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Association between internal control and sustainability reporting: A systematic exploratory literature review

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Abstract:

Although many studies have separately explored sustainability reporting and its determinants, as well as internal control, the analysis of the emerging relationship between these two areas remains a relatively new field of research. Against this background, this article aims to identify and group together the relevant literature that has studied the impact of internal control on the quality of sustainability reporting. It then proposes a thematic analysis of the selected articles in order to highlight gaps in current research and future prospects in this field. To achieve this objective, an exploratory systematic review of the literature was carried out using the PRISMA method, starting from an initial identification of 332 documents and resulting in an in-depth analysis of the final 16 articles. The results show a positive correlation between internal control and sustainability reporting, a finding observed in 15 out of the 16 selected studies, mainly demonstrated through quantitative analyses. However, research in this area is still in its infancy. It is characterized by a limited number of studies, a geographical focus on Asia, and a dominance of analyses in polluting sectors. This systematic review provides a solid foundation for future research and highlights the growing importance of internal control in improving the quality and reliability of sustainability reporting, a key issue in the current context characterized by international sustainability reforms.

Keywords: Internal control; PRISMA method; ESG disclosure quality; greenwashing; non-financial reporting.
Classification JEL : M41, M42, Q56
Paper type: Systematic Literature Review

Résumé:

Bien que de nombreuses études aient exploré séparément le reporting durable et ses déterminants, ainsi que le contrôle interne, l'analyse de la relation émergente entre ces deux domaines reste un champ de recherche relativement nouveau. Dans ce contexte, cet article vise à identifier et regrouper la littérature pertinente ayant étudié l'impact du contrôle interne sur la qualité du reporting durable. Il propose ensuite une analyse thématique des articles sélectionnés afin de mettre en évidence les lacunes de la recherche actuelle et les perspectives futures dans ce domaine. Pour atteindre cet objectif, une revue systématique exploratoire de la littérature a été réalisée selon la méthode PRISMA, à partir d'une identification initiale de 332 documents et aboutissant à une analyse approfondie des 16 articles finals. Les résultats montrent une corrélation positive entre le contrôle interne et le reporting durable, un constat observé dans 15 des 16 études sélectionnées, principalement démontrée par des analyses quantitatives. Cependant, la recherche dans ce domaine en est encore à ses balbutiements. Elle se caractérise par un nombre limité d'études, une concentration géographique sur l'Asie et une dominance d'analyses dans les secteurs polluants. Cette revue systématique fournit une base solide pour les recherches futures et souligne l'importance croissante du contrôle interne dans l'amélioration de la qualité et de la fiabilité du reporting durable, un enjeu clé dans le contexte actuel marqué par les réformes internationales en matière de durabilité.

Mots clés : contrôle interne ; méthode PRISMA ; qualité de l'information ESG ; greenwashing ; reporting extra-financier
JEL Classification : M41, M42, Q56
Type du papier : Revue de Littérature Systématique

1. Introduction

Sustainability reporting is known in the literature by several names, including Corporate Social Responsibility CSR reporting (Belal & Cooper, 2011; Bouten et al., 2011), Environment, Social, and Governance ESG reporting (Arvidsson & Dumay, 2022), Triple Bottom Line TBL reporting (Kent & Monem, 2008), or non-financial reporting (Dagilienė & Nedzinskienė, 2018; Stolowy & Paugam, 2018). It has become recognized as an essential tool for disseminating and reporting a company's impacts beyond its financial performance. Capron and Quairel (2003) have defined it as “the dissemination of environmental and social information produced by companies for third parties simultaneously or independently of financial reporting.” This societal reporting generally takes the form of a report and is thus positioned, according to the literature, in two conceptions: either as a means of dialogue between the company and its, stakeholders or as a basis of information to be used by investors to make decisions (Rivière-Giordano, 2007).

According to Gokten et al. (2020), the historical development of sustainability reporting can be summarized in three main stages. A first, pre-standardization stage (1962–1998) marked the conceptual emergence of the field, notably illustrated by the 1989 Exxon Valdez accident, which underscored for the first time the significant financial consequences of corporate environmental impacts for stakeholders. A second, institutionalization stage (1999–2016) saw the establishment of dedicated frameworks, most notably the creation of the Global Reporting Initiative (GRI) in 1999. Finally, a third, post-standardization stage, beginning after 2016, is characterized by the progressive shift from voluntary to mandatory non-financial disclosure, driven by major regulatory developments such as the European CSRD and the IFRS Sustainability standards (IFRS S1 and S2).

This has thrown up new challenges for companies, forcing some of them into questionable practices in a bid to maintain a favorable public image. Such practices include the selective disclosure of information and expressive manipulation of the sustainability data. These correspond concretely to a filtering approach through which companies can emphasize soft and positive information that is unquantifiable, while negative information is hidden. They do this at the expense of the quantitative, quantified data communication, and they give primacy to qualitative data communication (Clarkson et al., 2008; Huang & Huang, 2020). What is more, they frequently resort to wordplay, vague and ambiguous vocabulary, and symbolic expressions in order to exaggerate their sustainability performance (Huang & Huang, 2020). As a result, even if some environmental informations are disclosed, the authenticity and quality of such disclosures are generally poor (Lyon & Montgomery, 2013), hence exposing companies to the risk of greenwashing (Laufer, 2003; Lyon & Montgomery, 2013; Matejek & Gössling, 2014).

Given the growing dynamism of non-financial information, the question of its reliability and transparency becomes crucial. In this context, the role of internal control, traditionally recognized for its importance in the reliability of financial information, has become essential. Indeed, as the Committee of Sponsoring Organizations of the Treadway Commission (COSO) points out, one of the main objectives of internal control is to ensure the reliability of financial information. What's more, a number of studies have shown that companies with higher-quality internal control have less information asymmetry and, consequently, more reliable financial information (Skaife et al., 2013;Lari Dashtbayaz et al., 2019; Rashedi&Dargahi, 2019; Frazer, 2020; Gal &Akisik, 2020;Monteiro et al., 2021). More recently, the COSO 2023 guidance on Internal Control over Sustainability Reporting (ICSR) has explicitly extended this reliability objective to non-financial information, reinforcing the conceptual grounds for considering internal control as a central determinant of non-financial reporting quality.

This relationship can be conceptually grounded, primarily, in agency theory (Jensen & Meckling, 1976), according to which internal control mechanisms are designed to reduce information asymmetry and limit opportunistic behavior between managers and stakeholders, thereby favoring more reliable disclosure. Complementarily, legitimacy theory (Suchman, 1995) and stakeholder theory (Freeman, 1984) help explain why such reliability matters in the first place, as they posit that disclosure quality serves, respectively, to maintain organizational legitimacy and to meet the diverse information needs of stakeholders. while the role of internal control in the reliability of financial information is well established, it is still not well studied regarding non-financial information. Yet, the stakes of reliability are just as high in this field, even more so as regulations and standards pertaining to non-financial information are developing fast. Internal control systems thus have an important role to play in non-financial information, much as they would for financial information. Discovering what has already been published on this emerging subject is therefore an essential step.

The analysis of existing reviews in the literature identifies that in previous studies, factors influencing the quality of non-financial disclosures are grouped into two broad categories, namely: internal and external factors (Hahn &Kühnen, 2013 ; Lagasio&Cucari, 2019; Farisyi et al., 2022; Minutiello&Tettamanzi, 2022; Benvenuto et al., 2023; Saoussany&Kidaye, 2023). These reviews have identified internal factors, including corporate governance structure with regards to board independence, board composition, and board size; firm characteristics in respect of firm size, industry, and ownership structure; and financial characteristics such as financial performance, debt, and profitability. External factors identified include stakeholder pressure and legal and regulatory systems. Other reviews (Samaha et al., 2015) examined the role of mechanisms of control, such as audit committee characteristics, on the quality of non-financial disclosures. However, the particular influence of internal control has not been analyzed in isolation. While other governance mechanisms, such as audit committee characteristics or ownership structure, also play a role in the quality of non-financial reporting, internal control is distinguished by its own specific function: it acts directly on the reliability of information at its source, whereas these other mechanisms intervene further downstream, through supervision or external oversight of that information. Given the direct and normatively grounded link between internal control and information reliability established by the COSO framework, as outlined above, this isolation constitutes a scientifically justified focus on a distinct and specific mechanism. It is all the more essential to shed light on this relationship given its inherently significant nature: the reliability of information is indeed among the primary objectives of internal control, now extending to non-financial information as well as financial information. To the best of our knowledge, no review has synthesized and analyzed all the studies concerning the specific impact of internal control on the quality of non-financial disclosure. Hence, a comprehensive literature review is essential to map and synthesize existing research on this topic, offering a clearer understanding of how the subject has been approached and evolved across studies.

In this context, it is under such a perspective that this article intends to fill this gap, specifically investigating the relationship between internal control and the quality of non-financial reporting. This objective was pursued by performing a systematic literature review. This approach is particularly suited to identifying existing research, assessing the methods used, and highlighting current gaps (Okoli, 2015; Sauer & Seuring, 2023). This is accordingly particularly useful in topics such as this one, which constitutes an emerging area of research. As a literature review focusing exclusively on this relationship, it will enrich the scientific community, on the one hand, by identifying the existing studies, assessing the methods used, highlighting current gaps, and, on the other hand, opening ways for future research in this important area of modern corporate governance.

Finally, the systematic review of the literature will answer the following specific questions:

- *What is the nature of the relationship between internal control and the quality of non-financial reporting?*

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- *What methodological approaches, sectoral focuses, and institutional or geographical contexts characterize existing studies, and what limitations do they present?*
- *What research gaps remain concerning the sectors and institutional contexts examined, and what avenues do these gaps open for future research?*

2. Theoretical framework

This section mobilizes three complementary theoretical frameworks to conceptually justify the relationship between internal control and sustainability reporting quality: agency theory, stakeholder theory and legitimacy theory. Agency theory serving as the primary lens through which the causal mechanism linking internal control to reporting quality is articulated, and the other two perspectives clarifying why this mechanism matters for the firm.

2.1. Agency theory

Agency theory, initially formulated by Jensen and Meckling (1976), is based on the idea that economic relationships are marked by a separation between owners (principals) and managers (agents). This separation generates conflicts of interest and information asymmetry: managers have more complete information than shareholders about the company's actual situation.

Internal control systems have long been studied as a governance mechanism that mitigates these agency problems in the context of financial reporting. Doyle et al. (2007) show that firms with weaknesses in internal control exhibit lower accruals quality, indicating that internal control directly conditions the reliability of the information ultimately disclosed to shareholders. Applying this same logic to sustainability reporting, internal control can be expected to play an equivalent role: by structuring the processes through which non-financial data are collected, verified, and validated, it limits the discretion available to managers and thereby reduces the risk of selective or misleading non-financial disclosure. This is consistent with COSO's own normative positioning, which identifies reliability of information as a core objective of internal control, formally extended to sustainability reporting in the COSO 2023 ICSR guidance.

2.2. Stakeholder theory

Stakeholder theory, introduced by Freeman (1984), challenges the shareholder-centric view of the firm by arguing that management is accountable not only to shareholders but to a broader set of stakeholders (employees, customers, regulators, local communities, and civil society organizations), whose interests must be considered in corporate decision-making. Within this perspective, corporate disclosure, including sustainability reporting, functions as a central communication channel through which firms respond to the differentiated information needs of these stakeholder groups (Gray et al., 1995; Ullmann, 1985).

Applied to the present research object, stakeholder theory explains why the quality of sustainability reporting matters in the first place: if disclosure is meant to genuinely inform stakeholder decision-making rather than merely satisfy a formal obligation, its reliability becomes a condition for the theory's underlying accountability logic to hold. Internal control, by underpinning the integrity of the information-production process, is what allows sustainability reporting to fulfill this stakeholder-accountability function rather than remaining a one-way, unverified communication exercise.

2.3. Legitimacy theory

Legitimacy theory, drawing on the concept of the organizational social contract, posits that firms operate within a system of shared societal norms and expectations, and that their survival depends on maintaining congruence between their activities and these expectations (Suchman, 1995; Deegan, 2002). When this congruence is threatened or perceived to be under threat, firms are theorized to use disclosure including sustainability reporting as a legitimation strategy, aimed at demonstrating conformity with societal values and thereby preserving or restoring their legitimacy. A well-documented risk within this theoretical tradition is that legitimation through disclosure can become symbolic rather than substantive: firms may increase the volume or visibility of their sustainability communication without a corresponding improvement in the underlying non-financial performance it purports to describe a pattern often labelled decoupling or greenwashing in the literature (Lyon & Montgomery, 2013). Internal control is theorized to reduce this risk by acting as an internal safeguard on the accuracy of what is disclosed, thereby supporting a form of legitimacy grounded in verifiable conduct rather than in impression management alone.

These three theories are not competing explanations but complementary lenses on the same phenomenon. Agency theory explains why an internal, firm-level monitoring mechanism such as internal control is needed in the first place to constrain managerial discretion and reduce information asymmetry. Stakeholder theory explains why the resulting information matters beyond the firm's own interests because a broad set of external stakeholders relies on it. Legitimacy theory explains why firms are incentivized to disclose this information at all to maintain social and institutional acceptance. Read together, they justify the central proposition examined in this review: that internal control, as an agency-cost-reducing and information-verifying mechanism, should be expected to enhance the quality of sustainability reporting precisely because that quality is what determines whether reporting can genuinely serve its stakeholder-accountability and legitimation functions, rather than merely their symbolic appearance.

3. Methods

A systematic literature review (SLR) is a rigorous, structured research methodology designed to identify, analyze, and synthesize all relevant scientific studies on a given subject. Its main objective is to provide a complete and objective analysis of the existing literature by answering clearly defined research questions (Farisyi et al., 2022). In management, conducting systematic literature reviews (SLRs) has become a common practice (Kraus et al., 2020). They guide researchers towards new avenues of research (Denyer & Tranfield, 2009; Sauer & Seuring, 2023).

A main element of a systematic review is the literature search. This must be carried out with rigor and reproducibility in order to minimize bias and guarantee the reliability of the results. It lays the solid foundations on which the study's conclusions and recommendations are built (Rethlefsen et al., 2021).

To carry out our systematic literature review, we chose to follow the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines, originally introduced by Moher et al. (2009) and updated by Page et al. (2021) in "The PRISMA 2020 statement: an updated guideline for reporting systematic reviews," considered the benchmark for systematic review reporting. These guidelines offer a general framework for performing reviews, assisting authors in choosing relevant studies.

In line with the guidance from Mateo (2020) titled "Procédure pour conduire avec succès une revue de littérature selon la méthode PRISMA", we have pinpointed several essential steps to guarantee the effectiveness of our systematic review.

3.1. Delineation of the research question:

To structure our literature review and meet the objective of this study, the following research questions are described:

- *How does internal control affect the quality of disclosure of non-financial information?*

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- *To what extent does effective internal control improve the quality of a company's non-financial reporting?*

3.2. Formulation of the search equation:

The first step is to identify the relevant keywords related to the research question. Given that the objective is to examine the impact of internal control on the quality of sustainability reporting, we have broken down our research question into four distinct groups of keywords.

- **Internal control:** For this group, we have used the single term "internal control."
- **Reporting:** To designate the communication of non-financial information, we have used a rich and varied terminology, employing the terms "information," "disclosure," "reporting," and "reports," which are among the most common in the literature.
- **Sustainability:** We began by using the terms "sustainability" and "non-financial." During an initial analysis of works in the literature, we identified the most frequent terms used by researchers to designate reports that go beyond financial results, including environmental and social aspects. To maximize the chances of finding a wide range of articles, we included the following terms: "non-financial," "sustainability," "environmental," "corporate environmental," "green," "corporate social responsibility," and "environmental, social, and governance."
- **Quality:** This group encompasses the terms "quality," "accuracy," "transparency," and "credibility" to capture this dimension.

Groups of keywords were then combined using the Boolean operators "**AND**" and "**OR**" to create a complete search string.
The final search equation is:

("internal control") AND ("non-financial" OR "sustainability" OR "environmental" OR "corporate environmental" OR "green" OR "social responsibility" OR "environmental, social, and governance") AND ("information" OR "disclosure" OR "reporting" OR "reports") AND ("quality" OR "accuracy" OR "transparency" OR "credibility")

3.3. Definition of inclusion and exclusion criteria:

During the selection process, the main criterion was that articles should articulate the relationship between internal control and sustainability reporting; they should explicitly study the impact of internal control on the quality of non-financial disclosure.
Secondly, in order to focus on recent work and capture recent developments in the field, only articles published from 2014 onwards were considered. This choice is justified by the adoption of new regulatory requirements and the evolution of corporate practices in terms of internal control and non-financial reporting over this period. Furthermore, as the field of research is relatively recent and most of the relevant articles are recent publications, the number of citations was not used as an inclusion or exclusion criterion. Using this criterion would have resulted in an insufficient number of articles for the literature review.
Finally, to ensure rigorous evaluation by the authors, only articles published in English, Arabic, or French were considered.

3.4. Identification of studies:

To identify relevant articles for our literature review, we used our search equation described above and carried out an in-depth search of two major bibliometric databases, recognized internationally by researchers: SCOPUS and Web of Science. These databases provide access to numerous peer-reviewed journals that include many scientific specialties. The obtained references were then exported into Zotero reference management software. This allowed us to view all articles together, as well as remove any identical ones and navigate through the articles in order to select them more carefully.

3.5. Selection of studies:

Based on the defined eligibility criteria, we explored the titles, abstracts, and keywords of the retrieved articles. This initial analysis enabled us to identify a restricted set of articles potentially relevant to our literature review.

3.6. Evaluation of eligibility:

To refine our selection, we carried out an in-depth reading of the selected articles. This detailed analysis covered the entire text, in particular the introduction, methodology, results, and discussion. Following this thorough reading, only those articles that fully met all the inclusion criteria were selected for the remainder of our literature review.

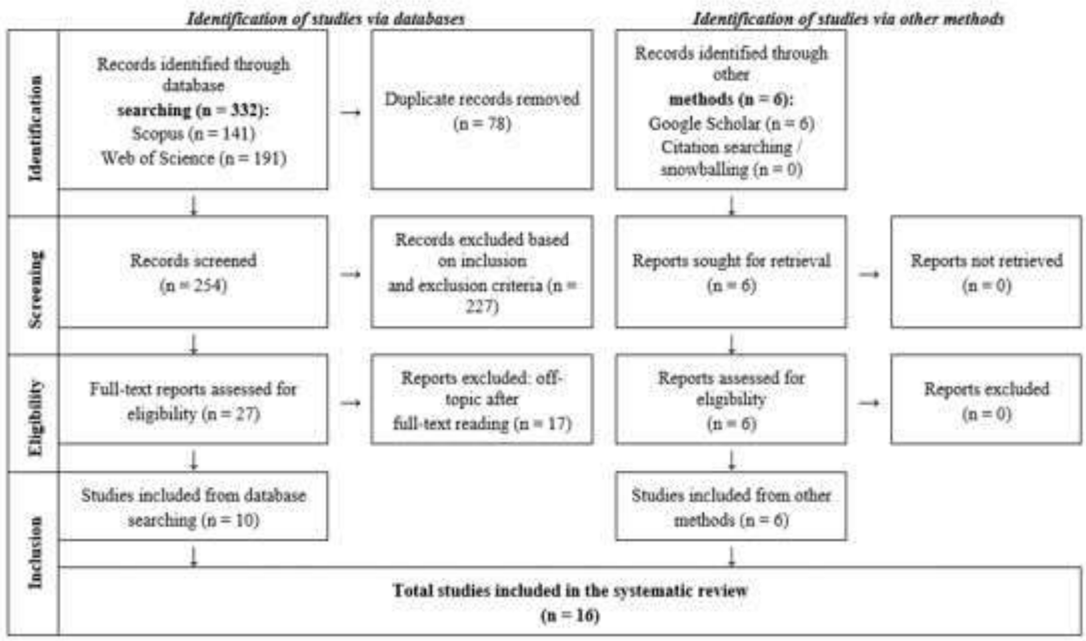
3.7. Inclusion of studies:

At the end of this rigorous evaluation process, we obtained a final set of high-quality, relevant articles for our literature review. These articles were then analyzed in detail to extract relevant data and meet our research objectives. Given the limited number of articles found due to the recent nature of the subject, we conducted an informal and complementary search on Google Scholar. This platform, renowned for its particularly broad and inclusive coverage, enabled us to discover 6 additional relevant articles that were not present in the databases initially consulted. The total number of articles included in the analysis is 16.

3.8. Complementary snowballing search:

In addition to the database-based search, a bidirectional snowballing strategy was employed, consisting of examining both the references cited (backward) by the 16 selected studies and the publications citing them (forward, via Google Scholar). This complementary step did not identify any new studies meeting the inclusion criteria: the relevant articles thus identified were already present in the initial corpus, and the few additional references identified were written in Chinese, thereby not meeting the language inclusion criterion. This dual verification confirms the saturation and robustness of the corpus constituted from the bibliometric databases.
The stages of the systematic literature review are presented exhaustively in the following figure:

Figure 1. Flowchart PRISMA



Source: Authors, adapted from Page et al. (2021)

3.9. Methodological quality assessment:

To ensure the methodological rigor of this systematic review, the entire article selection process was carried out by two researchers, with any disagreements resolved through discussion. Furthermore, the methodological quality of the 16 included studies was assessed using the Mixed Methods Appraisal Tool (MMAT) version 2018 (Hong et al., 2018), a validated instrument that appraises the quality of quantitative, qualitative and mixed methods studies according to five criteria specific to each study design. The majority of the studies (15 out of 16), being descriptive quantitative in nature, were evaluated using the criteria of Section 4 of the MMAT, while the study by Xu et al. (2023), which mobilized a qualitative comparative approach, was assessed using the criteria of Section 1. Each study was evaluated based on the information available in the articles, with binary responses (Yes/No) for each criterion. The final score, on a scale from 0 to 5, reflects the number of criteria satisfied according to the following scale:

- 5/5 = Excellent methodological quality (all criteria met)
- 4/5 = High quality (one criterion not met or unclear)
- 3/5 = Moderate quality (two criteria not met or unclear)
- 2/5 or less = Low quality (several criteria not met or unclear)

The results of this assessment, presented in Appendix 1, show that the majority of the studies (13 out of 16) exhibit high methodological quality (score ≥ 4/5), while three studies exhibit moderate quality (score of 3/5), mainly due to limitations related to sample size or sampling method. Overall, no study obtained a score below 3/5. This indicates that the overall methodological quality of the corpus is satisfactory, and that no study presents major methodological weaknesses that could undermine the validity of the conclusions of this systematic review.

4. Results and analysis:

4.1. Characteristics of included studies:

As the table below shows, the majority of publications on the subject date from recent years, with a relatively stable scientific output. In fact, the number of annual publications varies around three or four per year, testifying to a growing interest in studying the relationship between internal control and sustainable disclosure. Research focuses mainly on original articles, with only one conference publication listed. China is the country of origin of the majority of studies, underlining the importance of this theme in this context.
In total, this corpus of 16 studies is temporally concentrated between 2019 and 2024, with one study published in 2019, four in 2020, two in 2021, two in 2022, four in 2023, and three in 2024. China accounts for 10 of the 16 studies (62.5%), while the remaining six are distributed across Indonesia, Egypt, South Korea, Portugal, Iran, and Iraq.

Table1. Summary table of researches included on the relationship between internal control and sustainability reporting

Authors	Title	Journal/conference	Country	Publication date
Setiawanta & Purwanto	Stakeholder Power, Sustainability Reporting, And Corporate Governance: A Case Study Of Manufacturing Industry At Indonesia's Stock Exchange.	Scientific Papers of the University of Pardubice, Series D: Faculty of Economics and Administration	Indonesia	2019
Wu & Bu	Institutional environment, internal control and corporate social responsibility disclosure quality: evidence from China.	Int. J. Applied Decision Sciences	China	2020
Tan et al	Impact of Carbon Emission Trading System Participation and Level of Internal Control on Quality of Carbon Emission Disclosures: Insights from Chinese State-Owned Electricity Companies.	Sustainability	China	2020
Huang & Huang	Does Internal Control Contribute to a Firm's Green Information Disclosure? Evidence from China.	Sustainability	China	2020
Khlif et al	Internal control quality and voluntary disclosure: does CEO duality matter?	Journal of Applied Accounting Research	Egypt	2020
Xie	An Empirical Study on the Relationship between the Effectiveness of Internal Control and the Quality of Environmental Information Disclosure.	21 4th International Conference on Global Economy, Finance and Humanities Research (GEFHR 2021)	China	2021
Lee et al	Voluntary Disclosure of Carbon Emissions and Sustainable Existence of Firms: With a Focus on Human Resources of Internal Control System.	Sustainability	South Korea	2021
Monteiro et al	The impact of information systems and non-financial information on company success.	International Journal of Accounting Information Systems	Portugal	2022
Huang et al	Impact of internal control quality on the information content of social responsibility reports: A study based on text similarity—Evidence from China.	International Journal of Accounting Information Systems	China	2022
Xu et al	How can Chinese companies improve the quality of their corporate social responsibility information disclosure? A cross-level confgurational approach.	Journal of Cleaner Production	China	2023
Nematnezhad et al	Investigating the effect of the quality of internal control on the information content of social responsibility in companies listed on the Tehran Stock Exchange.	International Journal of Resistive Economics	Iran	2023
Muhammad et al	The impact of the quality of internal control on the information content of corporate social responsibility reports: An exploratory study of the opinions of a sample of internal auditors in Iraqi companies.	The Tikrit Journal of Administrative and Economic Sciences	Iraq	2023

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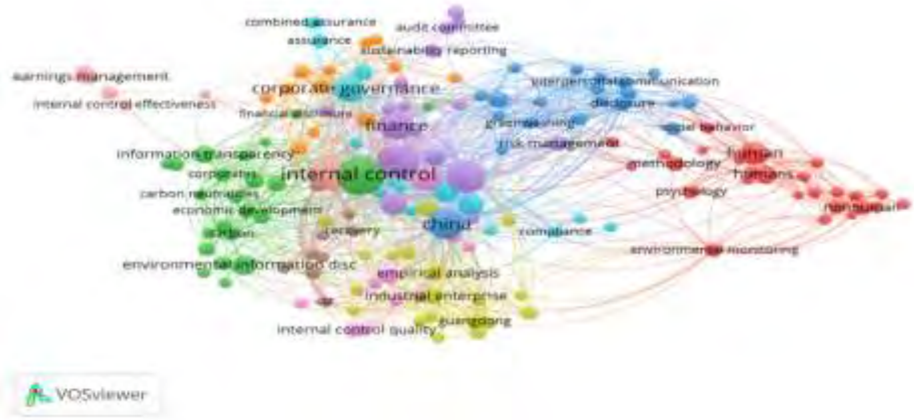
Wang & Hu	An empirical study on the relationship between the internal control effectiveness and the quality of environmental information disclosure: public data from listed companies in China's oil and gas industry.	Journal of Computing and Electronic Information Management	China	2023
Pasko et al	Does internal audit matter? Audit committee, its attributes, and corporate social responsibility reporting quality.	Investment Management and Financial Innovations	China	2024
Zhang et al	Media pressure, internal control, and corporate environmental information disclosure.	Finance Research Letters	China	2024
Yan et al	Does internal control improve enterprise environmental, social, and governance information disclosure? Evidence from China.	Corporate Social Responsibility and Environmental Management	China	2024

Source: Authors

Figure. 2. Thematic clusters of keyword co-occurrences in research on internal control and sustainability reporting.



Source: Authors' elaboration using VOSviewer

This figure shows a bibliometric network map developed using VOSviewer software, commonly used to visualize term co-occurrences for scientific literature. In our case, we used VOSviewer to map the co-occurrence of keywords located in the reviewed published documents. Each node in the map identifies a keyword; the size of the node reflects the number of times it appears in published research. The connections between nodes indicate strong correlations. Nodes were grouped into color-coded clusters; all nodes in each cluster had some degree of connection, representing a thematic area. This visualization highlights several important points:

- The central position of the concept "internal control" and the prominence of environmental topics reflect the evolution of management practices toward sustainability. The proximity between "internal control" and "sustainability reporting" suggests a close conceptual link between the two.
- The term "corporate governance" is closely linked to both "internal control" and "audit committee", confirming the role of governance structures in overseeing non-financial reporting.
- The presence of terms like "China" and "Guangdong" suggests that research on this topic is particularly focused on emerging economies, especially within that geographic region.
- Keywords such as "environmental information disclosure" and "carbon neutrality", when connected to "internal control", highlight the importance of control systems in ensuring the reliability of environmental information.
- The link between internal control, risk management, and greenwashing shows that internal control helps reduce risks related to sustainability.
- Finally, the appearance of terms like "empirical analysis" and "methodology" emphasize the relevance of empirical approaches in examining the connection between internal control and the quality of sustainability disclosures.

4.2. Research perspectives on the interaction between internal control and sustainability reporting: direct, multifactorial, and mediating relationships.

Our literature review shows three main ways to look at the link between internal control and sustainability reporting.

First, some studies explore how internal control directly affects the quality of non-financial reporting (group 1). Secondly, other studies have explored the effect of internal control by

considering it as one of many factors influencing the quality of non-financial reporting (group 2). Finally, a last category of studies adopted a more complex perspective, analyzing internal control as a mediator in the relationship between non-financial reporting and other variables (group 3).
The table below provides a concise overview of the articles analyzed, organized by group, focusing on their respective issues.

Table 2. Overview of main articles issues categorized by Group

Group	**Number of studies**	**Authors**	**main research question**
Group 1: Articles examining the direct impact of internal control on sustainability reporting.	5	Huang & Huang, 2020	How can internal controls within Chinese companies, particularly those operating in highly polluting sectors, influence the disclosure of environmental information?
		Xie, 2021	To what extent does the effectiveness of internal control influence the quality of environmental reporting of Chinese listed companies, particularly those with high levels of pollution, and how does this relationship vary according to the structure of the company (public or private)?
		Nematnezhad et al., 2023	Does internal control quality matter for the information content of economic, social, and environmental dimensions of corporate social responsibility reports of Iranian companies?
		Muhammad et al., 2023	Does the quality of internal control affect the information content of corporate CSR reports of Iraqi companies?
		Wang & Hu, 2023	What impact does effective internal control have on the quality of environmental disclosure in the oil and gas industry in China?
Group 2: Articles investigating the interplay between internal control and additional explanatory variables influencing the quality of sustainability reporting.	8	Setiawanta & Purwanto, 2019	How is CSR reporting influenced by government control, audit control, shareholder control, and internal control in the context of the manufacturing industry in Indonesia?
		Wu & Bu, 2020	Do internal control, the legal governance environment, as well as the regional governance environment, have a great influence on the quality of CSR communication in China?
		Tan et al., 2020	What impact does participation of Chinese state-owned power companies in the Carbon Emissions Trading System (CN-ETS) and the level of internal control have on the quality, transparency, and reliability of carbon emissions reporting information?
		Khlif et al., 2020	Does internal control affect corporate transparency through voluntary disclosure in emerging markets, particularly in Egypt? Which influence does CEO duality have upon this relationship?
		Huang et al., 2022	How does the quality of internal control impact the quality and quantity of the information content of social responsibility reports of Chinese companies, particularly with regard to the textual similarities observed between these reports, and how do agency costs moderate this relationship?
		Xu et al., 2023	How do the interactions between different factors: contextual like regulations and media attention, organizational such as internal control and company structure, and managerial traits like age, gender, education, experience, and CSR focus, influence the quality of CSR disclosure by Chinese companies?
		Pasko et al., 2024	How do internal control systems, the size of the audit committee, the proportion of independent directors on the audit committee, and the frequency of audit committee meetings affect the quality of CSR information provided by Chinese companies?
		Yan et al., 2024	What influence do the quality of internal control and media monitoring have on the quality of environmental, social, and governance information provided by Chinese companies, and how can media monitoring moderate this relationship?

Group 3: Articles exploring the mediating role of internal control in the relationship between sustainability reporting and other variables.	3	Lee et al., 2021	What is the connection between market value and a company's voluntary disclosure of its carbon emissions, and how may internal control mediate this relationship (by maintaining transparency of information) in the context of Korean companies?
		Monteiro et al., 2022	How do the quality of the internal control system and the quality of the accounting information system influence the quality of non-financial information, and how do these elements affect the Portuguese companies' success (decision-making success and non-financial performance)?
		Zhang et al., 2024	How does media pressure influence the disclosure of corporate environmental information by Chinese companies, and how can internal control mediate this relationship by improving the completeness and accuracy of such disclosure?

Source: Authors

4.3. Analysis of the main research variables: internal control/sustainability reporting:

This table presents the main variables studied (internal control and sustainability reporting) and the data collection methods used by the various authors.

The data reveal marked diversity in the approaches used to measure internal control and sustainability reporting. For internal control, all Chinese studies rely on the Shenzhen Diebold index, while other contexts employ questionnaires, audit report analysis, or original measures such as the number of dedicated staff. For sustainability reporting, content analysis of CSR reports predominates, but alternative approaches such as ESG rating systems or textual analysis are also used.

More specifically, each study uses a specific term (IC, ICI, LCE, ICQ, etc.) to designate the internal control quality index. Data collection methods can be broken down as follows: for internal control, the majority of studies (10 out of 16) rely on indices derived from specialized databases (Shenzhen Diebold), while the remaining studies employ questionnaires (3 studies), analysis of audit reports (1 study), or original measures such as the number of dedicated staff (1 study) or content analysis (1 study). For sustainability reporting, content analysis of sustainability reports predominates (8 studies), followed by ESG rating systems such as Rankins, HEXUN, or Sino-Securities (4 studies), questionnaires (3 studies), and other techniques such as textual similarity analysis (1 study).

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Table 3. Studied variables and data collection methods

Authors	Term used for the internal control variable	Data collection method	Term used for the sustainability reporting variable	Data collection method
Setiawanta & Purwanto, 2019	**IC**	**Report content analysis:** This variable was measured by calculating the ratio of actual disclosure to total possible disclosure.	**SRI** (Sustainable Development Reporting)	**Report content analysis:** the amount of disclosure in sustainability reports was used as a measure of this variable.
Wu & Bu, 2020	**ICI**	Measured using the internal control index provided by the Shenzhen Diebold database.	**CSRDI** (CSR disclosure quality)	**The Rankins CSR Ratings Database (RKS):** in this study, the CSR disclosure scores of listed companies in China are extracted from this database, which uses a structured evaluation system based on various indicators and several aspects, such as content, technique, and industry.
Tan et al., 2020	**LCE**	Measured using the internal control index provided by the Shenzhen Diebold database.	**QCDI** (quality of carbon emission declarations)	**Content analysis of CSR reports:** to identify 18 elements of carbon emissions declarations, the quality of these declarations was evaluated on a scale of 0 to 3 according to the level of detail of the information: 1 point for general disclosure, 2 points for non-quantitative disclosure (with words but no figures), and 3 points for quantitative disclosure (with precise figures). The sum of the scores obtained was then divided by the maximum possible score.
Huang & Huang, 2020	**ICR**	Measured using the internal control index provided by the Shenzhen Diebold database.	**Green** (level of greening)	**Content analysis of CSR reports:** The authors used a system of indicators made up of 20 questions grouped into four categories. For each question, the authors assign a value of 1 if the item is present or respected and 0 if the item is not respected or absent. The scores obtained from the content analysis are used to evaluate two aspects: Selective disclosure (GWLs), which measures the amount of information disclosed in relation to what should be disclosed, and expressive manipulation (GWLe), which assesses the quality of the information disclosed, distinguishing between substantial and symbolic. Then, GWLs and GWLe are combined using the geometric mean to calculate the level of greenwashing (GWL). Finally, the authors deduced the greening level (GREEN) from GWL.

Khlif et al., 2020	**ICQ**	The authors performed a survey, through a **questionnaire** distributed to external auditors, selected due to their profound knowledge about the internal control systems of the audited companies. They used a checklist already developed in the literature composed of 23 items divided in several categories like organization, risk management, global monitoring, and IT functions. Each item was rated on a scale of 1 to 3, where 1 means "not effective", 2 "moderately effective" and 3 "very effective". The ICQ score was calculated by taking the average of the scores given by auditors for the 23 items, giving a final score ranging from 1 to 3. The authors also applied two regression models. In the first, ICQ is treated as a continuous variable. In the second, it was transformed into a binary variable. Companies were then classified into two groups: those with ICQ above the median and those without.	**DS** (Voluntary Disclosure Score)	**Content analysis of CSR reports:** the authors used an index of 80 headings developed from existing literature on disclosure in Egypt. Each item was coded according to its presence (1) or absence (0) in the reports. The disclosure score is calculated by dividing the total number of items disclosed by the total number of possible items.
Xie, 2021	**ICE**	Measured using the internal control index provided by the Shenzhen Diebold database.	**EDI** (quality of environmental information disclosure)	**Content analysis of CSR reports:** by assigning scores to different elements (8 themes) such as environmental management, pollutant emissions, or energy consumption, each heading was coded according to the theme concerned. For example, for the theme of environmental management, the scoring is as follows: detailed description (2), general description (1), or absence (0). The disclosure score is calculated by dividing the total number of items disclosed by the total number of possible items.

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Lee et al., 2021	**IC**	Measured using specific data on the personnel in charge of internal control systems within companies, the authors employed a particular methodological approach, analyzing both the number of people working in companies' internal control departments (accounting, finance, and IT) and the average work experience of IC personnel measured in months. These data were obtained from reports by the Financial Supervisory Service (FSS) in Korea, which provides information on the human resources of internal control systems.	**Disclosure** (voluntary disclosure of carbon emissions)	**Company responses to Carbon Disclosure Project questionnaires (CDP questionnaires),** in which companies participate on a voluntary basis, provide responses to assess the quality and quantity of information disclosed on carbon emissions.
Monteiro et al., 2022	**ICSQ**	**Questionnaire:** drawn up and distributed to managers of Portuguese companies. The questions were organized into several sections, particularly for the internal control variable. The authors used measurement scales adapted from previous studies to assess this dimension. Responses to questionnaire items were measured on a 5-point Likert scale, ranging from "strongly disagree" (1) to "strongly agree" (5).	**NFIQ** (quality of non-financial information)	**Questionnaire:** developed and distributed to managers of Portuguese companies. The questions were organized into several sections, particularly for the variable of non-financial information. The authors used measurement scales adapted from previous studies to assess this dimension. Responses to questionnaire items were measured on a 5-point Likert scale, ranging from "strongly disagree" (1) to "strongly agree" (5).
Huang et al., 2022	**ICQ**	Measured using the internal control index provided by the Shenzhen Diebold database.	**Similarity** (the similarity between the texts of social responsibility reports for different periods)	**Analysis of textual similarity between reports:** the authors resort to automatic methods for natural language processing and text analysis within social responsibility reports. They converted each report into a set of numerical vectors, which corresponded to the frequencies of words inside a document. The TF-IDF technique was used to weight the importance of each word in the calculation of these vectors. The cosine similarity was used to compare these vectors against each other, thus quantifying the similarity of the various reports.
Xu et al., 2023	**Cont**	Measured using the internal control index provided by the Shenzhen Diebold database.	**CSRD** (Corporate Social Responsibility Index)	**The Rankins CSR Ratings Database (RKS):** in this study, the CSR disclosure scores of listed companies in China are extracted from this database, which uses a structured evaluation system based on various indicators and several aspects, such as content, technique, and industry.

Nematnezhad et al., 2023	**IC**	**Content analysis of company audit reports:** obtained using an index based on the weaknesses identified in companies' internal control systems, the authors have used an index that assigns a binary value (0 or 1) to measure the quality of internal control. If a company has at least one weakness, it receives a value of 1; if no weakness is identified, the value is 0.	**EC** (economic dimension), **SO** (social dimension), **EN** (environmental dimension)	**Content analysis of CSR reports:** The authors calculated a disclosure score by comparing the number of items actually disclosed by companies with the total number of expected items, according to an analysis grid established from the literature (the economic dimension with 5 components, the social dimension with 7 components, and the environmental dimension with 5 components).
Muhammad et al., 2023	**The quality of internal control**	**Questionnaire:** administered to accountants and auditors from Iraqi companies. Internal control was represented in the questionnaire by 12 statements, covering the most important aspects of internal control quality as identified in the literature.	**The content of economic information The content of social information The content of environmental information**	**Questionnaire:** distributed to Iraqi accountants and auditors, it includes 12 statements divided into 3 categories (economic, social, and environmental) based on existing literature, 4 statements per category.
Wang & Hu, 2023	**ICI**	Measured using the internal control index provided by the Shenzhen Diebold database.	**EDI** (Environmental Information Disclosure Index)	**Content analysis of CSR reports:** assigning 16 elements to environmental disclosure. The data was normalized as follows to obtain the final disclosure index: In terms of significance and comparability. 1 point for yes and 0 for none. In terms of adequacy. 1 point for qualitative disclosure only, 1 point for quantitative disclosure only, 2 points for qualitative and quantitative disclosure, and 0 points for no disclosure. The sum of all these scores was then divided by the maximum possible score.
Pasko et al., 2024	**IC**	Measured using the internal control index provided by the Shenzhen Diebold database.	**CSR** (social responsibility score)	**The social responsibility score provided by the HEXUN system:** This system evaluates companies according to 5 dimensions: shareholders, employees, customers, environment, and society.
Zhang et al., 2024	**ICQ**	Measured using the internal control index provided by the Shenzhen Diebold database.	**EM** (Value of the score for the content of the company's environmental information disclosure)	**Content analysis of CSR reports:** based on various aspects such as environmental policies, environmental management systems, environmental risk disclosure, and environmental performance, Values were assigned as follows: a value of 0 for companies providing no relevant environmental information, a value of 1 for companies providing only textual descriptions, and a value of 2 for companies providing both textual and quantitative descriptions. These scores were aggregated to calculate the environmental disclosure index.

Yan et al., 2024	**ICI**	Measured using the internal control index provided by the Shenzhen Diebold database.	**ESG** (disclosure of environmental, social and governance information)	**Sino-Securities ESG Rating System:** this system evaluates the ESG performance of companies according to a three-level rating system, ranging from AAA (best performance) to C (worst performance). The numerical values assigned to the different categories range from 9 to 1, respectively.

Source: Authors

** Shenzhen Diebold is an authoritative professional provider of internal control data in China. It has developed internal control indices, combined with the 2013 internal control integration framework published by COSO (the five components) and its guidelines, as well as relevant standards and systems published by the Ministry of Finance and the China Securities Regulatory Commission (Huang & Huang, 2020).*

4.4. Analysis of the research methodologies in selected empirical studies

Table 4 synthesizes the methodological profile of the 16 included studies, covering the research design adopted, the samples and sectors studied, the analysis periods, the control variables mobilized, and the reported relationship between internal control (IC) and sustainability reporting (SR), along with any additional nuanced findings. Taken together, these elements provide a structured overview of how the relationship between internal control and sustainability reporting has been empirically investigated to date.
The table shows a predominance of quantitative studies (15 out of 16), in particular multiple linear regressions, against a single qualitative study.
The studies are based on listed companies from a range of sectors, from manufacturing and electricity sector to polluting industries.
In total, nearly all studies from the analysis (15 out of 16) show a positive relationship between internal control effectiveness and CSR disclosure. This means that companies with robust internal control systems are more likely to improve their transparency and communication on these aspects.
However, some of the studies mention nuances on this relationship, like the moderating effect of CEO duality, media attention, or industry.
The control variables employed in these articles serve primarily to neutralize the influence of other factors likely to affect both internal control and the quality of non-financial disclosure. The variables most frequently used by the authors include company size, profitability, financial leverage, and growth, as well as governance characteristics such as ownership concentration and the presence of independent directors. In fact, company size, reflects the assumption that larger companies, with their greater resources, are more likely to disclose ESG information. Profitability is also often taken into account, as more profitable companies may have more means to improve their social or environmental responsibility practices. Financial leverage, suggesting that the authors aimed to control for the impact of capital structure on disclosure. Company growth as an indicator of performance and development can also affect disclosure practices. Finally, concentration of ownership and the presence of independent directors are key features of corporate governance structures. These elements influence management decisions, including those relating to the disclosure of ESG information.

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Table 4. Summary of the research methodologies of the empirical articles analyzed

Authors	Methodology adopted	Data analysis techniques	Sample	Industry	Period	Control variables	IC/SR relation	Additional results
Setiawanta & Purwanto, 2019	Quantitative study	Multiple linear regression	companies listed on the Indonesian Stock Exchange (60 Observations).	Manufacturing industry	2007-2016	company size	Negative	
Wu & Bu, 2020	Quantitative study	Multiple linear regression	companies listed on the Shanghai and Shenzhen stock exchanges (2095 companies).	-	2011-2015	company size, return on equity, financial leverage, company status, temporal control variables (year), sectoral control variable (business sector)	Positive	Institutional environment has a limited impact on the relationship between internal control and CSR disclosure. However, a strong regional environment significantly enhances the positive effect of internal control on CSR disclosure.
Tan et al., 2020	Quantitative study	Multiple linear regression	356 observations from Chinese state-owned enterprises.	Electrical industry	2012-2018	company size, size of board of directors, position of CEO, profitability, solvency growth, external auditor (BIG4)	Positive	Stronger effect in central government-owned companies than local ones.
Huang & Huang, 2020	Quantitative study	Multiple linear regression Quantile regression	A-listed companies in China's financial market, a total of 1603 observations.	The most polluting industries	2010-2016	level of regional economic development, company size, profitability, financial leverage, growth, losses. presence of Chairman as CEO, ratio of independent directors. individual share performance, industry variable, year variable.	Positive	Positive correlation between internal control and sustainability reporting quality (at the 25% and 75% quantiles). Negative impact of internal control deficiencies on sustainability reporting. Stronger effect in public companies. Positive impact of components: control environment and communication. Modest impact of external pressures (fines, media, foreign investors).
Khlif et al., 2020	Quantitative study	Multiple linear regression	64 EGX-listed companies, representing a sample of 512 company observations.	-	2007-2014	company size, ownership dispersion, board size, board independence, debt ratio, profitability, industry type.	Positive	CEO duality weakens the positive relationship between internal control and voluntary disclosure.

Xie, 2021	Quantitative study	Multiple linear regression	173 listed companies (A-share) with 428 observations values.	Heavy pollution industry	2017-2019	company size, location of listing, leverage, concentration of ownership, independence of directors, return on equity.	Positive	The positive effect of this relationship is more pronounced in private companies.
Lee et al., 2021	Quantitative study	Multiple linear regression	Companies responding to the Carbon Disclosure Project and having implemented an internal control system (total of 734 companies).	Different sectors	2014-2019	company size, leverage, return on assets, discretionary accruals, growth, percentage of shares held by foreign investors, industry dummies, year dummies.	Positive	
Monteiro et al., 2022	Quantitative study	Structural Equation Analysis (SEM)	381 observations obtained from questionnaires sent out to 7812 Portuguese companies.	-	March 2 to 31, 2020	-	Positive	
Huang et al., 2022	Quantitative study	Multiple linear regression Quantile regressions	companies listed on the A share market (1151 company observations).	-	2006-2017	growth, company size, level of debt, return on assets, market ratio, share held by largest shareholder, management ownership ratio.	Positive *(or negative correlation between ICQ and the textual similarity of CSR reports)*	The quality of internal control (ICQ) helps reduce agency costs, partially mediating its positive influence on CSR report content. The influence of ICQ on content diversification is more pronounced where CSR disclosures show lower similarity, and diminishes as the level of similarity increases. Significant effect of ICQ on reducing similarity in large firms; non-significant for SMEs. High media attention amplifies the positive impact of ICQ on CSR reports.
Xu et al., 2023	Qualitative study	Qualitative Configuration Analysis QCA (fsQCA fuzzy-set Qualitative Comparative Analysis)	798 listed companies in China.	-	2019	-	Positive	
Nematnezhad et al., 2023	Quantitative study	Multiple linear regression	87 companies listed on the Tehran Stock Exchange.	-	2016-2021	financial leverage, market to book value, return on assets, company size.	Positive	

Muhammad et al., 2023	Quantitative study	Simple linear regression	Sample of 57 accountants and auditors working in Iraqi companies.	-	-	-	Positive	
Wang & Hu, 2023	Quantitative study	Multiple linear regression	13 A-listed companies on the Chinese capital market.	The oil and gas industry	2016-2020	concentration of company equity, financial leverage, profitability, company size, company value.	Positive	
Pasko et al., 2024	Quantitative study	Multiple linear regression	companies listed in A shares on the Shanghai and Shenzhen stock exchanges (2613 observation data).	-	2010-2019	board size, proportion of independent directors, company size, leverage, return on assets, growth, loss.	Positive	The quality of internal control has a more significant impact on CSR disclosure in companies where the CEO and Chairman of the Board are not the same person.
Zhang et al., 2024	Quantitative study	Multiple linear regression	355 listed companies in China (2,840 valid samples).	High-pollution sectors	2015-2020	company size, debt ratio, proportion of independent directors, return on assets, equity concentration, years of listing, management power, industry, year.	Positive	Internal control emerges as a key mediator; media pressure stimulates better internal control, which in turn promotes more reliable environmental disclosure.
Yan et al., 2024	Quantitative study	Multiple linear regression	1,369 companies listed on China's A market (1,797 observations).	-	2009-2021	company size, size of board, independence of board, debt ratio, return on total assets, price/value ratio, CEO/Chairman duality, ownership concentration, shareholder balance, solvency, operational capacity, development capacity, company age, observation year, business sector.	Positive	Media attention reinforces the positive effect of internal control on ESG disclosure. Using internal control audit variable confirms robustness by limiting self-assessment bias. Internal control impacts governance performance most, followed by social and lastly environmental performance. Greater impact on ESG disclosure in private companies than in public ones. Proactive, ethical leaders enhance transparency and accountability in ESG disclosure. Companies in regions with stricter regulations (e.g., eastern China) disclose better ESG data than those in central regions.

Source: Authors

5. Discussion

This systematic review reveals a consistent finding across the included studies: a positive relationship between internal control and sustainability reporting quality. The following sections discuss the theoretical contributions of this work, identify gaps in the literature, and outline implications for practice and future research, including specific recommendations for companies, regulators and auditors.

5.1. Theoretical contributions and positioning relative to prior reviews

This review provides theoretical insights into the link between internal governance and non-financial communication. By mobilizing agency theory as its main framework, this synthesis confirms, across all the studies analyzed, that internal control acts as a mechanism for reducing information asymmetry between managers and stakeholders. This role, already well established in the field of financial information, now extends to that of non-financial information. In line with legitimacy and stakeholder theories, this synthesis also clarifies why this reduction of information asymmetry matters: companies use sustainability reporting as a tool to maintain their organizational legitimacy and respond to the informational expectations of their various stakeholders, and internal control precisely strengthens the quality of this reporting. This review thus offers theoretical articulations between internal control, information reliability and non-financial communication, paving the way for future research that more systematically mobilizes these conceptual frameworks.

This review also extends the theoretical framework mobilized by previous reviews. While earlier systematic reviews (Hahn & Kühnen, 2013; Lagasio & Cucari, 2019; Farisyi et al., 2022; Minutiello & Tettamanzi, 2022; Benvenuto et al., 2023; Saoussany & Kidaye, 2023) have examined the broader determinants of sustainability reporting (corporate governance mechanisms, ownership structure, board characteristics, external pressures), this study offers a finer understanding of how internal control, as a specific governance mechanism acting on the reliability of non-financial information, influences the quality of this communication. This focus does not substitute for these works but complements them by deepening a factor they had only touched upon, thus contributing incrementally to a finer understanding of the governance-reporting relationship.

5.2. Gaps in literature and future research directions

The study of the relationship between internal control and the quality of sustainability reporting is a major research challenge, both because of its current relevance and because of its practical implications for companies, auditors, and regulators. Although this field is of growing importance, it suffers from a notable lack of in-depth investigation, offering researchers a unique opportunity to enrich scientific literature.

Existing literature, still in its infancy, is largely focused on the Chinese context, where environmental and social issues are particularly pressing. It is therefore essential to extend the field of research to other regions of the world in order to generalize the results obtained and contribute to international debates on the reliability of non-financial information. Comparative studies would also provide a better understanding of the impact of national regulations on this relationship by comparing the experiences of countries that have set up specific regulatory frameworks for non-financial reporting with those of less-regulated countries.

Beyond geographical expansion, another gap concerns the need to identify which specific components of internal control have the greatest effect on sustainability disclosure. Most studies fail to pinpoint the specific impact of each internal control component. This is a crucial question, however, if efforts to improve internal control practices are to be better directed and their positive impact on the transparency of non-financial information maximized. The study by Huang and Huang (2020) represents a step forward. By studying the impact of the five

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internal control factors as identified by COSO, the authors confirm that specific elements, such as an adequate control environment and communication and information, provide a more significant positive impact on environmental disclosure. Undoubtedly, more specific studies in this direction are needed in different contexts and sectors.
Furthermore, the current literature, which takes a global approach to CSR, fails to grasp the specific mechanisms by which internal control influences the various dimensions of non-financial performance. With the exception of the study by Yan et al. (2024) which demonstrated that internal control exerts its most significant influence on corporate governance performance, followed by social responsibility and then environmental performance, other research tends to treat CSR in a global manner. They do not specifically examine the heterogeneous impacts of the different dimensions of CSR (environmental, social, and governance). This gap has important practical implications, as it limits the ability to design control systems tailored to the specific challenges of each dimension. Future research should therefore delve deeper into the analysis of the impact of internal control on different sustainability dimensions, taking into account sector specificities and varied institutional contexts.

5.3. Managerial and regulatory implications

Beyond its theoretical and empirical contributions, this systematic review carries significant practical implications for various stakeholders.
For companies, the positive relationship between internal control quality and sustainability reporting quality suggests that investments in internal control systems are not merely compliance-driven expenses, but strategic assets that enhance transparency and stakeholder trust. Managers should therefore view internal control as a value-creating function, particularly in a context where stakeholders increasingly demand reliable non-financial information. Concretely, this means orienting internal control systems toward sustainability issues and transposing best practices already proven in the financial domain to the processing of non-financial data. This is not about starting from scratch, but about adapting and extending existing mechanisms to cover the entire sustainability information production cycle, from collection to publication.
For regulators and standard setters, the findings of this study argue in favor of strengthened internal control requirements within regulatory frameworks for non-financial reporting. Specifically, regulators should require companies to implement internal control systems dedicated to the production of sustainability information, and to ensure their reliability through independent audits, similar to what is already required for financial information. Recent reforms such as the CSRD in Europe are moving in this direction, but this requirement needs to be generalized through national and international regulations to ensure harmonization of practices on a global scale.
For auditors, these findings highlight the need to strengthen their expertise in non-financial internal control. As sustainability reporting moves toward mandatory assurance, auditors must not only know how to assess the effectiveness of internal control systems designed for non-financial information but also understand how these systems can be established and operationalized within companies. This implies developing specific expertise on the particularities of non-financial data, their nature, sources, and collection and validation processes. It also calls for the development of professional standards and clear guidelines on how to audit these systems in the context of sustainability reporting.

6. Methodological limitations of the corpus

Although the convergence of results across studies reinforces the credibility of the observed relationship, several methodological limitations of the corpus warrant critical discussion. These limitations are presented below in order of their relative impact on the validity of our conclusions, from the most to the least significant.

The most significant limitation concerns the strong methodological homogeneity of the corpus. 15 out of 16 studies included in this review adopt a quantitative approach, predominantly based on multiple linear regressions. The predominance of a single methodological approach means that our conclusions rest essentially on correlational evidence, without the benefit of qualitative or mixed-methods studies that could shed light on the organizational and managerial mechanisms by which internal control actually influences the quality of sustainability reporting. Moreover, although multiple linear regression provides a simple and important starting point in understanding this relationship, other alternative methods could be explored to obtain more complete and nuanced knowledge. The application of more advanced econometric methods, coupled with the use of artificial intelligence and machine learning techniques, would add meaningfully to the study of this relationship. Future research would benefit from diversifying methodological approaches (case studies, qualitative surveys, mixed methods …), to deepen the understanding of causal mechanisms and strengthen the external validity of the conclusions.

Second, the possibility of publication bias must be considered. The fact that 15 out of 16 studies report a positive relationship between internal control and sustainability reporting quality raises the question of whether this convergence reflects a genuine empirical reality or a publication bias favoring the dissemination of statistically significant and positive results at the expense of null or negative findings. This phenomenon is particularly prevalent in emerging research fields where early exploratory studies naturally prioritize the publication of compelling findings. Nevertheless, the diversity of geographical contexts represented (China, Indonesia, Egypt, South Korea, Portugal, Iran, Iraq) suggests that the positive relationship is not confined to a single institutional environment, which partly mitigates this concern. However, we acknowledge that this constitutes a limitation that should be taken into account when interpreting our conclusions.

Third, the heterogeneity of the measurement instruments used across studies raises questions regarding the comparability of results. As shown in Table 3, the measures employed to evaluate internal control vary considerably: composite indices from specialized databases, questionnaires administered to auditors or managers, binary indicators based on the identification of deficiencies in audit reports, or original measures such as the number of staff dedicated to internal control systems. Similarly, non-financial reporting is measured through diverse approaches: content analysis of sustainability reports, ESG rating systems such as the Rankins CSR Ratings Database, questionnaires, or textual similarity analysis. While this diversity reflects the richness of possible approaches to capturing both internal control and sustainability reporting, it nevertheless limits the ability to precisely quantify the magnitude of the effect or to identify the specific mechanisms at work. The convergence of findings observed: a positive relationship is all the more remarkable as it emerges from a methodologically heterogeneous corpus. However, this heterogeneity calls for caution in making direct comparisons between studies and suggests that future research would benefit from adopting more standardized and harmonized measures.

Fourth, the language restriction constitutes a potential coverage bias. The search was limited to publications in English, French and Arabic. Given that the majority of empirical studies identified focus on the Chinese context, it is possible that relevant literature written in Chinese may have been excluded. This was indeed confirmed during the complementary snowballing search, which identified some studies written in Chinese that were therefore not included in the final corpus.

Fifth, the corpus of articles remains relatively small, reflecting the novelty of the subject. The search was limited to English, French and Arabic texts, as well as to two databases, Scopus and Web of Science, that may not include all relevant publications. To mitigate this limitation, the

search was supplemented with informal exploration on Google Scholar and a bidirectional snowballing strategy. This complementary step did not identify any new studies meeting the inclusion criteria: the relevant articles thus identified were already present in the initial corpus. This confirms the saturation of the corpus constituted from the bibliometric databases. Nevertheless, the limited size of the corpus restricts the scope of generalization and calls for caution in drawing definitive conclusions.
Finally, the inclusion of all works related to the impact of internal control on sustainability reporting, including those where internal control is a mediating variable or where other variables are considered, may have introduced some heterogeneity in the scope of the studies analyzed. This choice is justified by the fact that the relationship between internal control and sustainability reporting is still underexplored; therefore, it was necessary to consider all existing works to provide a comprehensive overview. However, this decision may have blurred the boundaries of the analysis and should be kept in mind when interpreting the results.

7. Conclusion

The aim of this analysis is to provide an overview of the current state of the literature on the relationship between internal control and sustainability reporting, using a systematic review based on the PRISMA method. This rigorous and structured method enabled the identification, selection, and synthesis of relevant studies to ensure a comprehensive and objective analysis of the subject. It was determined that, despite the growing relevance of this research theme, the literature is still in its infancy, particularly as regards study contexts and activity sectors. Indeed, only a handful of studies, mainly concentrated in Asian countries, have explored this relationship. The majority of these studies have adopted quantitative methodologies and produced globally consistent results.
This work makes several significant contributions. On a theoretical level, it articulates three complementary frameworks: agency theory, stakeholder theory and legitimacy theory, to explain why internal control influences the quality of sustainability reporting. By demonstrating that internal control acts simultaneously as a governance mechanism (reducing information asymmetry), a transparency tool (responding to stakeholder expectations) and a credibility guarantee (reinforcing organizational legitimacy), this review provides a coherent theoretical foundation for understanding the link between internal governance and non-financial communication. On an empirical and methodological level, to the best of our knowledge, it enriches the existing literature by proposing one of the first reviews examining the quality of sustainability reporting through a single factor: internal control. This review plays a key role in highlighting the importance of this emerging topic and attracting further academic attention. It also offers to the scientific community a detailed and structured analysis of the current state of research by analyzing all the articles included, and identifies the variables most commonly studied in the literature that have a significant impact on this relationship, such as CEO duality, media pressure, and corporate ownership structure (public or private). Finally, this review also carries practical implications for companies, regulators and auditors, particularly regarding the adaptation of internal control systems to sustainability data and the need for strengthened regulatory requirements and professional standards.
Several limitations are associated with this analysis, including the strong methodological homogeneity of the corpus, the possibility of publication bias, the heterogeneity of measurement instruments, the language restriction, the small size of the corpus, and the inclusion of studies where internal control is a mediating variable. These limitations are discussed in detail in Section 6 and are taken into account in the interpretation of our findings.
Looking ahead, future research should focus on several key directions: diversifying methodological approaches, extending the geographical scope beyond Asia, and deepening the

analysis of which specific internal control components have the greatest impact on sustainability reporting, as well as how this impact varies across ESG dimensions. In conclusion, despite these limitations, this systematic review provides a foundation upon which future research in this promising field might well be based. It underlines the growing importance of internal control with respect to the quality of non-financial reporting.

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Appendix A1: Methodological Quality Assessment of Included Studies (MMAT)

N°	Article	Study Type	MMAT Section	Score	Quality Level
1	Setiawanta & Purwanto, 2019	Descriptive quantitative	Section 4	4/5	High
2	Wu & Bu, 2020	Descriptive quantitative	Section 4	5/5	Excellent
3	Tan et al., 2020	Descriptive quantitative	Section 4	5/5	Excellent
4	Huang & Huang, 2020	Descriptive quantitative	Section 4	5/5	Excellent
5	Khlif et al., 2020	Descriptive quantitative	Section 4	5/5	Excellent
6	Xie, 2021	Descriptive quantitative	Section 4	4/5	High
7	Lee et al., 2021	Descriptive quantitative	Section 4	5/5	Excellent
8	Monteiro et al., 2022	Descriptive quantitative	Section 4	3/5	Moderate
9	Huang et al., 2022	Descriptive quantitative	Section 4	5/5	Excellent
10	Xu et al., 2023	Qualitative (fsQCA)	Section 1	5/5	Excellent
11	Nematnezhad et al., 2023	Descriptive quantitative	Section 4	4/5	High
12	Muhammad et al., 2023	Descriptive quantitative	Section 4	3/5	Moderate
13	Wang & Hu, 2023	Descriptive quantitative	Section 4	3/5	Moderate
14	Pasko et al., 2024	Descriptive quantitative	Section 4	5/5	Excellent
15	Zhang et al., 2024	Descriptive quantitative	Section 4	5/5	Excellent
16	Yan et al., 2024	Descriptive quantitative	Section 4	5/5	Excellent

Legend :

- ***5/5*** *= Excellent quality (all criteria met)*
- ***4/5*** *= High quality (one criterion not met or unclear)*
- ***3/5*** *= Moderate quality (two criteria not met or unclear)*
- ***≤ 2/5*** *= Low quality (several criteria not met or unclear)*

Explanatory note:

The MMAT (Mixed Methods Appraisal Tool) score is calculated based on five criteria specific to each study design type. For descriptive quantitative studies (Section 4), the criteria assess: the relevance of the sampling strategy, the representativeness of the sample, the adequacy of the measures, the risk of non-response bias (when applicable), and the appropriateness of the statistical analysis. For qualitative studies (Section 1), the criteria focus on the adequacy of the approach, data collection methods, the grounding of results in the data, interpretation, and methodological coherence.