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Readability of Sustainability Reports: A Bibliometric Analysis and Systematic Literature Review

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Abstract: This paper aims to investigate the latest scientific developments, map research networks and topics, and present a critical analysis of the gaps and future opportunities in the literature on the readability of sustainability reports. Through data collection and filtering processes, the final sample included 10 articles. Then, a bibliometric analysis was developed using Scopus metrics and AJG classification. VOSviewer software (Version 1.6.18) was used to develop bibliometric networks. Finally, we developed a systematic review analysis to answer our third objective. The results show that most studies on the readability of non-financial reports come from Europe and Oceania; the sample's co-citations per author were classified into three clusters; most of the sample was linked to analyzing the quality and effectiveness of sustainability reports; and organizations tend to use low readability in sustainability reports. This study contributes to further scientific knowledge about the readability of sustainability reports and impression management techniques and to the research into the importance of sustainability reporting for managing stakeholder impressions. A wide range of implications for the academic community, regulatory bodies, organizations, and all users of the information disclosed through sustainability reports were identified. The main limitations may have been created by the sample's size, exclusion criteria, and keywords selected.

Keywords: sustainability reporting; readability; impression management; bibliometric analysis; systematic literature review

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1. Introduction

Sustainability reports are voluntary public reports issued by organizations to inform stakeholders about the organization's impact on the environment, society, and the economy [1]. In addition to all the financial information, there is a growing awareness of the protection of ecosystems and populations. Thus, the disclosure of sustainability information is of growing concern [2–4], and the consensus among researchers appears to be that all types of sustainability reporting are on the increase and will continue to increase over time [5]. Therefore, the disclosure of this information has increased both in the number of organizations that undertake such practices and the depth in which they do so [1,6–9].

Organizational managers have long recognized that congruence between organizational actions and the values of the relevant public is critical to organizational survival [10–12]. Accounting researchers suggest that corporate social and environmental disclosure helps address some organizational legitimacy problems [13]. With the growth of public awareness and media coverage of environmental, social, and ethical issues, firms have sought to enhance the scope and depth of their social and environmental disclosure [14]. Both society and stakeholders influence organizations to disclose the effects of social and environmental efforts as well as possible in financial and non-financial reports [15,16]. Thus, the extent of environmental and social disclosure is a function of exposure to public pressure in the social/political environment [17,18].

Corporate social and environmental disclosure is expected to be an effective management strategy to develop and maintain satisfactory relationships with stakeholders [16]. Some organizations express their concern for the environment and society as a method of managing reputational risks while responding to institutional interests and pressures [19]. Consequently, the objective of legitimizing an organization's operations through sustainability disclosure is the necessary motivation to adopt decisions related to such disclosure and guarantee their survival [12,20]. In fact, legitimacy theory can explain disclosure patterns over time or the syntactic variability of disclosures across firms, i.e., the use of readability in disclosed reports as an impression management technique [21]. Thus, organizations seeking to maintain or gain legitimacy have an incentive to use communication strategies, which include financial and non-financial reporting [12,22,23]. In addition, considering legitimacy theory, organizations may seek to alter stakeholder norms, values, and beliefs by means of accounting narratives [12,24].

In contrast to mandatory financial disclosures, sustainability reporting is less prescriptive, thus making the underlying motivation for disclosure by managers a topic of research [14]. Their voluntary nature gives organizations the flexibility to disclose completely disparate socially responsible information [25,26]. For this reason, the practices underlying the development of sustainability reports remain of current interest due to their variability across business or country contexts, the debate about their various determinants and drivers, and their potential role as a mechanism for social accountability [21]. These inconsistencies have created problems over the years in determining the completeness of the information [27] and may bring about scenarios where impression management strategies and tactics are used [28].

Most researchers define impression management in organizations as the behaviors that individuals use to shape how they are perceived by others [28–30]. Impression management allows individuals to influence their behavior, motivations, morality, and personal attributes such as reliability, intelligence, and future potential [31]. In the context of accounting disclosures, companies select the information to be disclosed according to their own criteria and present it in a "crafted" way to modify stakeholders' perceptions [11,32]. Reading ease manipulation is one of several impression management techniques [28]. The main presumption of this technique is that those who prepare the reports manipulate transparency by reducing clarity when they wish to obscure some information [28,33–36]. Thus, the opportunistic behavior of sustainability disclosures is related to the management obfuscation hypothesis, which assumes that managers may intentionally reduce the readability of these disclosures to make them more complex and obfuscate negative information, thus creating difficulties in extracting the real meaning of a narrative [37].

Based on these assumptions, a new scientific stream emerges: the readability of sustainability reports. Our research, therefore, has three main objectives. First, there is a need to investigate the latest scientific developments on the readability of sustainability reports; next, we seek to identify research networks and topics in the field of readability of corporate sustainability disclosures; and lastly, we seek to critically analyze the gaps in the literature and proposals for the development of future research work in the field of sustainability reporting readability.

With a search based on keywords related to the topics under study and using the functionalities that Scopus provides, we filtered our initial results and collected documents related to our objectives. Consequently, our final sample consisted of 10 articles. Next, the Scopus metrics, the Academic Journal Guide (AJG) classification, and VOSviewer software were used to analyze and bibliographically map these articles. Thus, the methodological approaches used were essentially qualitative, with a highlight on bibliometric analysis and literature review.

This study contributes to the development of scientific knowledge on this research topic. Furthermore, this study also contributes to reaching a conclusion on whether sustainability reporting is of high importance for managing stakeholders' impressions. Thus, an overview can be obtained of the complexity/amplitude of the information, which compa-

nies make available to their stakeholders, about the activities that impact the environment and society and how disclosure of this information can be used to legitimize the organization's activities. In this way, it is possible to highlight a set of theoretical implications regarding the development of existing theoretical assertions and the development of the literature itself, as well as practical implications for regulatory bodies, organizations, and all users of the information disclosed through sustainability reports.

The remainder of the paper is organized into five key points: a brief background of the theme (Section 2); a theoretical framework of this study (Section 3); the method that presents the relevance of the methodologies applied, the research design, and the data processing process (Section 4); the results that outline the bibliometric mapping, a bibliometric citation network analysis, a systematic literature review, and the theoretical and practical implications of our investigation (Section 5); and a synthesis of the main conclusions, contributions, limitations, and future research developments (Section 6).

2. Readability of Sustainability Reports

Financial information is often communicated through written narratives that are largely qualitative in nature. The purpose of these narratives in reports is to amplify quantitative accounting information. However, most of these documents are not subject to external audit, and the information disclosed is voluntary, which makes it easier for managers to manipulate it [38]. Academic research into accounting narratives can be divided into two categories: content analysis studies and readability research [35]. The first approach is related to understandability and the second to syntactical complexity [35]. The application of this second approach in annual reports and their lexical features can capture the characteristics of disclosure [39]. In short, the readability of accounting reports is believed to refer purely to the correspondence between the ability of the reader and the degree of difficulty in reading the text [27,35,36,40,41]. Thus, the major research effort in exploring the style (content and format) of accounting narratives has been directed toward their readability [42].

The main objective of readability research is to develop formulas able to predict and measure the transparency of language [43]. Thus, the most significant way to quantify the characteristics of disclosure is with an index of readability [44]. The main reasons for the use of this tool are appropriateness, wide use, and comparability [34,45]. These facts increase the reliability and validity of studies and make replication of the experiment easier for other researchers [33,42]. Readability indexes use the frequency of language variables in a document to generate an estimation of reading difficulty [41,44]. The most used readability measures include word or sentence length, the number of complex words, and the average syllables per word [33,41]. The most popular measure used to calculate syntactical complexity is the Flesch readability formula [33–35].

According to the literature, early research related to accounting narratives and readability includes, for example, [46], who studied the readability of UK companies' annual reports almost sixty years ago. Other examples from the same era include [47–52]. At this time, it was hoped that readability could give a clue about the comprehensibility of these reports, and when it turned out that this was a false hope, interest in this area temporarily declined [53]. Years later, [33,34,42,43,54] revived the topic of readability of corporate financial reports, seeking to establish relationships with financial performance itself. In the 21st century, authors started to direct the analysis of readability to annual reports, but still from the financial point of view [35,36,39,41]. For example, [35] once again analyzed the readability of the CEOs' letter of annual reports but, in this case, according to their thematic structure. Another example is [39], who analyzed the relationship between the readability of annual reports, the financial performance of firms, and the persistence of results.

Eventually, as interest in social responsibility information increased, the importance of clear and accessible communication in non-financial reports began to gain more prominence in recent years. For this reason, only a few recent studies have examined the readability of sustainability reports, as well as the impact that environmental and social performance itself

has on the degree of readability, and have begun to emerge more recently [1,9,25,27,55,56]. Thus, considering the increasing disclosure of environmental and social information and its comparability and credibility, an important question is raised: is sustainable information disclosed in a readable way? First, to answer this question, it is important to note that information can be perceived, presented, and interpreted in completely different ways by different individuals [57]. However, reporting should enable companies to be accountable, democratic, and, above all, transparent to their stakeholders [58]. Given this close relationship between society and companies, a non-financial report can be considered effective depending on the form in which the information is made available, considering its extent and depth [7]. Sustainability reports must be readable to potentiate effective communication and so that the users of the information can understand the meaning of the accounting narratives [59–61]. Reports with high levels of readability can be crucial to facilitating the stakeholders' decision-making process since communication plays a key role in the fulfillment of social and environmental contracts and the legitimization process of companies [62]. Readability is therefore a crucial point on the checklist for assessing sustainability reports [63].

Nevertheless, although the reporting of sustainability information through non-financial reports has increased over time, these documents are characterized by syntactic complexity and a lack of transparency on the part of organizations in producing reliable information, enhanced by the concealment of environmental and social damage caused [27,64]. Consequently, these inconsistencies in reporting have created difficulties over the years in determining the completeness of the information and have led to a lack of comparability and credibility [27]. Therefore, information asymmetry is a consequence of the use of sustainability reports to assess an organization's performance since, in most cases, shareholders, investors, and other stakeholders do not directly observe the true impact of its activities [55]. The truth is that organizations contribute both to environmental degradation and attempt to reduce its consequences [65]. Thus, manipulating the readability of sustainability reports can also serve as a tool for companies to obfuscate inferior information in comprehensive narrative CSR (Corporate Social Responsibility) disclosures [25]. In short, organizations may purposefully obfuscate potentially controversial actions with selective, incomplete, and/or biased disclosures [3].

3. Organizational Legitimacy Theory

In the field of sociopolitical theories, legitimacy theory can be highlighted. Legitimacy can be considered as the perception or assumption representing the stakeholders' reaction towards an organization, which reflects a congruence between the company's actions and the shared beliefs of a social group [66]. While economic legitimacy is dependent on the market, environmental and social legitimacy is dependent on society at large [67,68]. Several analyses of environmental and social practices conclude that there are contradictory or inconsistent results regarding the degree of companies' disclosure and their legitimacy. However, although various studies point to the contrary, in fact, legitimacy theory can explain disclosure patterns over time or the variability of disclosures across firms [21]. By means of accounting narratives, organizations can seek to alter stakeholder norms, values, and beliefs [12,24]. Therefore, organizations use legitimacy as a resource to manage and shape the perceptions and judgments of stakeholders and gain their support, resources, and cooperation [66]. The objective of legitimizing an organization's operations through sustainability disclosure is the necessary motivation to adopt decisions related to this disclosure [20]. Thus, companies are encouraged to adopt communication strategies, which include financial and non-financial reporting, to obtain favorable perceptions from society and guarantee their survival [12,22,23,59].

Furthermore, organizational legitimacy can be divided into three dimensions, which include pragmatic, moral, and cognitive legitimacy. Although each dimension is related to the overriding concept of legitimacy, they fall under different behavioral dynamics [66]. According to [21], only pragmatic and moral legitimacy are directly relevant in environmental

and social disclosure. In this sense, environmental disclosure and the use of impression management strategies in sustainability reports can be seen as means of achieving pragmatic legitimacy, in that information is provided about the nature of the exchanges between stakeholders and the organization and the adoption of their agenda by organizations [3]. At the level of moral legitimacy, using accounting narratives and impression management strategies (such as reading ease manipulation), organizations can seek to alter stakeholder norms, values, and beliefs [3,24,34].

Nevertheless, in addition to accounting narratives, organizations also use other means of business communication, such as press conferences, to manage perceptions of social and environmental legitimacy [69]. Society's perceptions are filtered through the media into a common type of impression [70]. Moreover, all forms of environmental communication can be considered organizational perception management tools [8,71]. According to legitimacy theory, increased media coverage of environmental and social issues puts pressure on companies to increase their environmental and social disclosures [17]. Nevertheless, maintaining legitimacy for organizations in different circumstances enables divergences in the breadth and depth of information in the reports of companies in different industries [72]. For example, environmental disclosure has a negative correlation with a company's industry if it belongs to an environmentally sensitive industry [69]. Under the legitimacy theory, it is also expected that companies with worse environmental and social performances disclose more information to legitimize their activities [73].

However, legitimacy may not necessarily be beneficial to society. According to legitimacy theory, sometimes an organization's management instrumentally manipulates legitimacy and uses evocative symbols to gain support from society [66]. Moreover, companies use impression management strategies and techniques to achieve a socially responsible and legitimate image, and to manage stakeholders' perceptions [34,69]. Impression management refers to ways of controlling individuals' impressions, behaviors, motivations, values, and personal attributes toward organizations. This theoretical perspective assumes that the basic human desire is to be viewed positively by others, whether organizations or individuals [29]. Impression management is concerned with creating a new image or maintaining and protecting a current image [11,30]. This process can be conscious and strategic or unconscious and habitual, depending on whether companies seek to cultivate a certain image [74].

In relation to accounting narratives, it is found that organizations can use impression management techniques such as changes in readability to manipulate their sustainability reports, present a self-serving view in corporate and sustainability reporting, and alter stakeholders' perceptions [8,11,34]. Verbally, traditional forms of defensive verbal impression management tactics such as apologies or justifications can be used to enhance organizations' image [71,75]. In practice, organizations may be considered legitimate, but they may be undermining the environment and society in which they operate [25]. Although impression management is used from a more manipulative perspective, it does not necessarily mean that organizations always seek to create verbal impressions [31]. Thus, the implicit assumption of this theoretical approach is that organizations use textual/syntactical, visual, and verbal techniques and concealment, attribution, assertive/proactive, and defensive/reactive approaches to defuse problems or to highlight successes [11,12,28,34,69,76–78].

4. Methodology

4.1. Relevance of the Methodologies Applied

Regarding bibliometric analysis, according to [79], it is the most suitable method to study the conceptual structure of a research area and has a recent application in social science research, specifically in the field of management or accounting [80]. Bibliometric analysis allows researchers to discover themes and topics in progress, identify patterns of collaboration and research components, and analyze the scientific currents that support a given type of literature [81]. This methodology is well suited to deciphering and mapping scientific knowledge that develops over time and the evolving nuances of well-rounded

fields by schematizing and organizing large volumes of unstructured data in a rigorous manner [82]. In general, bibliometric analysis is used as a support to build and display bibliometric maps and identify clusters and their citation networks [83]. Finally, it should be emphasized that bibliometric analysis has added advantages over other qualitative investigations by virtue of the objective presentation of statistical results from a selection of scientific databases, which in turn have less room for subjective assumptions [84].

In addition, a literature review is a fundamental feature of scientific research. This literature review should follow a methodological approach and be quite clear in explaining the procedures and steps resulting from its application [85]. This methodology is developed according to a variety of purposes. These purposes may include a scientific basis for future research and observing the scope of a research topic or topic of interest [86]. Furthermore, [87] states that this technique provides a theoretical foundation for any empirical study, substantiates the research question, identifies the relevance and contribution of studies, and frames the research methodologies, approaches, and main objectives underlying an investigation. By summarizing, analyzing, and synthesizing a related body of literature, it also makes it possible to assess the validity, reliability, and quality of existing work regarding a topic to reveal any weaknesses, inconsistencies, divergences [88], and gaps [89]. Both bibliometric analysis and systematic literature review are very rigorous processes [85,88], which can be broken down into three key steps: planning, review, and reporting [89], which we present next.

4.2. Objectives and Research Questions

According to [89], the bibliometric and literature review must be planned, which includes establishing the objectives and research questions, as well as defining the review protocol. Thus, considering the relevance and pertinence of the methods discussed in the previous section, the aim of this study is to identify the state of the research field (latest scientific developments, citation networks and topics, and gaps/proposals for future research) focused on the readability of sustainability reports that have been published in the selected multidisciplinary research database (Scopus). Considering the objectives and approaches of [87–89], as well as the contributions we intend to provide to the literature, we have established the following research design (see Table 1).

Table 1. Research design.

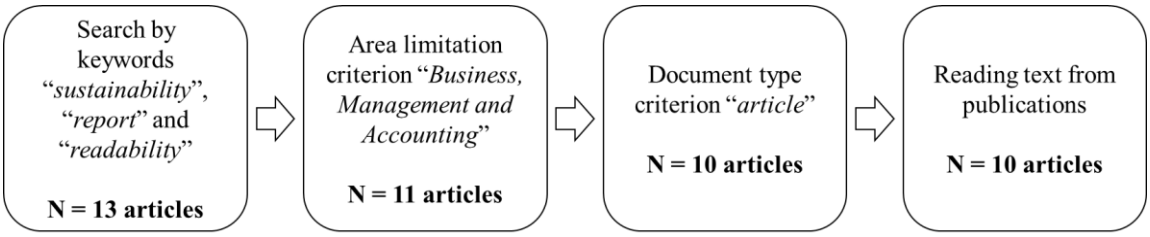
Objectives	Research Questions	Methodology
1. Investigate the latest scientific developments on the readability of sustainability reports.	1.1. Which authors have published work on the readability of sustainability reports? 1.2. What is the geographical origin of the authors identified? 1.3. Which journals published them? 1.4. What is the impact of the journals where the papers were published?	Bibliometric analysis with Scopus database metrics and AJG classification.
2. Identify research networks and topics in the field of readability of corporate sustainability disclosures.	2.1. What are the main research topics in this area? 2.2. What methodologies used? 2.3. What samples are analyzed? 2.4. What is the bibliometric relationship between our sample and the literature?	Construction and visualization of bibliometric maps with VOSviewer software, version 1.6.18.
3. Critical analysis of the gaps in the literature and proposals for developing future research work in sustainability reporting readability.	3.1. What are the main results of the literature review? 3.2. What are the main contributions of the work? 3.3. What are the main gaps in the literature and opportunities for future research?	Systematic literature review of the sample of articles collected.

Source: Own elaboration.

In summary, the research design presented in Table 1 allowed the development of the bibliometric analysis and the systematic literature review that we intend to outline. For this reason, considering these approaches and the research questions we intend to answer, below, we present the description of the last methodological processes defined by [89], specifically, the steps related to the conduct of the review (search and selection of relevant articles according to exclusion and inclusion criteria) and the development of reports and disclosures, by means of which data are extracted and analyzed [89].

4.3. Data Collection, Filtering, and Analysis

This process started with an exploratory analysis and registration of scientific articles. Systematic searches were conducted from 11 November 2022 to 15 January 2023. The Scopus database was searched to collect documents covering all studies on the readability of non-financial reports, with a focus on sustainability. To this end, the following search string was constructed and entered into the aforementioned database. It should also be noted that Microsoft Excel was used for data processing. According to the literature that served as a basis for this research, presented in Section 3, regarding the readability of non-financial reports, we conducted a search in the Scopus database, using the terms "sustainability", "report", and "readability". This initial search was conducted with limitations, as the above terms were only considered for journal titles, abstracts, and keywords. With this filtering process, the search yielded 13 results. Figure 1 presents the data collection process, which is explained below.



Source: Own elaboration

Figure 1. Data collection/filtering process.

As shown in Figure 1, the initial sample of 13 articles was filtered to exclude all documents outside the field of business, management, and accounting. This exclusion criterion reduced our sample to 11 publications. The next exclusion criterion allowed the selection only of documents that corresponded to articles that had been submitted to a scientific review process and published in scientific journals. We then proceeded with an initial analysis of each of the articles that make up the sample, which involved reading the abstract, the methodology, and the results to ensure that the content of these articles was consistent with our research objective. Thus, the final sample consists of 10 scientific articles.

In the first part of the bibliometric analysis (performance analysis), we make a detailed analysis of the bibliometric network, considering the tables, graphs, and metrics that the Scopus database makes available. The performance analysis is based on techniques of publication-related metrics, citation-related metrics, and metrics that combine both techniques [78,79]. Thus, these metrics and the AJG classification allowed us to assess the quality, impact, and relevance of authors, scientific articles, and academic journals. By using them, we were able to investigate the latest scientific developments in the readability of sustainability reports (first objective).

Then, the selected publications (sample of 10 articles) were analyzed and processed by VOSviewer software, version 1.6.18, which allowed the construction and visualization of bibliometric maps [81]. Using the functionalities of this software, we built maps based on co-citations by document, author, and source. In short, the main objective of these techniques is to scientifically map the literature based on the assumptions that citations are the result

of intellectual links between publications (which are formed when one publication cites another) and that publications that are frequently cited together are like a topic [81]. Finally, according to the same authors, these networks allow us to identify the most influential authors and publications, research clusters, and recent or niche publications outside the selected topic. We were thus able to identify research networks and topics in the field of readability of corporate sustainability information (second objective).

Finally, given the importance of the systematic review of the literature evidenced by [84], the selected articles were analyzed in their entirety to synthesize and critically analyze the main results and variables used, the gaps in the literature, and the proposals for the development of future research work in the field of readability of sustainability reports (third objective). For this reason, we focused especially on the results and perspectives for future research. We observed a tendency in these studies to investigate the impact of certain factors (personal attributes and characteristics of the CEO, business characteristics, variables related to corporate governance, economic and financial indicators, contextual variables, and disclosure characteristics) on the readability of their reports. The final sample also includes articles with a broader scope, and others focused on specific sectors, limited geographical areas, or even specific macroeconomic contexts, such as the COVID-19 pandemic or financial restructurings.

5. Results and Discussion

5.1. Bibliometric Mapping

In the content of this section, we seek to answer the first objective of the research, that is, to map and analyze current literature within the scope of analyzing the readability of sustainability reports released by companies. To this end, we conducted a bibliometric search in the Scopus database between 11 November 2022 and 15 January 2023, which allowed us to identify 10 articles published since 2010. Table 2 summarizes the results obtained.

According to our results, 7 out of 10 articles in the sample were published in the last three years (2020–2022), showing that the study of the readability of sustainability reports is a research topic with an increasing trend in recent years, reaching the largest volume of articles in 2020 (see Table 2). The delimitation by thematic area shows that the areas of "business, management and accounting" and "economics, econometrics and finance" correspond to around 45% and 18% of the selected articles, respectively.

Regarding the authorship and co-authorship of scientific articles, Patrick Velte, from Leuphana Universität Lüneburg, is the only author with two published articles (in 2018 and 2019), of which the last one is co-authored. It should be noted that in his 2018 article, Patrick Velte analyzed companies' reactions to the decline in confidence following the 2008–2009 financial crisis in terms of the implementation of integrated reporting and the evolution of readability levels of financial and non-financial reports [90]. The following year (2019), his research focused on the determinants of disclosure quality and materiality in integrated reporting in an international context [91]. The determinants identified were readability, learning effects, gender diversity, reporting of non-financial information, quotation in the Dow Jones Sustainability World Index, and management of results. Leuphana Universität Lüneburg (Germany) is therefore the institution with the most affiliated articles. As shown in Table 2, 3 out of 10 studies on the readability of information disclosed in sustainability reports come from Germany, followed by Australia. Another piece of evidence that results from the analysis of Table 2 is that 7 out of 10 articles focus on non-financial reports from companies based in Europe and Oceania.

The articles were published in different scientific journals. The publication with the highest number of citations is a work by Gerwanski Kordsachia and Patrick Velte, published in 2019 in the journal *Business Strategy and the Environment* [91]. Velte is, therefore, the author with the highest number of citations and, consequently, with the greatest scientific impact. The studies in which he was author and co-author also have the highest average H-index (23 and 13.5 in 2018 and 2019, respectively). The article by [56] is the third most cited publication, with the third highest H-index average, and the most recent publication

with citations. Overall, a total of 23 authors contributed to studies analyzing the readability levels of sustainability reports. However, it is important to note that the number of citations of an article is a function of its quality and time, meaning that analyzing the impact of a recent article requires attentiveness.

Table 2. Bibliometric mapping and metrics per publication.

Author(s) and Year of Publication	Geographical Origin	Journal Title	Number Cited	AJG (2021)	SQJ (2022)	SNIP (2022)	H-Index (Average)
Uddin & Chakraborty (2022) [1]	United States	Journal of Emerging Technologies in Accounting	0	ABS1	Q2	0.825	2.5
Phang et al. (2022) [92]	Australia	Managerial Auditing Journal	0	ABS2	Q2	1.323	7
Zhang et al. (2021) [56]	Australia	Journal of Business Ethics	22	ABS3	Q1	2.976	9
Mnif & Kchaou (2021) [93]	Tunisia	Meditari Accountancy Research	1	ABS1	Q2	1.337	4
Adhariani & du Toit (2020) [55]	Indonesia	Journal of Accounting in Emerging Economies	10	ABS2	Q2	1.177	7.5
Nilipour et al. (2020) [27]	New Zealand	Australasian Accounting, Business and Finance Journal	5	ABS1	Q2	1.024	5
Smeuninx et al. (2020) [9]	Belgium	International Journal of Business Communication	15	-	Q1	1.306	9
Saber & Weber (2019) [94]	Germany	International Journal of Retail and Distribution Management	13	ABS2	Q1	1.359	4.5
Gerwanski et al. (2019) [91]	Germany	Business Strategy and the Environment	58	ABS3	Q1	2.790	13.5
Velte (2018) [90]	Germany	Problems and Perspectives in Management	23	ABS1	Q3	0.586	23

Source: Based on Scopus.

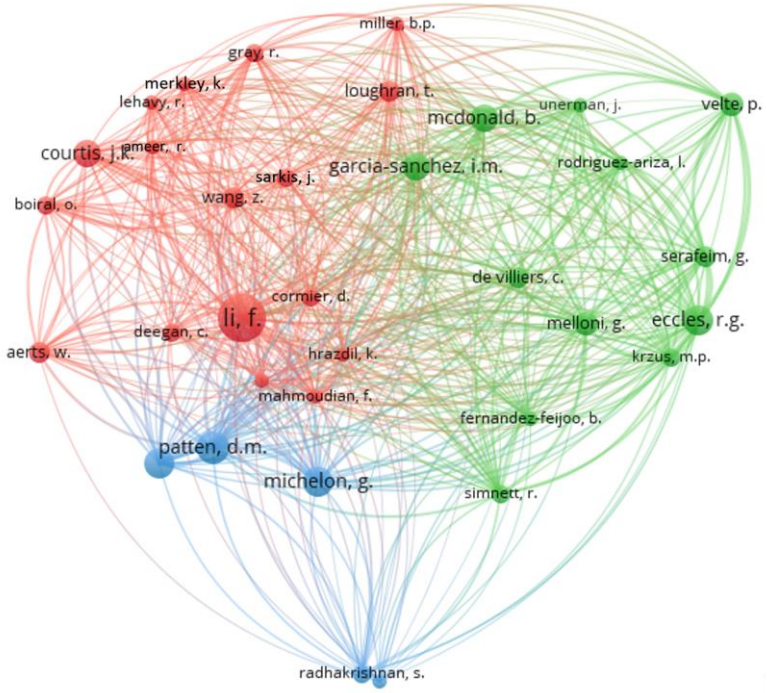
According to the information summarized in Table 2, the most cited articles were published in leading journals, according to the Scimago and Academic Journal Guide classification. This evidence can promote high dissemination of scientific knowledge, reinforcing the credibility of the research carried out and making it more reliable for the scientific community. At the same time, it can be understood as recognizing the relevance and timeliness of analyzing the readability of non-financial information, its impact on political decisions, and its repercussions on society as a research topic, leading researchers to explore it in depth in future research.

5.2. Bibliometric Citation Networks

In this section, results are presented that provide answers to the following research questions: what are the main research topics in this area? What is the bibliometric connection between the sample of articles in this research and previous literature? What methodologies were adopted and what samples were analyzed? To this end, VOSviewer software was used, which allowed the construction of bibliometric citation networks for the analysis of co-citations by document, source, and author.

Firstly, at the level of bibliometric citation networks per document, it is worth noting that we only found cross-citation links for articles by [9,27,93]. Furthermore, we used VOSviewer software to carry out an analysis of co-citations by the scientific journals in which the sample articles were published (see Figure A1). This analysis allowed us to conclude that the *Journal of Business Ethics* and the *Accounting, Auditing & Accountability Journal* have served as a scientific basis for the topic of readability of non-financial reports, as they have the greatest overall connection strength. These two journals were therefore defined as reference journals in the study of the readability of sustainability reports released by companies. In Figure 2, the main authors are represented by citation and co-citation, that is, according to the number of citations in the sample articles—the curved lines in the figure represent the links between the different authors. In other words, Figure 2 schematizes

the reference citation network (by author) of each of the 10 articles in our sample. As a result, authors were grouped into three different clusters (red, blue, and green), meaning that authors from the same group are more likely to be cited together.



Source: Own elaboration using VOSviewer

Figure 2. Bibliometric network of co-citations by author.

To classify each of the groups in the literature citation network, we analyzed the most common research topics of each of the authors presented in Figure 2. The blue cluster includes authors who typically analyze the quality and effectiveness of companies' sustainability reports, the communication of sustainability information to stakeholders, and the way in which accounting relates to the creation of value and the sustainable management of organizations. The green cluster includes authors who tend to analyze the relationship between sustainability disclosure and the financial performance of companies, as well as accounting and auditing issues within the scope of sustainability. Finally, the red group brings together authors who generally focus on models, theoretical structures, standards, and practices for disseminating information about sustainability and, therefore, make substantial contributions to the research topic. From the analysis of the bibliometric citation network presented in Figure 2, we can also conclude that Feng Li, affiliated in the USA, is the author with the greatest total connection strength, as he is the most referenced in the 10 articles that make up our sample.

Using author-based co-citation analysis, it was possible to capture information about articles and authors that were not included in our sample. Thus, some authors who were widely recognized and cited for their research within the scope of sustainability dissemination, and more specifically its readability, were highlighted. In other words, this bibliometric citation network extended beyond the limits defined for the sample, connecting our sample with works that share similar concepts, topics, or approaches. Furthermore, co-citation analysis provided us with a broader perspective on the academic impact of certain documents and even scientific trends [81]. Thus, considering the network of bibliometric citations presented in Figure 2 and its structuring into three distinct groups, the bibliometric connection that exists between the articles in our sample and previous literature can be demonstrated. Consequently, we proceeded to classify the 10 articles that make up our

sample, taking those three research topics as reference. As shown in Table 3, the result of this process shows that the 10 articles in our sample fit into only two research topics.

Table 3. Research topics and methodology.

Research Topic	Methodology	Sample/Research Period	Author(s) and Year of Publication
Quality and effectiveness of sustainability reporting (blue cluster)	Content analysis. Gunning fog index. Multiple linear regression model.	99 companies listed on the S&P 300 and S&P Global 300 between 2016 and 2017.	Uddin & Chakraborty (2022) [1]
	Content analysis. Gunning fog and Bog index. Multiple linear regression model.	518 companies from 45 countries operating in environmentally sensitive sectors during 2016–2018.	Mnif & Kchaou (2021) [93]
	Content analysis. Flesch reading ease, Flesch–Kincaid, and Gunning fog.	25 companies listed on Indonesia's stock exchange from 2015 to 2017.	Adhariani & du Toit (2020) [55]
	Content analysis. Flesch–Kincaid grade level, Gunning fog, Coleman–Liau, SMOG and Automated readability.	37 companies listed on the New Zealand stock exchange from 2007 to 2016.	Nilipour et al. (2020) [27]
	Content analysis. Flesch–Kincaid grade level and Gunning fog.	470 companies from the United States, United Kingdom, Europe, Australia, and India.	Smeuninx et al. (2020) [9]
	Content analysis. Gunning fog index. Multiple linear regression model.	359 European and South African companies between 2013 and 2016.	Gerwanski et al. (2019) [91]
	Content analysis. German modified SMOG index, Modified Amdahl index and WSTF index.	Two supermarket chains and six German outlet chains in 2016.	Saber & Weber (2019) [94]
Relationship between sustainability disclosure and financial performance of companies and auditing issues (green cluster)	Content analysis. Dale–Chall index, Flesch–Kincaid index and Gunning fog index. Logistic regression analysis model.	48 Australian listed companies between 2011 and 2021.	Phang et al. (2022) [82]
	Content analysis. SMOG and tone at the top Logistic regression analysis model.	130 companies in financial restatements processes from the Audit Analytics database between 2000 and 2017.	Zhang et al. (2021) [56]
	Content analysis. Flesch reading ease and Gunning fog. Multiple linear regression model.	215 European companies, between 2014 and 2016.	Velte (2018) [90]

Source: Own elaboration.

Regarding methodologies to support studies, one of the main qualitative analysis techniques is textual reading, which must be carried out in three ways: observation (perceiving the textual material), interpretation (understanding the text from an analytical perspective), and selection (distinguishing, which is important in relation to the research questions) [95]. According to Table 3, the qualitative approach is predominant in the articles that make up our sample, namely, through the application of content analysis to annual reports and/or sustainability reports. The use of various linguistic techniques applied through software is also prevalent to enable the automation and textual and phrasal analysis of official company reports. This fact justifies the application of readability indices, such as the Flesch–Kincaid grade level, the Gunning fog, the Coleman–Liau, the SMOG, and automated readability, by [9,27,55,90,91]. However, the studies also directed their research questions to the factors that could explain the readability levels of reports released by companies. Thus, multiple linear regression models [1,87,88,90] and logistic regression analysis models [56,92] were used. It was also found that most samples focused on large companies, generally listed on stock markets or referred to in financial databases, which makes obtaining data easier.

As shown in Table 3, the majority of research (7 out of 10 articles) was included in the blue cluster of bibliometric citation networks, as these authors sought to analyze the

quality and effectiveness of corporate sustainability reports, as well as the communication of sustainability information to stakeholders: [27,55], for example, longitudinally studied the readability of sustainability reports from listed companies; [94] sought to understand whether supermarkets and large shopping areas differ substantially in communicating their sustainability; and finally, the effectiveness and transparency of their communication is studied by [1,9,91,93] by analyzing the impact of numerous explanatory factors on the level of readability of companies' sustainability reports. Even though the results of the analyzed investigations are different and have their own specificities, they are extremely well aligned with the blue cluster research topics.

In the green cluster, studies by [56,90,92] investigated the relationships between companies' sustainability practices, the relationship between sustainability disclosure and companies' financial performance, and auditing issues. These three researchers were included in this cluster, as the common objective was to analyze the quality of information on sustainability in different financial and economic contexts. Specifically, [92] examined the effect of companies' sustainability practices on their performance and evaluation during the COVID-19 pandemic, [55] analyzed the effectiveness of disclosing CSR practices in protecting the company's reputation after financial reformulations, while [90] studied the possible connections between the readability of sustainability reports and the experience (financial and sustainability) of audit committees. The works included in the green cluster also showed many similarities in terms of results, so this classification is also empirically supported.

Although none of the articles that make up our sample were included in the red cluster, which includes studies/authors that focus on models, theoretical frameworks, standards, and practices for preparing sustainability reports, it is important to note that the disclosure of information on sustainability follows a growing trend [cf., e.g., 1,5,6,7,8,10], allowing some problems of organizational legitimacy to be resolved [13]. However, this type of disclosure is less prescriptive, giving organizations flexibility to disclose completely disparate information [14,25,26]. Therefore, the information disclosed may appear inconsistent and less transparent [27]. This is further enhanced by the use of impression management strategies. Manipulating readability is one of several impression management strategies [1,11,28,75]. Among the different theories used to justify the adoption of impression management strategies, legitimacy theory stands out [28]. Thus, the need for a deeper theoretical and conceptual understanding of the process through which organizations seek to achieve and maintain legitimacy, as well as a critical analysis of organizational practices, attitudes, and processes, has long been evident [66,91]. Therefore, conditions are created for the future development of theoretical work, to expand scientific knowledge about the readability of non-financial reports [81], and to analyze readability as an impression management technique, as well as an instrument of legitimacy for companies regarding their performance in the field of sustainability [1,28,78].

5.3. Systematic Literature Review

To develop a critical analysis of the gaps and proposals for future research in the field of sustainability report readability analysis, we firstly present a descriptive summary of the results and future research proposed in our sample. Specifically, we intend to describe the main results, contributions, research gaps, and research opportunities for future research listed in the articles that make up the sample. Table 4 summarizes the main results of the first part of this process.

According to Table 4, most studies aim to investigate the impact of various factors on the readability levels of non-financial reports. Numerous explanatory factors were used, such as: personal attributes and characteristics of CEOs; monetary and non-monetary incentives for CEOs; characteristics of the companies and their organizational structure—existence of a sustainability committee, size, age of the company, sustainability performance, degree of internationalization, and business complexity; variables related to corporate governance (e.g., gender diversity, assurance of non-financial information, and

level of knowledge of audit committees); economic–financial indicators (e.g., earnings management, financial leverage, and asset profitability); contextual variables cultural dimensions, COVID-19 pandemic and financial recovery, and DJS index; and characteristics of the report (quality of disclosure, materiality of information, lines of content, and size of reports) [1,9,27,55,56,90–94].

Table 4. Summary of results and future perspectives of the sample.

Research Subject	Results and Discussion	Future Perspectives	Author(s) and Year of Publication
Quality and effectiveness of sustainability reporting (blue cluster)	Reports from companies in regulated industries are less readable than reports from other companies. Less complex companies have more readable sustainability reports.	Analyze linguistic manipulation of sustainability reports as an obfuscation technique. Examine differences by country or region, especially about the new EU environmental, social, and climate reporting requirements.	Uddin & Chakraborty (2022) [1]
	CEO's monetary and non-monetary incentives negatively influence the readability of sustainability reports (greater reading complexity). The complementary relationship between these incentives. Other CEO characteristics have no significant effect on the readability of sustainability reports.	Investigate the readability of sustainability reports written in a language other than English. Use other readability indices like the plain English index and the Flesch reading ease score. Analyze the role of the sustainability director in reporting and explore the relationship between director incentives and sustainability assurance practices.	Mnif & Kchaou (2021) [93]
	The reports had a low level of readability. Companies in the same industry implemented the same format and language in disclosing their sustainability information. Companies may deliberately use more complex language for some purposes, such as creating a good impression and supporting the legitimacy of the company. CSR disclosure practices are considered symbolic to establish a company's positive image and are not substantive in nature.	Construct more accurate measures of readability in the Indonesian context. Investigate possible determinants and the economic consequences of readability in Indonesia. Analyze the relationship between sustainability reporting readability and company financial performance.	Adhariani & Toit (2020) [55]
	Readability improved by only 6.5 percent. Substantial increase in the number of companies reporting sustainability information. Statistically significant negative correlation between average readability index and number of reports. Longer sustainability reports have lower readability indices. Environmentally sensitive companies published more readable information.	Examine the readability of other communication channels, such as sustainability information published on web pages and in social media. Investigate other determinants (company characteristics) of readability.	Nilipour et al. (2020) [27]
	Sustainability reports are still a very difficult document to read, sometimes more difficult than financial reports. Region proved to be an important variable. Results highlight the impact of legislative contexts and linguistic variety as an underexplored variable. Association between better economic performance and lower syntactic complexity, supporting the syntactic obfuscation hypothesis.	Analyze the relationship between nonfinancial performance and readability of financial and nonfinancial reports. Quantitatively investigate language variety and the impact of industry on readability.	Smeuninx et al. (2020) [9]
	Readability is positively associated with learning effects, gender diversity, and the assurance of non-financial information in the integrated report. The amount of information in the integrated reports and earnings management does not affect the quality of readability.	Analyze the impact of senior management characteristics on sustainability disclosure. Investigate and compare the alignment of materiality disclosure quality with different theoretical frameworks. Analyze whether a company's disclosure is truly geared towards providing valuable information or to what extent it is used for impression management.	Gerwanski et al. (2019) [91]
	The results reveal no major differences between supermarkets and discounters regarding the readability of sustainability reports. Supermarkets perform significantly better in sustainability readability than discounters. Poor quality in readability analysis is reflected in less concrete data.	Analyze differences in the readability of different retail formats for different countries and for different industry sectors. Investigate the readability of different forms of communication.	Saber & Weber (2019) [94]

Table 4. *Cont.*

Research Subject	Results and Discussion	Future Perspectives	Author(s) and Year of Publication
Relationship between sustainability disclosure and financial performance of companies and auditing issues (green cluster)	Companies that disclose sustainability practices exhibit higher market valuations relative to other companies. Sustainable practices help loss-making companies remain resilient during the pandemic. The negative association between sustainability practices and asset profitability. The positive relationship between sustainability disclosure and firm value is stronger in firms with higher readability ratings.	Analyze the investment and degree of disclosure of sustainable practices during the COVID-19 pandemic.	Phang et al. (2022) [92]
	Companies change their reports to a more conservative tone, increasing the readability and length of reports, despite strategically disclosing sustainability-related content. Companies that reaffirm CSR disclosure suffer smaller losses in value. Disclosure of CSR practices alleviates reputational damage and plays a protective role during periods of crisis.	Examine other disclosure characteristics of CSR reports, such as strategic framing and presentation style. Investigate how possible sustainability items can be integrated into integrated reports.	Zhang et al. (2021) [56]
	Financial and sustainability auditing has a positive impact on the readability of reports. Combined auditing has a stronger effect. To combine financial and sustainability information into integrated reports, audit committees need to have more diversified expertise.	Analyze the effects of regulatory changes that increased stakeholder management incentives after the 2008–2009 financial crisis. Examine other variables of board composition on the quality of integrated reporting. Use other methodologies such as interviews and questionnaires to overcome the limitations of readability indices.	Velte (2018) [90]

Source: Own elaboration.

Considering the results of the studies carried out (see Table 3), questions were raised that may indicate the use of impression management strategies in organizations' sustainability reports. In other words, although the number of sustainability reports has increased over time, these documents have highly complex language and wording, and, often, organizations do not produce transparent, credible information. In this sense, this information may not necessarily be beneficial to society due to its instrumental manipulation [9,25,27,38]. This circumstance validates the hypothesis that sustainability reports can be a very important mechanism for managing stakeholder perceptions [9,11,25,93].

Considering the research gaps identified in our sample, it is possible to determine distinct future lines of research within the scope of impression management in the dissemination of information about sustainability. Researchers should also develop and adapt readability indices to the specificities of different languages to extend the study of the readability of accounting reports [55,90,93]. Given that some authors have already proven that some characteristics of CEOs can influence accounting narratives, future research should continue to analyze the impact of their characteristics and attributes on the degree of readability [90,91,93]. The scientific community must also consider the impact of regulatory and normative changes, namely, recent regulations regarding the disclosure of information on EU sustainability in company reports [1,90]. The impacts caused by crises, such as the COVID-19 pandemic, and effects related to industry and financial performance should also be the subject of study in future research [1,9,26,53,89,91].

In addition, in a critical sense, even though most investigations showed that the sustainability reports are a difficult genre to read [1,9,27,55], they had completely different focuses in terms of the samples and regions selected. Thus, identifying new geographical and regional scopes for future research perspectives begins to be rather reductive and limiting, since the literature indicates similar conclusions in different samples. Previous studies have also investigated the readability of various accounting narratives, such as annual reports, integrated reports, sustainability reports, notes to financial statements, and management discussion and analysis sections, and have shown divergent results [55]. For this reason, future research should analyze differences in the readability of different communication channels. According to our analysis, only [27,94] have addressed this issue. Thus, the focus on sustainability reports by the authors in the sample limited their

own investigations, making them so targeted that they neglected the importance of other organizational communication channels, such as websites.

Finally, it should be noted that the manipulation of readability is one of several impression management techniques. The literature therefore identifies different approaches and types of impression management techniques [28,76–78]. However, only [56] identified the analysis of different impression management approaches and techniques as a prospect for future research. In addition, [1] identified only the analysis of the linguistic manipulation of sustainability reports as a future investigation. Once again, focusing only on readability can lead to very incomplete research. In this way, obfuscation techniques, information veracity, visual presentation style, and integration of information into a single report should also be investigated [1,56,91]. Future research should always adopt interdisciplinary and integrative approaches to the various impression management techniques so that it is possible to fully understand the variables that determine these behaviors and, thus, to anticipate and interpret the information disclosed [73,75].

5.4. Theoretical and Pratical Implications

Our bibliometric analysis and systematic literature review suggests that the readability of sustainability reports has important theoretical and practical implications for academic and business communities.

Regarding theoretical implications, as previously mentioned, ref. [91] raise the need to understand different theoretical frameworks in future research. Moreover, none of the articles that make up our sample were included in the red cluster, which focuses precisely on the development of theoretical frameworks. This evidence may be an indicator of the need to expand theoretical understanding about sustainability disclosure and the specificities of the process through which organizations seek to achieve and maintain legitimacy [5,10,21,66,71,91]. According to legitimacy theory, legitimacy influences not only the way individuals act in relation to organizations, but also the way organizations are perceived by stakeholders. Therefore, it is necessary to understand the economic, cultural, political, organizational, and social context in which legitimacy theory is applied, since a wrong application and interpretation of the results obtained can lead to a lack of complete understanding of the perception of legitimacy [63] and the characteristics (quantity and syntactic variability) of the financial and non-financial reports that are intended to be studied [5].

Concerning practical implications, the synthesis and critical analysis of our results demonstrate the need for regulatory and standard-setting bodies to regulate the disclosure of information in the field of sustainability to help readers understand the true content of reports and companies' activities. According to our results, we call on these bodies to formulate and implement more standards and regulations to improve the coherence and comparability of sustainability reports, considering, in particular, the problem arising from the dichotomy of mandatory vs. voluntary disclosures of sustainability information [96,97]. Our research also highlights the need for companies to become aware that sustainability reports are accounting narratives that are difficult to understand [1,9,27,55], so it is imperative to make the information more explicit for all social and environmental dimensions. By using tools such as readability indexes, companies can make the information clear enough to more users and readers [1,37,78]. Finally, our research highlights that more and more companies have to deal with challenging stakeholders, who are becoming increasingly aware of environmental and social problems and, therefore, require comprehensive sustainability reports. This will also encourage greater transparency, quality, and credibility of sustainability reports [25,37,78,98].

6. Conclusions

The negative impacts that humanity has on the environment and society are becoming increasingly evident. For this reason, sustainability is expanding to include a wider range of environmental and social issues across all scientific fields [15]. Due to increased awareness

of sustainability issues, companies are under pressure to share information on their social and environmental impacts in corporate reports [11,12]. The growing concern for the environment and society has led companies to increase the level of sustainability disclosure, empowering the development of specific information [27]. These facts have led to the emergence of a new scientific stream: the readability of sustainability reports [9].

An effective sustainability report can be achieved by providing sufficient, high-quality, and easily understandable information to facilitate the stakeholders' decision-making processes [34,60,75]. However, this is often not the case, and companies seek only to legitimize their activities. For this reason, through impression management strategies, they alter stakeholders' perceptions, disseminate purely symbolic information, and do not demonstrate the true impact of their activities [5,11,24,75]. In practice, organizations may be considered legitimate, even though they cause environmental and social harm where they operate [25]. In short, CSR disclosure practices are often considered symbolic to establish a company's positive image rather than substantive in nature [9,11,27,55,56].

In this sense, this information may not necessarily be beneficial to society, as manipulating the readability of sustainability reports is in fact a tool for companies to obfuscate inferior information in more extensive and broad sustainability disclosures [25,38,74]. Furthermore, a theoretical framework based on legitimacy theory has been proposed. In short, corporate social and environmental disclosure enhances the achievement of organizational legitimacy [13]. Thus, this theoretical approach can indeed explain the impression management strategies used by firms. In these terms, organizations manage external perceptions and obtain legitimacy through impression management techniques [8], namely, by manipulating the readability of accounting narratives [33–35].

Through a complex process of data collection and filtering, which involved keywords related to the topics under study, the scientific area of interest, the type of document, and the textual reading of the documents, the final sample included 10 articles. To answer the research questions, a systematic literature review and a bibliometric analysis were carried out. Scopus metrics and AJG classification were used to identify the latest scientific developments on the readability of sustainability reports. Next, the selected articles were analyzed and processed by VOSviewer software to develop bibliometric maps and identify research topics. Finally, a systematic literature review was applied to critically analyze the main results of the sample, the research gaps, and the proposals for future research.

Regarding bibliometric mapping, the results show that the readability of non-financial reports is a very topical issue. Most studies on the readability of non-financial reports come from Europe and Oceania (7 papers). Patrick Velte (affiliated with Leuphana Universität Lüneburg) is therefore the author with the highest number of citations in the sample obtained. Finally, the *Journal of Business Ethics and Business Strategy and the Environment* obtained the highest number of citations.

In the bibliometric citation networks, we developed co-citation analyses by document, source, and author. According to the co-citations per document, we only found cross-citation links for the articles by [9,27,93]. The *Journal of Business Ethics* and the *Accounting, Auditing & Accountability Journal* are the scientific basis. In terms of co-citations per author, these were classified into three different clusters: quality and effectiveness of sustainability reporting (blue cluster); the relationship between sustainability disclosure and financial performance of companies and auditing issues (green cluster); and models, theoretical frameworks, and standards for sustainability disclosure (red cluster). Moreover, most of the research in our sample (7 out of 10 research) was assigned to the blue cluster of the bibliometric citation networks. Regarding the methodologies adopted, textual and content analysis, readability indexes, and multiple linear regression or logistic regression models are highlighted.

Finally, all the research in our sample raises issues that indicate the use of impression management strategies in organizations' sustainability reports. Indeed, companies engaged in unscrupulous business practices may resort to the complexity of environmental and social disclosure as a form of impression management strategy to counteract negative public

sentiment [99]. Organizations can purposely obfuscate potentially controversial actions using selective, incomplete, and/or biased disclosures, such as syntactic variability [3], and, therefore, according to legitimacy theory, these techniques have altering stakeholders' norms, values, and beliefs as their main objective [3,24]. In addition, the impression management perspective of the sustainability disclosure, the adequation of methodologies per region and language, the important role of the CEO in the reports, the regulation and normative changes, and the contextual environment are the main scientific gaps and proposals for future research.

By these means, the three objectives outlined for the research were achieved. Therefore, the understanding of the topic under study (readability of sustainability reports) was explored and extended. Furthermore, the most recent scientific developments regarding the readability of organizations' non-financial and/or sustainability reports were also explored. In conclusion, we believe that this has added another important contribution to the literature, raising the awareness of organizations on the issue of sustainability, and bridging the existing scientific gaps. It is also expected to have potentiated new developments in this research area, as well as having created a new literature base for future investigations. The theoretical implications of this research are connected with the development of existing theoretical assertions and the development of the literature on readability of sustainability reports itself. From a practical point of view, important insights are derived for regulatory bodies, organizations, and all users of the information disclosed through sustainability reports.

However, this research also has limitations. The main limitation relates to the small size of the sample, which prevents us from reaching more robust conclusions and generalizing our findings. The exclusion criteria and the filtering process also implied choosing some studies over others, which may have led us to ignore some contributions to the topics under investigation, such as book chapters [100] and other types of publications. Finally, although the set of keywords that were used are appropriate, some articles available in the literature may not have been included, thus preventing us from having a broader view of topics related to sustainability in the area of accounting and management. Considering the above, future research should apply different sets of keywords and filtering criteria and use other multidisciplinary databases to expand the conclusions of this study. Future research should also explore and comparatively analyze the literature concerning the readability of financial reports and the scientific stream focused on the readability of sustainability reports. Finally, future research could contribute to the growing body of research on the articulation of different impression management techniques, see [11,28,66,73–75,91]. Understanding the relationship between different impression management techniques, including readability, will benefit theoretical and empirical research, as well as organizations and individuals, regarding their use, management, and effectiveness in different social contexts and over time.

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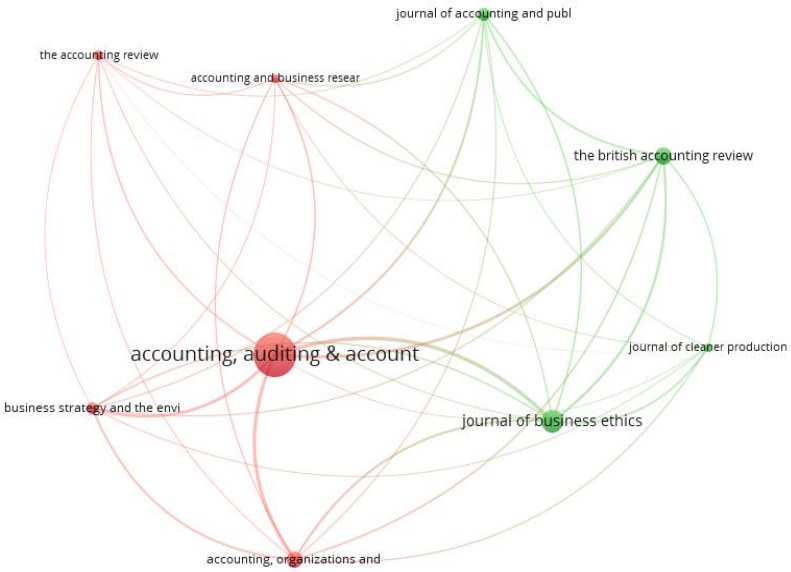
Appendix A



Source: Based on VOSviewer.

Figure A1. Analysis of co-citations by journal.

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