and motivations, possible challenges in the implementation of corporate biodiversity measures are addressed comparatively little in the publications examined. Academic research could continue to focus on how these challenges influence the successful implementation of biodiversity measures and how they can be better addressed. A comprehensive analysis of the challenges companies face in implementing biodiversity measures could be academically and practically beneficial. From an academic standpoint, this could help address existing research gaps. On a practical note, companies could actively work on adapting their internal structures through, for example, capacity building, to better cope with the identified challenges.

However, this paper has some limitations. First of all, as part of the systematic literature search, only four databases were included in the analysis, which could potentially lead to a neglect of relevant literature. Future studies might incorporate a broader selection of databases and further investigate the development of biodiversity accounting. Another limitation is the scarcity of publications (n = 29) in this regard. However, the increasing number of research papers in recent years indicates that the subject has great potential and that an increase in publications in this area can be expected.

In conclusion, companies are currently more motivated by extrinsic incentives to implement measures to protect biodiversity. Most companies still need to identify how their business activities affect biodiversity, which requires extensive knowledge building. The results suggest that while corporate biodiversity management and reporting are gaining attention, significant gaps remain in geographical diversity, sectoral representation, and methodological rigor. Addressing these gaps requires targeted research efforts in underrepresented regions and sectors, along with methodological innovations that combine qualitative and quantitative insights. For this reason, this paper calls for further academic and practical actions to actively engage in establishing a more comprehensive foundation to develop sound biodiversity practices.

CRediT authorship contribution statement

Lena Keckel: Writing – review & editing, Writing – original draft, Methodology, Investigation, Data curation, Conceptualization. **Yu-Shan Lin Feuer:** Writing – review & editing, Writing – original draft, Project administration, Conceptualization. **Remmer Sassen:** Writing – review & editing, Writing – original draft, Supervision, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

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