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REVIEW ARTICLE

Research trend in Sustainable Development Goals reporting: a systematic literature review

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Abstract
This paper examines the common themes delivered in studies on corporate reporting in relation to Sustainable Development Goals (SDGs). Articles of the aforesaid studies were mostly acquired from Scopus and Web of Science (WoS) archives from year 2015 to 2022 in which the contents were carefully reviewed for selection. To systematise the literature, PRISMA 2020 statement is used. Descriptive analysis reveals an increase in publications on corporate SDG reporting, although most are focused on developed nations. The analysis also shows a scarcity of studies on the consumer goods, agricultural, fishery, and forestry sectors. Furthermore, current studies have yet to adopt a qualitative or mixed-method approach. There are fundamentally six themes that emerged from the review of literature—the degree of SDG engagement, the quality of SDG reporting, the determining factor in SDG reporting mechanism, the consequences of SDG reporting, the legitimisation approaches, as well as the institutional/stakeholder pressure. For determinants of SDG reporting, it is observed that environmental governance is not explored. This paper identifies the least addressed SDGs that businesses can focus on to accelerate their SDG contribution rate. This paper guides future research and informs decision-making by organisations and stakeholders interested in promoting sustainable development through SDG reporting.

Keywords SDGs · SDG engagement · Quality of SDG reporting · Value creation · Determinants of SDGs · Legitimisation strategy · Stakeholder pressure · Institutional pressure

Introduction

The United Nation (UN) recognises the pivotal role of the private sector in contributing to the achievement of Sustainable Development Goals (SDGs) (Grainger-Brown and Malekpour 2019; Wang et al. 2020; Elalfy et al. 2021). In order to promote sustainable development, the business community was urged to adopt the SDGs by Ban Ki-moon, the former UN Secretary-General, during a Global Economic Forum in 2016 (United Nations 2016). The business sector is recognised as a significant contributor to economic growth, enabling the acceleration of sustainable development efforts. According to an SDG engagement survey by PwC (2015), companies see SDGs as an avenue for future business opportunities and rank SDG 8 (decent work and economic growth) as the top goal for which their business can have the highest potential impact. However, business activities can also have adverse impacts on sustainable development. Companies that aspire to pursue sustainable development need to constantly improve their activities to achieve true sustainability. As a result, stakeholders are now demanding more information from businesses to evaluate their SDG performance. Corporate disclosure has thus become an essential tool for companies to demonstrate their commitment to achieve SDGs and communicate their sustainability efforts to their stakeholders (Di Vaio and Varriale 2020).

Although many business entities have responded to the UN's call to incorporate sustainable development strategies and efforts in their activities (GRI and UNGC 2018), the

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disclosure of SDG information has been criticised for its lack of comprehensive reporting framework, greenwashed reporting, and limited usefulness in assisting stakeholders to make an informed decision (KPMG 2018). This has led to difficulties in effectively allocating capital to support SDG efforts as stakeholders cannot fully depend on the information provided. These issues, among others, have received much scholars' attention, leading to increasing empirical research in corporate SDG reporting.

However, there is limited knowledge of the practical and theoretical issues which have been discussed in business and management literature. Despite the increase in empirical research on corporate SDG reporting, there is a limited number of comprehensive reviews on this topic. While individual studies can provide valuable insights, a review of the literature can offer a more holistic perspective and identify gaps and inconsistencies in the existing research. This calls for a review of the current literature to provide insights into the recent development in this field.

While previous studies have attempted to identify the themes in non-financial reporting research (Hahn and Kühnen 2013; Dienes et al. 2016; Kim 2021), it is only recently that SDG reporting has been incorporated into this field. In this context, Turzo et al. (2022) have identified research themes based on different types of corporate non-financial reporting including SDG reporting. However, we argue that SDG reporting is a distinct area worth studying because it is a relatively new area that has its own unique reporting process. Past literature review on SDG reporting research has primarily concentrated on the factors that influence SDG reporting (Datta and Goyal 2022).

Pizzi et al. (2020) have carried out a bibliometric analysis and systematic review of SDG-related business and management literature. Their multidisciplinary-based analysis revealed that non-financial reporting is one of the four main themes that emerged in the literature. As their study covered a broader scope of research, the specific themes related to reporting areas were not specifically reviewed. To our best knowledge, there is no systematic review that has focused on the intersection between private companies and SDG reporting. Therefore, we attempt to fill in a research gap by exploring themes related exclusively to corporate SDG reporting, an area suggested by Pizzi et al. (2020) as requiring further investigation.

This study uses a systematic literature review method to provide a rigorous and structured approach to review and synthesise the existing literature. By conducting this study, we aim to identify the strengths, limitations, and trends in the current state of research on corporate SDG reporting. Specifically, we attempt to reveal key research themes and the interconnectedness of the themes in the field. Examining the themes in greater detail provides knowledge for the development of effective corporate SDG reporting strategies. The findings from this study can then be used to guide future research and inform decision-making by organisations and stakeholders who are interested in promoting sustainable development through SDG reporting.

The remaining sections of this paper are structured as follows: the second section supports the background of this study. The third section provides the research method, and the fourth section presents the descriptive analysis of the current literature. Thematic results are in the fifth section, while recommendations for future research are in the sixth section. The seventh section ends with a conclusion and limitations of the study.

Background

The trend of non-financial reporting practices has received growing interest and scrutiny from academic scholars. This is demonstrated by the proliferation of studies examining non-financial reporting over the years (for reviews, see, e.g., Hsiao et al. 2022; Turzo et al. 2022). Corporate sustainability reporting represents a distinct strand within the broader landscape of non-financial reporting research (Turzo et al. 2022). While the term "sustainability reporting" may be subject to certain controversies (see, e.g., Marshall and Toffel 2005; Milne and Gray 2013), most scholars (see, e.g., Lee Brown et al. 2009; Amran and Haniffa 2011; Hahn and Kühnen 2013; Ioannou and Serafeim 2017) commonly refer to it as a firm's practice of publicly disclosing information about its impacts on economic, environmental, and social matters. In a similar vein, Aras and Crowther (2008) proposed a stakeholder-based model of corporate sustainability reporting, which emphasises the disclosure of information regarding a firm's financial returns, organisational culture, societal influence, and environmental impact.

In contrast, corporate SDG reporting involves disclosure regarding a firm's engagement and contribution towards the fulfilment of SDGs (Calabrese et al. 2021). While reporting on sustainability is broad based and diverse, SDG reporting specifically focuses on corporate progress towards the achievement of 17 goals outlined by the UN. Since the introduction of SDGs, the discourse around SDGs has been apparent within the sustainability reporting landscape of firms across sectors and continents (Whittingham et al. 2022). Reporting on SDGs enables firms to communicate with their stakeholders in a universal language (GRI, UNGC and WBCSD 2015; GRI and UNGC 2018; Lashitew 2021). However, the SDG sub-targets are often national or global in scope, extending beyond the reach of individual firms (Khaled et al. 2021). This poses challenges for business sectors to identify relevant SDGs and report on their SDG contributions in a meaningful way (Izzo et al. 2020a).

Given the contrasting nature of sustainability reporting and SDG reporting, it is essential to conduct a review of recent trends and the state of knowledge in SDG reporting research. This review is especially timely as we have reached the midpoint of the SDG timeline. Identifying and addressing any existing research gaps is crucial in establishing a clearer pathway for future research, which can advance the maturation of the corporate SDG reporting landscape.

The current research relating to SDG reporting is relatively scarce when compared to sustainability reporting. This is unsurprising given that empirical research on sustainability reporting spans over five decades (Brooks et al. 2018; Andrew and Baker 2020; Pasko et al. 2021), whereas the term "SDG" gained prominence in business and nonfinancial reporting only in recent decade. Nevertheless, the scholarly contribution to SDG reporting is viewed as "slow" (Qian et al. 2021) and "fragmented" (Pizzi et al. 2020). Research in SDG area has indeed been challenging due to its inherent complexity and multidisciplinary nature (Ike et al. 2019; Mensah 2019; Cosma et al. 2020).

Research method

Identifying search terms and databases

This study conducts a systematic review which evaluates and synthesises the current knowledge in the field of SDG reporting in order to draw conclusions from the observed phenomenon (Saunders et al. 2019; Page et al. 2021). In our review, we utilised PRISMA 2020 statement established by Page et al. (2021). This approach offers a transparent and thorough account of how we systematically review the literature in our analysis.

We aim to carry out a review of studies that pertain to or are relevant to SDG reporting conducted by private sector entities. We chose Scopus and Web of Science (WoS) databases, considering their extensive coverage and reputable nature in identifying highly relevant research publications in the field of corporate SDG reporting. Within the academic community, both Scopus and WoS stand as highly regarded and widely utilised databases, recognised for their meticulous indexing and rigorous evaluation procedures (Pasko et al. 2021). In accordance with the objective of our research, we used the keywords "SDG" or "sustainable development goal*" and subsequently "report*" or "disclos*". We did not confine the search to any specific country or region. The search was done on 19 September 2022.

Specifying inclusion and exclusion criteria for review

The literature that investigates corporate SDG reporting only existed after business sectors adopted SDG reporting practice in 2015 (the year Agenda 2030 was launched). Therefore, we set the search period from 2015 to 2022 for both databases. Research articles from all countries/regions were included. The search was then limited to English-written articles. The SDG is a topic that covers diverse fields including economy, engineering, law, science, and medicine. For practicality, the search was limited to subject areas connected with corporate reporting practices relevant to SDGs. These areas encompass fields such as the environment, business, economics, and interdisciplinary studies. Considering that corporate reporting functions as a communication channel between business sectors and stakeholders, we selected categories that are relevant to the business field. We also selected environmental and social science categories which publish articles that study the dynamics between organisations, the environment, and society. After applying the inclusion/exclusion criteria (see Table 1), the search results were 2855 records (see Fig. 1).

Before the screening stage, we combined the lists of records extracted from both WoS and Scopus. We removed 752 duplicate records, resulting in 2103 records left for screening. The subsequent step involved the manual screening of the records' abstract to pre-determine whether the articles are relevant to our study. Abstracts that particularly mention SDG reporting or disclosure and the private, business, or corporate sectors were deemed pertinent at this point. We removed 1925 irrelevant records after the manual screening. The remaining records were 178 where articles were sought for retrieval. However, three articles were inaccessible. Thus, only 175 articles were retrieved. These articles were read in full to assess whether the research undertaken indeed covers SDG reporting by companies. During this process, we eliminated articles that were irrelevant to corporate SDG reporting/disclosure. Additionally, articles exclusively focusing on SDG disclosure within the education sector were also excluded. This is attributed to the fact that they constitute a separate avenue of research, owing to the distinct nature of educational institutions (Caputo et al. 2021; De la Poza et al. 2021). As a result, 93 articles were removed.

To ensure that other relevant articles are not omitted, we used the Publish or Perish software to undertake cross-checking (Harzing 2007). We found two articles from Google Scholar to be included in our review. Together with 82 articles from WoS/Scopus, we have 84 studies included in our review (or reports of included studies).

Descriptive analysis

Drawing from the methodologies of Hahn and Kühnen (2013), Dienes et al. (2016), and Hsiao et al. (2022), we applied their approaches to analyse trends and patterns in

Table 1 Search string and inclusion/exclusion criteria

	Web of Science (WoS)	Scopus
Advanced search	(TS = (SDG* OR "sustainable development goal*")) AND TS = (report* OR disclos	TITLE-ABS-KEY ((sdg* OR "sustainable development goal*") AND (report* OR disclos)
Include	All countries/regions	All countries/regions
Limit to	English	English
Exclude	Book Chapters	Book Chapters
	Proceeding Paper	Conference Paper
	Book	Book
Categories	Environmental Sciences	Environmental Sciences
	Management	Social Sciences
	Multidisciplinary Sciences	Business Management and Accounting
	Business Finance	Economics, Econometrics and Finance
	Social Sciences Interdisciplinary	Multidisciplinary
	Economics	

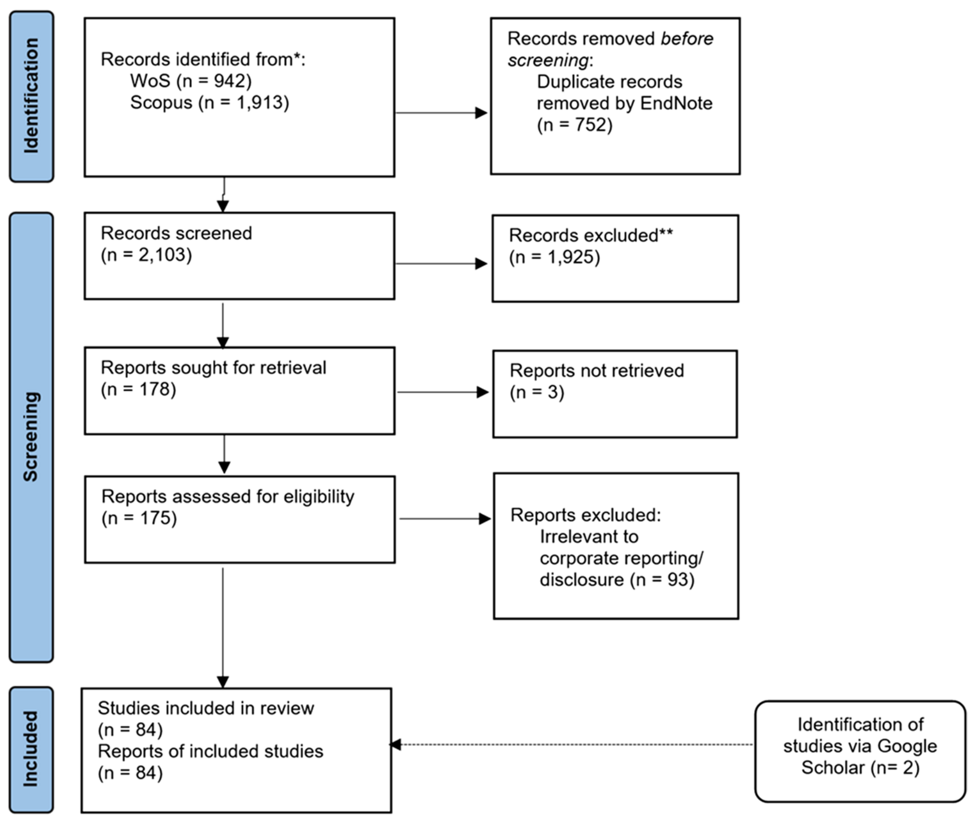

Fig. 1 Identification of studies via Web of Science, Scopus. and Google Scholar. * Following the suggestion by Page et al. (2021), the count of records for each database was kept separately prior to the screening stage. His approach was employed to ensure the precision and transparency of the selection process and outcomes

literature. Following suit, we examined trends and patterns in the published articles, subsequently classifying them into five distinct topics.

Publications by journal

A total of 46 journals contributed to the articles included in this literature review. Out of these, four journals have published at least three articles. The most productive journal is *Sustainability* (18). Publications centered on corporate sustainability discourse are aligned with the mission of *Sustainability*, as its publisher, MDPI, is a member of the United Nations Global Compact (UNGC). While the *Journal of Cleaner Production* featured 11 articles, *Corporate Social Responsibility and Environmental Management* published 8 articles. This is followed by *Sustainable*

Table 2 The most cited journals

Journal Title	Number of citations	Number of articles	Database	Research area	JCR Impact Factor 2022	Quartile
Journal of Cleaner Production	647	11	WoS/Scopus	Science & Technology – Other Topics Engineering; Environmental Sciences & Ecology	11.1	Q1
Corporate Social Responsibility and Environmental Management	465	8	WoS/Scopus	Business & Economics Science & Ecology	9.8	Q1
Sustainability	373	18	WoS/Scopus	Science & Technology – Other Topics; Environmental Sciences & Ecology	3.9	Q2
Sustainable Development	146	4	WoS/Scopus	Development Studies; Science & Technology—-Other Topics; Public Administration	12.5	Q1

Development with 4 articles. The combined articles from these four journals make up 49% of the total articles under review (see Table 2). While *Sustainability* has published the greatest number of articles, the *Journal of Cleaner Production* has garnered the highest number of citations, specifically 647 citations. Notably, the latter journal's citation count surpasses that of *Sustainability* by 1.7 times.

It seems that such publications are absent in prominent accounting journals that hold high rankings such as those classified as Q1 or Q2 in the Journal Citation Report (JCR) Impact Factor rankings, as well as those ranked as A* or A according to the Australian Business Deans Council (ABDC) Journal Quality List. Journals such as *Accounting, Auditing & Accountability*, *Contemporary Accounting Research*, and *Journal of Accounting and Public Policy* lack such contributions. This may suggest that accounting journals continue to prioritise conventional accounting subjects over the emerging significance of research on sustainable development reporting.

Research publications by year

The first two years (2015 and 2016) saw no studies done on corporate SDG reporting. UN SDG disclosure was considered a relatively new dimension in corporate reporting, thus might require some time for data collection and analysis before a research paper could be published. A single article was published for the subsequent year. The research gained momentum after that, with 18 studies in 2020 and 23 studies in 2021. The year 2022 witnessed the highest number of studies, totalling 37 published articles (up until mid-September), marking a substantial increase of more than 61% from the preceding year (see Fig. 2). The number of citations reached its peak in 2020 with a total of 747 citations.

The increase in publications concerning SDG reporting shows the growing trend of businesses engaging in SDG disclosure practice. The amount of research examining this subject is anticipated to increase significantly as more businesses make SDG reporting a key component of their sustainability strategy. This signifies the growing significance of SDG reporting within the realm of business, highlighting the necessity for a thorough grasp of its practices, advantages, and challenges.

Studies by geographical location

Out of the 84 studies, 24 (or 29%) of them explored SDG reporting practices by selecting sample companies from multiple countries, often spread across diverse locations worldwide. There are 18 (21%) studies which focus on a specific region(s) predominantly in Europe. Another 35 studies (42%) are country specific. The studies consist of sampled companies mostly from Spain (10), followed by Italy (5), Indonesia (3), and Australia (2). Other countries under study are Greece, India, UK, Belgium, South Africa, France, Sweden, Portugal, USA, Latin America, China, Nigeria, Columbia, Oman, and Libya, with one article, respectively (see Fig. 3).

The cross-country studies have constituted 50% of the total articles. The majority of the companies in the samples are from developed nations or are among the largest businesses listed on the Fortune 500 or Global 2000. Although cross-country studies provide insights into the progress of SDG achievement on a worldwide basis, the results cannot be generalised particularly in developing countries. Most theories or hypotheses which are widely accepted in developed countries have been applied to developing countries (Qian et al. 2021). This simply ignores the unique political, economic, legal, and cultural contexts of a developing country, which may be the key factors to highlight the real issues faced by companies in that country.

The emphasis on studies conducted in developed countries has resulted in the neglect of the unique challenges faced by developing countries, even though these are the regions that often lag behind in terms of progress towards the SDGs. Each country has its challenges and prioritisation when addressing

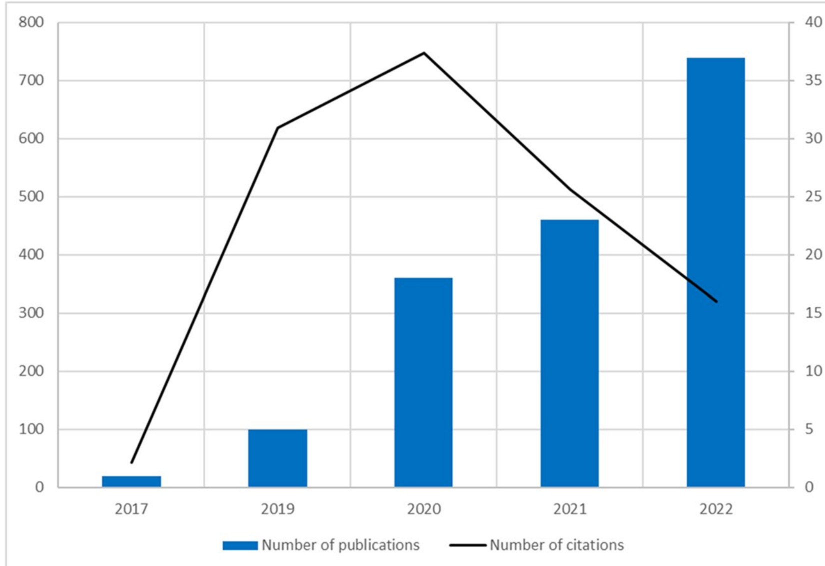

Fig. 2 Number of publications and citations by year

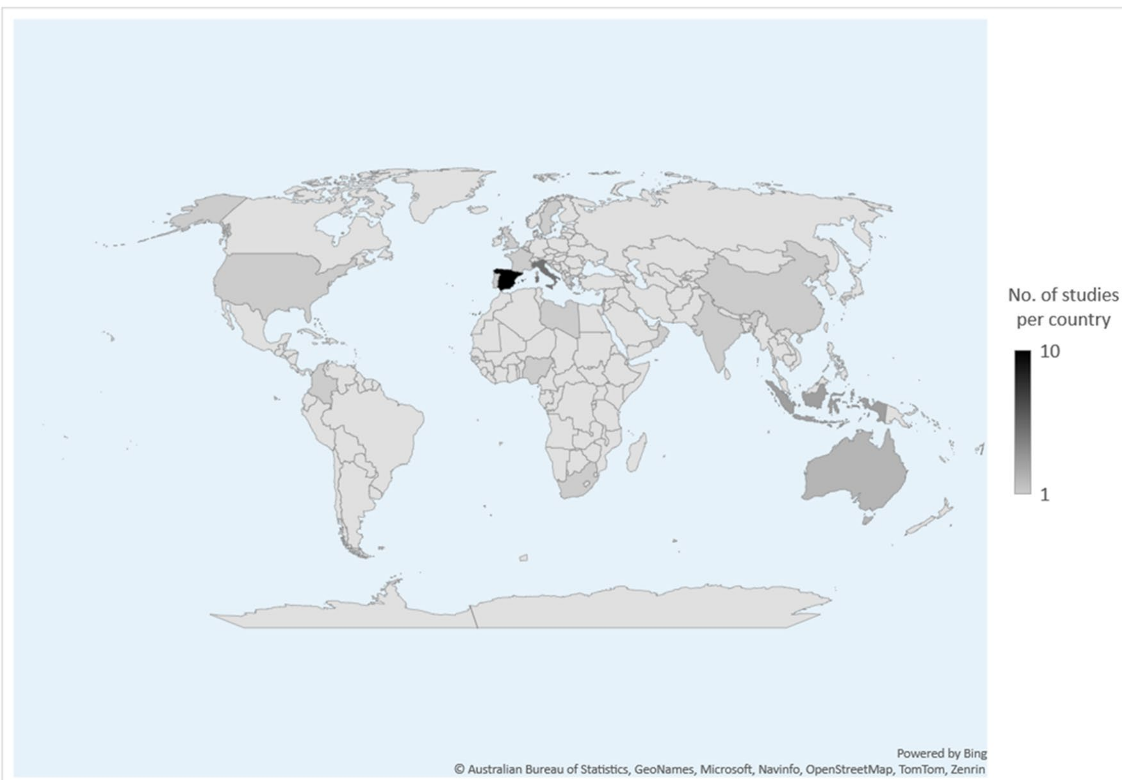

Fig. 3 The number of studies by country

the SDGs. For example, Brazil's major SDG challenge is to reduce inequalities (related to SDG 10), whereas Canada's major challenge is to ensure sustainable consumption and production (related to SDG 12). When research from these countries is conducted together, it may dilute the focus on specific SDG-related challenges faced by respective countries. This may hinder companies in their respective countries to disclose more about their contribution towards the nation's most challenging SDGs. A country-specific study can address such issues but is currently lacking.

Studies by sector

There were 54 (64%) out of 84 studies that examined sample companies in a diverse range of sectors. Another 27 (32%) studies examined companies' SDG reporting from a specific sector. Out of the 27 studies, more than one study was conducted in financial services (6), energy/utilities (4), maritime (3), apparel (2), aviation (2), and tourism (2), whereas the sectors with one study each include manufacturing, food retail, hospitality, metals, pharmaceutical/retail, real estate, superannuation, and telecommunication.

Our findings show that there are no specific studies done on highly environmentally sensitive sectors such as fishing, timber, and agriculture sectors. Studies on sectors that provide consumer goods and services (e.g., food and beverage and healthcare) are similarly lacking.

Research methodology

Approximately 56% of the studies take on a descriptive nature (for details regarding the methodology employed in each article, see Appendix). The majority of descriptive studies conduct content analysis, employing quantitative and/or qualitative methods, to evaluate SDG disclosure. They assess the extent of SDG engagement or disclosure quality. An additional 36% of the studies fall under the quantitative category, involving the utilisation of numerical secondary data for conducting statistical tests, such as regression analysis and grey relational analysis. It is evident that no qualitative studies (such as interviews) or mixed-method studies (combining quantitative and qualitative approaches) have been conducted concerning SDG reporting (see Fig. 4). The interview method has the advantage of discovering novel or alternative perspectives and adding richness to the understanding of an aspect of SDG reporting[1] (Creswell 2014). The reliability of the results can be enhanced by using a mixed methods approach, which combines quantitative and qualitative methods. Depending on the type of design used, mixed methods can complement the results from the quantitative approach with those from the qualitative one (or vice versa) or compensate for the inherent bias resulting from either method (Greene et al. 1989).

We found four studies that do not fit into either category (classified as "others"). These are the only studies that use primary data for analysis. However, the studies are not meant to test relationships between variables. Three studies use

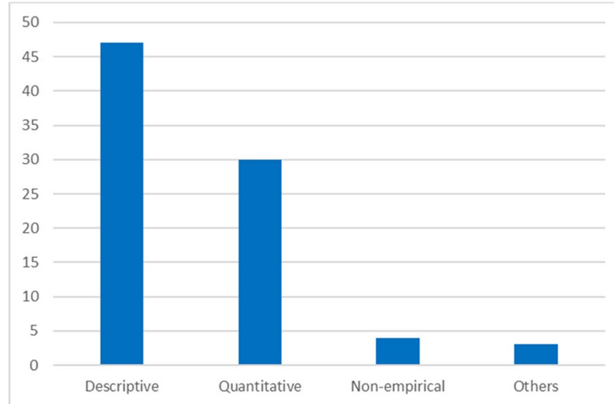

Fig. 4 The number of studies by research methodology

questionnaires combined with content analysis to evaluate the level of SDG reporting, whereas one study adopts semi-structured interviews together with a few other research methods (such as literature review, case studies, and content analysis) for the purpose of proposing an alignment framework for SDG reporting.

Main themes in SDG reporting research

All studies were critically examined by highlighting and documenting recurring themes that emerge from the literature. There are six key themes inferred from the literature on corporate SDG reporting. Other than "conventional" themes such as factors influencing SDG reporting and quality or the extent of SDG reporting, the concept of value receives great attention from scholars. The three commonly used theories underlying their research are legitimacy, institutional, and stakeholder (see Table 3).

Level of SDG engagement

The level of engagement with SDGs pertains to the degree to which companies communicate the associations between the SDGs and their business. The studies on SDG reporting have offered valuable insights into the prevailing corporate SDG engagement level. The studies typically determine the level of engagement by analysing the disclosure content. It is important to acknowledge that not all studies under review intend to analyse the level of corporate engagement with all aspects of the SDGs. However, we found 19 (26%) articles that researchers address 17 goals as a significant part of their research while the rest of the study looked into different aspects of SDG in reporting. Driven by our intention to provide insight on the current trend in corporate SDG reporting, we summarise the results of their findings in Table 4.

[1] For an example of interview as the methodology used in corporate sustainable development reporting research, see Bebbington, J., Higgins, C., and Frame, B. (2009). Initiating sustainable development reporting: Evidence from New Zealand. *Accounting, Auditing & Accountability Journal, 22*(4), 588–625.

Table 3 Theory or framework used in research

Theory of framework	Number of articles	%	References
Legitimacy	13	15.48%	Fonseca and Carvalho (2019); Izzo et al. (2020b); Curto-Pages et al. (2021;)Elalfy et al. (2021); García-Meca and Martínez-Ferrero (2021); Pizzi et al. (2021); Sekarlangit and Wardhani (2021); Silva (2021); Calvo—-Centeno et al. (2022); Di Vaio et al. (2022); Lodhia et al. (2022); Manes-Rossi and Nicolo (2022); Oppong (2022)
Institutional	8	9.52%	Rosati and Faria (2019a); Gerged and Almontaser (2021); Macellari et al. (2021); Bose and Khan (2022); Erin et al. (2022); García – Sanchez et al. (2022); Moore and Sciulli (2022); Whittingham et al. (2022)
Stakeholder	4	4.76%	Gunawan et al. (2020); Lopez (2020); Mehmood et al. (2022); Zhou et al. (2022)
Signalling	1	1.19%	Cosma et al. (2020)
Impression management	1	1.19%	van der Waal and Thijssens (2020)
Two of the above	6	7.14%	Garcia-Sanchez et al. (2020); Gambetta et al. (2021); Calabrese et al. (2022); Heras-Saizarbitoria et al. (2022a); Kuswantoro et al. (2022); Nicolò et al. (2022)
Three or more of the above	4	4.76	Rosati and Faria (2019b); Erin et al. (2022); Garcia et al. (2022); Kucukgul et al. (2022)
Others (e.g., resilience, resource – based view, trade – off, mouse click, reputational voluntary disclosure, social change, value, circular economy, framing and corpus linguistics, agency, identity (re) formation and social entrepreneurship	13	15.48%	Acuti et al. (2020); Gazzola et al. (2020); Izzo et al. (2020a); Olofsson and Mark-Herbert (2020); Wang et al. (2020); Kazemikhasragh et al. (2021); van den Broek (2021); Al Lawati and Hussainey (2022); Giron et al. (2022); Hummel and Szekely (2022); Jiménez-Yáñez and Fontrodona (2022) Krasodomska et al. (2022); Opferkuch et al. (2022)
Nondeclared/not applicable	34	40.48%	
Total	84	100%	

There are several measurement approaches used by researchers to determine the level of SDG engagement. For example, Perryman et al. (2022) utilised an ordinal scale to classify SDG engagement level. They established four distinct categories: disclosure accompanied by action and measurement is deemed a high level of engagement, disclosure of action without measurement is classified as moderate, content revealing minimal action without measurement falls into the minimal level, and the absence of engagement is evident when neither action nor measurement is disclosed.

Conversely, Heras-Saizarbitoria et al. (2022a, b) conducted an exploratory study where the firm's commitment to SDGs was classified into five levels: intermediate (if SDGs are integrated as part of the organisational goal), low (if SDGs are specifically referred), very low (if business strategy is associated with SDG targets), extremely low (if SDGs are mentioned several times), and non-existent (if SDGs are not mentioned at all). On a different note, Nylund et al. (2022) used the concept of responsible research and innovation (RRI) to determine the level of SDG engagement. They evaluated each of the 17 SDGs at the sector level, classifying them according to the strategic, proactive, reactive, and unaware levels on the RRI scale.

Another approach is by analysing the textual content and themes of discussion surrounding SDGs. For example, Costa et al. (2022) explored how tourism companies engage SDGs in their sustainability report. Instead of using a measurement scale, they focused on three key attributes of SDG discourse: (1) materiality matrix, (2) SDG-related statement, and (3) strategic business actions and relevant measures in compliance with GRI guidelines. Other attributes considered by researchers are the inclusion of SDGs within CSR practices (Singh and Rahman 2021), specific SDGs as part of business model/strategy/goal (Haywood and Boihang 2021; Song et al. 2022), an assessment tool to measure how business activities impact SDGs (Song et al. 2022), and the allocation of a dedicated page or section within reports to SDGs (Manes-Rossi and Nicolo 2022).

Regarding the research findings, it was observed that the majority of studies indicated that SDG engagement remains at a surface level. As indicated by Heras-Saizarbitoria et al. (2022a, b), within the samples of 1370 companies, more than 80% of them failed to elucidate how they prioritise, operationalise, or integrate SDGs into their business practices. Likewise, the conclusions drawn from Silva (2021) revealed that while 67% of the 100 sampled

Table 4 Findings from existing studies: SDG disclosure trend

Basis of measurement	Author(s)/year	Data used in the study	Sustainable Development Goal (SDG)																
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Binary score (e.g., non-disclosure versus disclosure)	Lodhia et al. (2022)	50 companies listed on Australian Stock Exchange (2017–2018)		L*											H	L*			
	Andrian et al. (2021)	non-financial companies listed on the Indonesia Stock Exchange with 496 reports (2017–2019)				H										L			
	Sekarlangit and Wardhani (2021)	265 companies (2016–2017)									H							L	
Ordinal score (e.g., no specific disclosure topic to quantitative information about specific disclosure topic)	Tsalis et al. (2020)	29 company members of the Hellenic Network for Corporate Social Responsibility									L				H				
	Avrampou et al. (2019)	5 banks in 2016 listed on Dow Jones sustainability world index				H													L
	Gambetta et al. (2021)	14 companies from Spanish Global Compact Network with 56 observations (2016–2019)								H						L			
	Sardianou et al. (2021)	37 banking institutions in 2018								H							L		
	Ionascu et al. (2020)	16 companies with 39 observations (2016–2018)	L	L				H								L			
	Nechita et al. (2020)	36 companies from ISI Emerging Markets Group's EMIS platform with 147 observations (2015–2019)	L							H									
Percentage of companies addressing each SDG	Calvo-Centeno et al. (2022)	35 companies in 2017 and 2019 listed on IBEX 35 index of the Madrid Stock Exchange		L #						H ##					H #	L ##			
	Erin et al. (2022)	50 companies with 200 observations (2016–2018)										H			L				
	Fonseca and Carvalho (2019)	235 Portuguese organisations	L											H					
	Izzo et al. (2020a)	40 companies listed on Italian Stock Exchange belonging to the FTSE MIB Index in 2018		L						H									
	Izzo et al. (2020b)	134 companies in 2018 from IIRC's IR reporters list		L						H									
	Nicolò et al. (2022)	46 companies in 2017													H			L	

Table 4 (continued)

Basis of measurement	Author(s)/year	Data used in the study	Sustainable Development Goal (SDG)																
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Others (e.g., level of prioritisation)	Ionascu et al. (2020)	16 companies with 39 observations (2016–2018)	L	L									H						
			L					H								L			
	Heras-Saizarbitoria et al. (2022)	1370 observations (2018 and 2020)								H						L			
	Garcia-Sanchez et al. (2020)	160 companies listed on Madrid Stock Exchange		L						H									
	Hatayama (2022)	61 companies								H						L			
	Wang et al. (2020)	40 top container liners and container terminals with 56 observations (2016–2019)	L**	L**			L**			H									

Note: (1) H, highest; L, lowest; (2) #, 2017; ##, 2019; (3) *, equal percentage; (4) **, SDG 1, 2, and 5 have less than 1% each

companies made reference to SDGs, the majority of them offered information at a broad or goal level. The connection between the 17 goals and their associated targets was not clearly shown.

The studies adopted different methods in determining whether a particular SDG receives attention from companies by ranking each of the 17 goals. A common method used by researchers was to calculate the percentage of companies mentioning SDGs while others went further by assigning a score that represents the nature and extent of information provided. Meanwhile, there were a few studies that analysed specific SDG targets in the disclosure using qualitative content analysis. For example, Acuti et al. (2020) identified SDG targets related to the concept of urban resilience and subsequently analysed the extent to which companies incorporate these resilience targets in reporting. Borges et al. (2022) mapped the corporate SDG practices among oil and gas companies against targets of SDG 7 (affordable and clean energy), SDG 9 (industry, innovation and infrastructure), 11 (sustainable cities and communities), and SDG12 (responsible consumption and production). Landau (2020) used some case examples to illustrate how the operational practices of hospitality companies contribute to SDG 13 (climate action) targets. Furthermore, by focusing on a specific SDG, it becomes possible to align its related targets with GRI indicators in greater detail, while also aligning them more effectively with business themes and corporate initiatives (Di Vaio and Varriale 2020; Perello-Marin et al. 2022). In their research, Vallet-Bellmunt et al. (2022) conducted a specific study focused on SDG 12 (responsible consumption and production), employing SDG compass' business themes and GRI topics as instrumental tools. Within this study, they analysed how food retailers communicate their contributions to SDG 12, achieving this by aligning each of the SDG 12 targets and their associated business themes with the pertinent GRI topics. Rather than providing a broad overview of the trend in SDG disclosures, these studies hold greater impact due to their focus on addressing gaps and issues in SDG reporting within particular contexts.

Many of the studies confirm the findings by Oxfam (Mhlanga et al. 2018) that while SDG 8 (decent work and economic growth) receives the highest level of attention or prioritisation, SDG 14 (life below water) garners the least focus in terms of SDG disclosure. However, certain studies indicated that companies gave the lowest priority to SDG 2 (zero hunger) instead of SDG 14 (life below water). Moreover, some studies identified different SDGs as the most pertinent, such as SDG 4 (quality education), SDG 6 (clean water and sanitation), or SDG 10 (reduced inequalities). Studies conducted by Calvo-Centeno et al. (2022), Erin et al. (2022), Lodhia et al. (2022), and Nicolò et al. (2022) have revealed that different companies assign differing levels of significance to the same goal. For instance, SDG 13 (climate action) was simultaneously considered both highly important and least important by different companies.

Interestingly, three studies within the financial sector (see Avrampou et al. 2019; Gambetta et al. 2021; Sardianou et al. 2021) showed that even companies within the same sector disclose differing levels of engagement for each SDG. The contrasting outcomes can be reasonably attributed to differences in measurement criteria, sample size or selection, sector or industry classification, study year, and/or the geographic origin of the samples.

The findings presented in Table 4 might yield inconsistent reporting trends for each individual SDG, yet they distinctly indicate that companies do not allocate equal attention to every SDG. These trends are consistent with the surveys conducted by practitioners such as KPMG (2020) and Preston and Scott (2015). These findings carry three implications.

First, companies should possess sufficient resources to engage in activities that contribute to all SDGs. Hence, the identified disclosure gap provides companies with an opportunity to realign their sustainable development efforts towards the SDGs that receive comparatively lesser contributions. For example, a company could still make positive contribution to SDG 15 (life on land) by engaging in activities such as conserving forested areas and enhancing biodiversity even if its primary business operations do not directly impact biodiversity loss. Second, the focus on only part of the SDGs suggests that some SDGs are more feasible to be achieved at the country level such as SDG 1 (end poverty) and SDG 2 (zero hunger). Therefore, firms arguably are not expected to engage all 17 SDGs in a balanced way (Manes-Rossi and Nicolo 2022; Nicolò et al. 2022).

Third, there are different goal prioritisations for different sectors; hence, the most relevant goal(s) should be identified for each sector. For example, the financial sector is the only sector that provides responsible/sustainable lending. This economic indicator should be integrated into the business models of financial institutions to ensure effective capital allocation and investments directed towards businesses that foster sustainable development. This will initiate "ripple effects", making a positive contribution to SDG 8 (decent work and economic growth), SDG 10 (reduced inequalities), and 13 (climate action), among others. The third perspective could be perceived as more pragmatic with regard to resource mobilisation and the implementation of SDGs at the organisational level. Among other objectives, SDG 17 (peace, justice, and strong institutions) fosters collaboration within the business community itself to realise SDGs. Collaborating across different sectors allows for the aggregation of varied expertise and resources, enabling the formulation of solutions to complex challenges (Whittingham et al. 2022).

The existing research on corporate SDG reporting has mainly focused on analysing the reporting strategies and trends in different sectors or specific sector. While this research provides an understanding of the evolution of corporate SDG reporting practice, using a standardised approach to measure corporate contribution to SDGs ignores the fact that different sectors are equipped with varying expertise and resources to implement each of the SDGs. There is a need to shift the research paradigm towards developing instruments tailored to evaluating specific SDGs reported by sectors which have common SDG targets. This has the potential to enhance the impact of SDG reporting, as companies can relate better to the evaluation as it specifically addresses their contextual challenges in reporting SDGs.

Quality of SDG reporting

While numerous studies provide insights into the current SDG engagement level among corporate entities, certain research proposed different criteria for assessing the quality of SDG reporting (see Table 4). The quality criteria differ across studies. The studies conducted by Avrampou et al. (2019), Nechita et al. (2020), and Tsalis et al. (2020) have evaluated the quality of disclosure through the application of a quantitative scoring system, such as a scale from 0 to 5. In Nechita et al.'s (2020) study, a higher score was assigned to disclosures of SDG targets and measurement results compared to those without such disclosures. The disclosure of quantitative information is given greater weightage than qualitative information. This approach is similarly employed by Tsalis et al. (2020). In the studies of Hatayama (2022) and Sardianou et al. (2021), scores are assigned based on the strength of the relationship between materiality items and SDGs. As observed in Silva (2021), qualitative analysis was conducted to assess the quality of disclosure through past, present, and future orientation of the narratives. Another qualitative analysis was employed by Manes-Rossi and Nicolo (2022) to examine the depth of information disclosed, whether it comprises a mere executive statement or specific key performance targets for SDG achievement.

The quality of SDG disclosure is of utmost significance to ensure the dissemination of value-relevant information to capital providers (Hummel and Szekely 2022). Currently, the poor quality of reporting has led to a lack of investor interest in backing long-term investments associated with "value creation" (Adams 2017). This lack of credibility in the disclosed information hampers their ability to recognise the significance of the provided data, thus impeding their capacity to allocate capital towards sustainable development initiatives.

The current approaches to measuring quality of reporting appear fragmented with some studies blurring the distinction

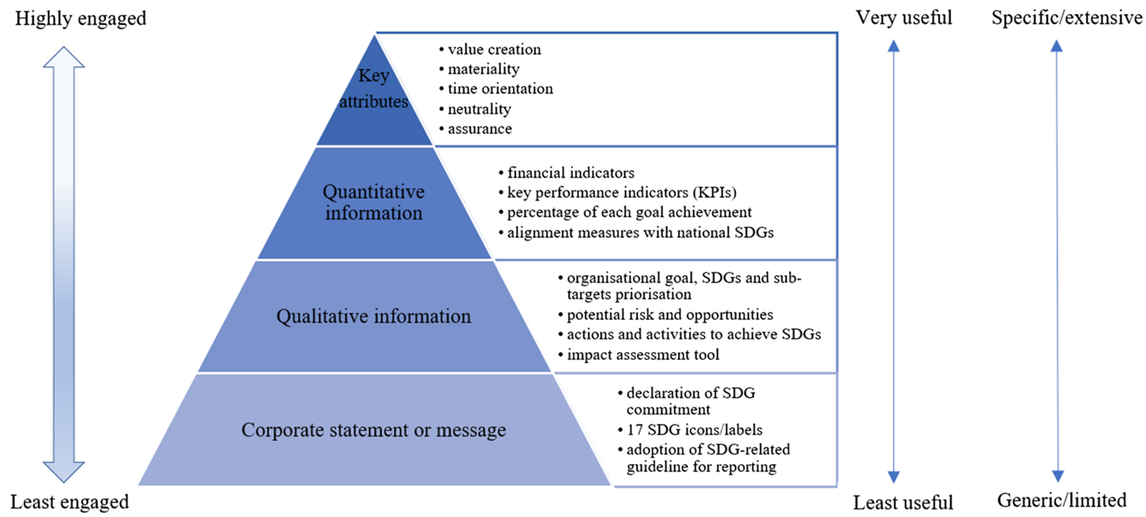

Fig. 5 Quality of SDG reporting

between engagement level and reporting quality. Although "good" quality of SDG disclosure is closely associated with the depth of engagement, a high level of engagement does not necessarily reflect good quality of information and vice versa (Ionascu et al. 2020).

Based on the works of the current studies, we have developed a hierarchical structure of information levels and fundamental attributes that outline the standards for quality SDG reporting. This structure is visually depicted in the pyramid diagram presented below (see Fig. 5).

At the base of the pyramid lies a corporate statement issued by a company. The statement may declare a commitment to SDGs and/or the adoption of guideline(s) or framework(s) for SDG reporting. Typically, the statement or message is accompanied by prominently displayed icons or labels representing the 17 SDGs. The company has not disclosed any additional qualitative or quantitative information. Such limited information is the least useful for users of the report since it is only a generic statement. Regardless of the number of times a company mentions "sustainability" or "SDGs" or includes related images throughout its report, it is still vague as there is no evidence towards the materialisation of the SDGs, either via aspirations or actions (Ionascu et al. 2020; Macellari et al. 2021).

The third tier within the hierarchy introduces qualitative information, wherein a company elaborates on the connection between prioritising SDGs and sub-targets and its organisational objectives. The company's dedication to SDGs becomes evident when it divulges risks and opportunities, outlines actions and initiatives linked to SDGs, and elucidates how impact assessment can be conducted. Although such information is important to evaluate the extent to which the company embeds SDGs in their business, the veracity of the "story" disclosed is still questionable. There is an abundance of guidelines available to provide a standardised framework or matrix that can easily be adapted to suit the company's requirements. Therefore, purely qualitative information lacks credibility when it lacks substantial evidence of SDG performance to support it.

The quality of reporting is further enhanced by quantitative measures in the second level of the hierarchy. A company may be aware of its SDG commitment and prioritisation but without tracking the progress of its SDG targets, it is unlikely that there is any actual contribution towards SDGs (Calabrese et al. 2021). Quantitative information basically requires disclosure of financial indicators, key performance indicators (KPIs), and the percentage of each goal achievement. Such information is useful for benchmarking the company's own SDG performance against industry peers. To enhance the informativeness of disclosure, companies should provide quantifiable indicators that demonstrate the degree to which their SDG contribution align with national goals (Gunawan et al. 2020).

The current SDG reporting by companies is often criticised for lack of meaningful information due to greenwashing elements (Lashitew 2021). Even with both quantitative and qualitative information available, a company may tend to report only positive news to seek legitimacy (Diaz-Sarachaga 2021b). Therefore, the top level of the pyramid requires the company to consider the characteristics of the information disclosed. While qualitative information may be extensively reported with linkages to specific quantitative measures, the SDG reporting quality should be further enriched by five key attributes—embracing the concept of value creation (Adams et al. 2020), materiality (SDGs prioritisation) (Sardianou et al. 2021), time orientation (past, present, and future actions) (van den Broek 2021), neutrality (unselective reporting) (Garcia-Sanchez et al. 2020), and external assurance on reporting (Krasodomska et al. 2021).

The measurement bases used to assess the SDG engagement level and disclosure quality seem to be "overlapped." These two aspects could potentially be consolidated. The quality of SDG reporting should be commensurate with the level of SDG engagement. If the important characteristics at the top of the pyramid are not included in the disclosure, a "high" degree of SDG engagement is at best superficial.

Consequences of SDG reporting

At least half of the studies would mention, to some extent, the significance of SDG reporting in creating or enhancing value for stakeholders. Although the concept of value is not extensively explained in quantifiable terms or directly linked to any specific interest group, researchers generally agree that corporate contribution to SDGs directly correlates with creating or increasing value for shareholders, society, and the environment.

In the business context, the term "value" primarily refers to profit generated by business activities. The profit is earned when the monetary value a buyer is willing to pay for the use of goods or services exceeds the costs of production incurred by the seller (Lepak et al. 2007; Porter and Kramer 2011). Traditionally, the value generated by firms (acting as sellers) has been conventionally understood as returns exclusively directed towards shareholders. This ""limited" notion contradicts the perspectives of researchers who contend that the value generated should extend to a wider group of stakeholders. This viewpoint is particularly relevant in the context of sustainable development, where the goals and targets are meant for the benefits of a diverse spectrum of society. In this study, we noted the varying perspectives among researchers concerning the interrelation between SDGs, SDG reporting, and the creation of value.

Haywood and Boihang (2021) considered SDGs to be the centre of value creation for companies where values are not only created for firms but also for society and the environment. This perception is an integral part of their assessment of SDG reporting, examining how companies create value by incorporating SDGs into their corporate strategies instead of the mere mention of their awareness and commitment towards SDGs. Likewise, Lopez (2020) viewed companies as a source of creating value for both internal and external stakeholders as their business activities can have a positive impact on the economy, society, and the environment.

However, García-Meca and Martínez-Ferrero (2021) did not hold the same viewpoint. They argued that incorporation of SDGs into corporate strategies is not as straightforward as they may seem. Companies need to be strongly convinced on the importance of SDGs in enhancing firm value; otherwise, it is challenging to create values in a broader sense. Companies would not be willing to engage in activities that extend beyond shareholder-focused initiatives if shareholder value creation is not aligned with stakeholder value creation (van der Waal and Thijssens 2020). Their studies discovered that SDG reporting does not enhance firm value, except for those sectors grappling with controversies and environmental sensitivity. This finding supports the notion that, in general, companies utilise SDG reporting mainly to portray an image of creating values through sustainable development. As a result, the financial markets do not show a positive response towards SDG reporting.

On the other hand, Garcia-Torres et al. (2017) argued that shareholder values can be reconciled with societal values. By embracing the "sustainable value creation" approach, various stakeholder groups can realise the benefits of value creation without undermining those for shareholders. They introduced a framework that apparel companies could potentially adopt to foster sustainable value. Their premise was that disclosure serves as an "agent of change", transforming from a mere tool for disclosure to a tool driving actionable initiatives. Companies are to disclose information regarding the mechanisms employed to address material issues, subjects pertinent to the industry landscape, and stakeholders engaged in implementing sustainability-related measures.

In a separate study conducted within the same sector, Olofsson and Mark-Herbert (2020) explained the value of integrating SDGs in reporting. According to them, SDG integration in corporate communication can create shared value by incorporating two dimensions: motive and method. The "motive" requires companies to identify opportunities and challenges with SDGs, followed by goal prioritisation to assess the impact of their contribution to areas prioritised. These initiatives enable companies to perceive the positive and negative implications of their business activities, thereby promoting sustainability value viewed as substantive to stakeholders. The "method" complements the motive dimension by requiring companies to set internal goals aligning with SDGs that can be put into practice within their business activities. Their performance on SDGs is then disclosed for the purpose of tracking and monitoring.

The International Integrated Reporting Council (IIRC) has advocated the concept of value creation through the implementation of an integrated reporting framework (IIRC 2013, 2021). Adams et al. (2020) further refined the concept in Sustainable Development Goals Disclosure (SDGD) recommendations. The framework does not provide a specific definition of value creation. Rather, it implies firms' capability to manage their relationship with stakeholders engaged in their business operations, while generate favourable financial returns for shareholders.

The IFRS (International Financial Reporting Standards) Foundation (which has recently consolidated IIRC's integrated reporting framework under its umbrella) sets the definition of "enterprise value"[2] as the "sum of the value of the entity's equity (market capitalisation) and the value of the entity's net debt". The meaning of both "values" boils down to the returns created for shareholders. It is difficult to reconcile with the notion of shared value (combined shareholder and stakeholder values) deemed created by contributing to SDGs. It appears that sustainability-related disclosure is meant for capital providers to evaluate the intrinsic value of a company, and not for assessing the corporate contributions towards generating value for sustainable development.

There are a few researchers (Al Lawati and Hussainey 2022; Cosma et al. 2020; García-Meca and Martínez-Ferrero 2021) who tested the direct impact of SDG reporting on firm value. Only Al Lawati and Hussainey (2022) found a positive effect of SDG reporting on firm performance, in terms of return on equity. There are yet to be studies directly exploring the impact of SDG reporting on variables such as cost of capital, competitive advantage, and corporate reputation among others.

Determinants of SDG reporting

Around 27% of the studies explored the determinants of SDG reporting. The determinants can be categorised into four levels: (1) transnational, (2) country, (3) organisational, and (4) individual (Krasodomska et al. 2022). At the international level, the adherence to a global framework of standards (such as UNGC, GRI, or IIRC) is recognised as a significant driver for business entities, particularly multinational corporations, to embrace SDG reporting (van der Waal and Thijssens 2020; Pizzi et al. 2021; Giron et al. 2022). At the national level, the government's stance or perspective on SDGs plays a pivotal role in influencing the inclusion of SDGs within corporate reporting practices (Krasodomska et al. 2022). For example, van der Waal and Thijssens (2020) utilised Hofstede's cultural dimensions to examine determining factors, whereas Pizzi et al. (2022) and García-Sánchez et al. (2022) regarded the country's legal system as the influential factor. The research carried out by Bose and Khan (2022) revealed that the performance level of national SDGs, the alignment of stakeholder-shareholder orientation, the sustainability regulatory environment, and national development ranking are potential drivers of corporate SDG reporting.

In terms of organisational settings, the influence of industry regulations and the inherent characteristics of the industry can compel companies to consider the implications of SDGs (van der Waal and Thijssens 2020; Elalfy et al. 2021; Pizzi et al. 2021; Krasodomska et al. 2022). The most explored input variables are at the firm level which include company profiles such as size, age, ownership structure, and firm performance (Rosati and Faria 2019b; Elalfy et al. 2021; Pizzi et al. 2021; Arena et al. 2022; García-Sánchez et al. 2022) and board characteristics such as gender composition, director profile, and existence of CSR committee (Martínez-Ferrero and García-Meca 2020; Pizzi et al. 2021; Sekarlangit and Wardhani 2021; Arena et al. 2022). Additional factors explored include commitment and adherence to sustainability standards (Rosati and Faria 2019b), the past experience of the firms in sustainability-related reporting exercises (Pizzi et al. 2021; Krasodomska et al. 2022), and the impact of assurance on a firm's practice of SDG reporting (Rosati and Faria 2019b; Garcia et al. 2022).

The substantial number of findings leads to inconsistent results for certain variables. For board characteristics, Giron et al. (2022) discovered a positive correlation between the proportion of women on a company's board of directors and SDG disclosure. However, Pizzi et al. (2021), Sekarlangit and Wardhani (2021), and Arena et al. (2022) did not establish a statistically significant relationship between these factors. Arena's study suggested that age of board members, particularly the presence of younger ones, has no influence on promoting SDG reporting. The result from Rosati and Faria (2019b) and Giron et al. (2022) showed the contrary. In another study, Pizzi et al. (2021) and Martínez-Ferrero and García-Meca (2020) highlighted a positive correlation between the quantity of independent directors and SDG reporting; nevertheless, this relationship was deemed statistically insignificant in the study conducted by Sekarlangit and Wardhani's (2021).

The recent studies provide valuable insights into both micro and macro factors that influence SDG reporting (see Fig. 6). Building upon the factors identified by Dienes et al. (2016) and Hahn and Kühnen (2013) in their literature reviews, the current studies have comprehensively addressed a wide range of factors.

However, we noticed that that a research gap exists concerning the role of environmental governance in facilitating SDG reporting practices. Environmental governance plays a pivotal role in not only ensuring companies move beyond mere compliance motivations but also actively engage in advancing sustainable development. A robust environmental governance framework can motivate firms to enhance transparency and accountability in their SDG reporting, embrace a forward-looking perspective on sustainability considerations, and synchronise their business operations with the SDGs. The study of environmental governance influence

[2] The definition of "enterprise value" can be found within the exposure draft titled "IFRS S1 General Requirements for Disclosure of Sustainability-related Financial Information", which pertains to Sustainability Disclosure Standards, available at https://www.ifrs.org/content/dam/ifrs/project/general-sustainability-related-disclosures/exposure-draft-ifrs-s1-general-requirements-for-disclosure-of-sustainability-related-financialinformation.pdf.

Fig. 6 Determinants of SDG reporting

Transnational — International-level determinants

- Adoption of global reporting guidelines (Rosati & Faria, 2019b; van der Waal & Thijssens, 2020; Curto-Pages et al., 2021)
- Regional pressures (Elalfy et al., 2021; Pizzi et al., 2021; Arena et al., 2022)
- Membership to UNGC network (Fonseca & Carvalho, 2019; van der Waal & Thijssens, 2020; Curto-Pages et al., 2021; Elalfy et al., 2021)
- Sustainability ranking (van der Waal & Thijssens, 2020)

National — Country-level determinants

- Country-of-origin (van der Waal & Thijssens, 2020; Bose & Khan, 2022)
- Future-orientation of government (Krasodomska et al., 2022)
- SDG performance (Gerged & Almontaser, 2021; Bose & Khan, 2022)
- Institutional systems (Rosati & Faria, 2019a; Bose & Khan, 2022; García-Sánchez et al., 2022; Pizzi et al., 2022)

Organisational — Industry-level determinants

- Industry sensivity (Krasodomska et al., 2022; García-Sánchez et al., 2022)
- Corporate/media visibility (García-Sánchez et al., 2022)
- Sector affiliation (Fonseca & Carvalho, 2019; van der Waal & Thijssens, 2020; Giron et al., 2021)

Individual — Firm-level determinants

- Firm size (Arena et al., 2022; Elalfy et al., 2021; Rosati & Faria, 2019b; van der Waal & Thijssens, 2020)
- Firm age (García-Sánchez et al., 2022)
- Capital structure (Gambetta et al., 2021; Arena et al., 2022)
- Type of organisation (Elalfy et al., 2021; Kazemikhasragh et al., 2021)
- Listing status (Elalfy et al., 2021)
- Corporate governance structure (Rosati & Faria, 2019b; Martínez-Ferrero & García-Meca, 2020; Giron et al., 2021; Kazemikhasragh et al., 2021; Pizzi et al., 2021; Sekarlangit & Wardhani, 2021; Arena et al., 2022; García-Sánchez et al., 2022)
- Ownership structure (Arena et al., 2022)
- Economic performance (Fonseca & Carvalho, 2019; Rosati & Faria, 2019b; Kazemikhasragh et al., 2021; Arena et al., 2022; García-Sánchez et al., 2022)
- Intangibility level (Rosati & Faria, 2019b)
- Type/Length of reporting document (Fonseca & Carvalho, 2019; Curto-Pages et al., 2021; Pizzi et al., 2021)
- Previous experience in non-financial reporting (Pizzi et al., 2021; Krasodomska et al., 2022)
- External assurance (Rosati & Faria, 2019b; Elalfy et al., 2021; Garcia et al., 2022)

can illuminate how companies can effectively integrate sustainability into their business operations. This can lead to positive contributions to both environment and sustainable development (Ba 2021).

Legitimisation strategies

A company might be inclined to utilise disclosure as a tool for addressing stakeholder demands. This approach is commonly referred to as a legitimisation strategy. Incorporating SDGs in reporting can signify that a firm embraces stakeholder inclusivity, aiming to generate profits while also safeguarding society and the environment. Presently, certain researchers heavily criticise SDG reporting, asserting that it is more symbolic in nature rather than a genuine demonstration of advocacy (Calabrese et al. 2022). Despite an upward SDG reporting trend, most disclosures tend to conclude with management statements, lacking additional evidence to substantiate tangible contributions to SDGs (Manes-Rossi and Nicolo 2022). The companies tend to utilise visual representations such as vibrant SDG icons and graphical image disclosure to generate a wow effect instead of tracking and monitoring real progress in achieving SDGs (Nicolò et al. 2022). This disclosure strategy can be described as “conciliatory” at best, as it aims to appease the expectations of stakeholders (Silva 2021; Nicolò et al. 2022). Moreover, Silva (2021) revealed that a mere 6% of the 100 sampled companies acknowledged the potential of SDGs to be “transformative”, implying a capacity to reshape their fundamental business policies and practices. This suggests that the majority of companies claim to support sustainable development efforts but do not have the intention to alter their business practices (Nicolò et al. 2022).

Viewed through the lens of legitimacy theory, prior studies on sustainability reporting (excluding SDGs) have highlighted the frequent use of impression management strategies within the disclosed content (Sandberg and Holmlund 2015; Diouf and Boiral 2017; García-Sánchez et al. 2019). Macellari et al. (2021) presented a similar argument after conducting a counter-accounting analysis on sustainability reports issued by companies that had committed to UNGC/SDGs. They found that the UNGC/SDG reporters did not fully disclose at least 80% of negative events that occurred despite being reported from sources external to the organisations. This suggests that companies do engage in a “concealment” behaviour whereby disclosure content is selectively omitted (Merkl-Davies and Brennan 2007; Leung et al. 2015; Macellari et al. 2021). On the other hand, Garcia-Sanchez et al. (2020) examined whether defensive tactic (justification of negative events) was part of companies’ communication strategies. Their study revealed that more than 80% of companies reported SDGs in a neutral tone, suggesting a real commitment to SDGs.

Unlike small- and medium-sized entities, there is a higher tendency for larger companies to engage in SDG reporting (Pizzi et al. 2021). This is because large public companies are concerned about maintaining their legitimacy due to the extensive scrutiny they face from stakeholders and society as a whole (Elalfy et al. 2021). The current studies (see García-Meca and Martínez-Ferrero 2021; Ramos et al. 2022) indicate that SDG reporting did not positively influence business performance. This suggests that SDG disclosure is utilised as legitimisation strategy. However, environmentally and socially sensitive firms receive positive reaction from financial markets when they report on their SDG contribution (García-Meca and Martínez-Ferrero 2021).

At this stage, it cannot be ascertained that the likelihood of engaging in SDG reporting relies on the type of industry a firm operates in. Izzo et al. (2020a) found that the sector effect is not obvious in terms of which industry reports more on SDGs although a contradictory result was obtained by Curto-Pages et al. (2021). Also, statistical test results by Calvo-Centeno et al.'s (2022) study indicate that sector type plays no role in determining the extent of SDG reporting although generalisation of the results is difficult (sample size of 35 from only six sectors). A study by Erin et al. (2022) indicates that firms in Nigeria are mostly indifferent towards SDG reporting, thus limiting the existence of a legitimisation strategy.

Based on the outcomes of the current research, it seems that companies utilise SDG disclosure as a strategy to convey a perception of their commitment to sustainable development. While this approach might effectively aid them in shaping stakeholder expectations, there is presently insufficient evidence to firmly establish a direct connection between SDG reporting and tangible sustainability outcomes. It is recommended that future research focuses on delving deeper into this relationship. Also, future studies could uncover the factors that drive companies to adopt SDG reporting as a strategy for legitimising their actions. The suggested areas for research include regulatory dynamics, industry influence, and stakeholder pressures as underlying motivations for disclosure. An exploration of the efficacy of SDG reporting as a legitimisation strategy could be valuable, encompassing an analysis of its effects on corporate financial performance, firm reputation, and the perceptions of stakeholders towards these disclosures. Moreover, studies can be conducted to investigate the various disclosure strategies employed by companies, including the use of graphical representations and sustainability statements.

Institutional or stakeholder pressure

The studies highlight the influence of economic, social, and political systems in the institutionalisation process, which drives corporate involvement in SDG reporting (Rosati and Faria 2019a; van der Waal et al. 2021; Bose and Khan 2022; García-Sánchez et al. 2022; Moore and Sciulli 2022). Bose and Khan (2022) revealed that SDG reporting tends to be more prevalent in shareholder-oriented countries, challenging the previously held notion that stakeholder pressure is the primary driver for companies to engage with SDGs. Similarly, Rosati and Faria (2019a) did not uncover a connection between civil law countries (characterised by robust stakeholder-led institutional systems) and the practice of SDG reporting.

The study by Gerged and Almontaser (2021) shows that even when companies operate in business environments characterised by political instability and lack of institutional support, the presence of commitment to SDG reporting is uncontested. Whether companies give in to normative pressure to obtain stakeholder legitimacy or transform core policies and structures into SDG-driven business is open to debate.

The study by Macellari et al. (2021) suggests that the UNGC, as a so-called catalyst for institutional change in business organisations, drives companies not towards a more substantive path but closer to opening the floodgates of symbolic gesture. This suggests that relying solely on institutional isomorphism might not be sufficient to drive companies towards substantial sustainable development efforts (Whittingham et al. 2022). Companies can make claims about their commitment to sustainable development by integrating SDGs into their sustainability reporting. However, the actual efforts behind these claims often lack substantiation, as the disclosed information tends to remain fragmented. This suggests that the complexity of corporate reporting behaviour cannot be fully supported by institutional or stakeholder pressure alone.

Arguably, companies bear responsibility for the negative externalities generated as a result of their business operations (Unerman et al. 2018; Lashitew 2021). A company must maintain the business ecosystem it operates within to ensure its continued viability and existence. The institutional pressure upon companies may compel them to adopt SDGs, but existing research informs us of the unintended outcomes such as using SDGs for greenwashing or bluewashing purposes (Lashitew 2021; Macellari et al. 2021). Heras-Saizarbitoria et al. (2022a, b) found that the discussion on SDGs is lopsided as companies tend to be selective of the information to report, favouring disclosures that are likely to induce readers to place them in a good light.

As highlighted by Lashitew (2021), companies encounter significant challenges in integrating SDGs into their business models due to conflicting objectives with organisations that continue to emphasise short-term financial gains. Consequently, a myopic disclosure strategy is embraced, employing SDGs primarily for public relations purposes. SDG reporting evolves into a management tool to reconcile the conflicting interests of various stakeholders while upholding a legitimate position. The corporate statements are "decoupled" from their actions. Even if the actual contribution is already being made, stakeholders will eventually doubt whatever claims made as a result of this "decoupling" practice (Cho et al. 2015; Andrew and Baker 2020). That makes us doubt whether reporting has any purpose other than to support corporate agenda (van der Waal and Thijssens 2020).

Directions for future research

Our comprehensive review of the existing literature indicates that the field of SDG reporting research is still at an early development phase. In this section, we outline potential directions for future research in SDG reporting:

i Several studies have been conducted within specific sectors such as maritime (Wang et al. 2020; Di Vaio et al. 2021; Zhou et al. 2022), energy (Gerged and Almontaser 2021; Arena et al. 2022; Manes-Rossi and Nicolo 2022), and financial services (Avrampou et al. 2019; Cosma et al. 2020; Gambetta et al. 2021; Sardianou et al. 2021; Al Lawati and Hussainey 2022; Jiménez-Yáñez and Fontrodona 2022). These authors' framework or hypothesis may be extended or adapted to less studied but no less important fields, such as agriculture, forestry, consumer goods, and fisheries.

ii As observed in Table 4, most studies have provided a broad overview of the disclosure trend in 17 goals. Only a limited number of studies (e.g., Acuti et al. 2020; Gunawan et al. 2020; Landau 2020; Borges et al. 2022) revealed the gaps between corporate practices and SDG targets within specific contexts. Hence, future studies can be oriented towards conducting target-based analyses that are particularly relevant to specific sectors. Established instruments such as SDG Compass or GRI can be employed for such analyses. These studies carry substantial practical implications for companies operating within the same sectors, providing directions for future strategy implementation and activities undertaken.

iii Currently, content analysis is used to corroborate the notion of symbolic reporting. Some researchers have acknowledged that their studies are limited to the use of secondary data obtained from corporate reports (Macellari et al. 2021; Lodhia et al. 2022). Therefore, future researchers can conduct surveys and interviews (quantitative and qualitative methods combined) to substantiate the existing findings (Creswell and Creswell 2018). A mixed-method approach enables researchers to collect a diverse range of primary data and simultaneously examine the research problem through the lens of the SDG reporters themselves. On the other hand, determinant studies primarily rely on statistical techniques to determine institutional factors that impact SDG reporting. If institutional pressure influences SDG reporting practice, then research should concentrate on the internal organisational processes that ultimately lead to the disclosure outcome (Suddaby 2010). This necessitates a methodological shift from content analysis to conducting interviews with individuals responsible for sustainability reporting.

iv There is a significant body of empirical research that provides support for the relationship between CSR reporting and improved firm performance (Andrew and Baker 2020). However, the studies on the relationship between SDG-related reporting and firm performance remain less conclusive (Ramos et al. 2022). Given the limited number of studies available, it might be too early to reach a conclusion at this point (Pizzi et al. 2020). More studies are required to better understand and ascertain the existence of the signalling effect in SDG reporting.

v Bose and Khan (2022) highlighted the prominence of SDG reporting in developing countries. Ironically, the research on SDG reporting practices in developing countries is scarce (most are concentrated in European regions; see Fig. 3). Because of the different challenges encountered by developing countries, the SDG prioritisation may be different at both national and organisational levels (Qian et al. 2021). Therefore, further research can sample companies operating in developing countries and conduct a comparative analysis with studies done on developed countries.

vi The current body of research primarily focuses on examining reporting behaviour from the company's standpoint, particularly in terms of using disclosure to engage stakeholders. However, there are no studies that specifically investigate the stakeholder perceptions regarding the value relevance of SDG reporting. Entities including media, not-for-profit organisations, regulators, and institutional investors exert substantial influence as stakeholders in shaping corporate accountability with respect to SDGs. Future research can identify gaps in reporting by comprehensively understanding the stakeholder's expectation.

vii The studies conducted so far are mostly cross-sectional and have been carried out during the early stages of SDG reporting adoption. While cross-sectional studies offer insights into the present phenomenon, longitudinal studies hold the advantage of providing insights into changes and developments over time (Rajulton 2001). As SDGs are monitored over the long term, longitudinal studies are useful to provide understanding on the evolution of SDG reporting and potentially yield different findings compared to cross-sectional studies (Rajulton 2001; Curto-Pages et al. 2021).

viii Although the current research is supported by some theories, there might not be adequate to account for the variations in SDG reporting. Potentially, future studies can apply less explored theoretical frameworks such as institutional governance theory, resource-based theory, and voluntary disclosure theory. One potential avenue to address the contradictory findings in current studies is to reconcile different theories, such as reconciling signalling theory and legitimacy theory. By exploring interdisciplinary fields, future research may also formulate a novel conceptual framework to comprehensively grasp the intricacies of the SDG reporting process.

Conclusion and limitations

This study has contributed to the development of non-financial reporting knowledge by providing an overview of the recent literature on corporate SDG reporting. Based on our synthesis of research topics, we identified the deficiencies in current research and suggested directions for future studies. By integrating studies on the level of SDG engagement, we highlighted the least addressed SDGs and the need for business engagement to accelerate the SDG contribution rate. We also built on current studies to introduce a four-level hierarchical framework for evaluating the quality of SDG reporting.

This study has revealed a substantial collection of research articles that pertain to SDG reporting. Our review study complements the previous findings by Mio et al. (2020) and adds to the existing research on SDG reporting/disclosure. It highlights a significant growth in the body of literature on this subject, reflecting the increasing interest and dedication in understanding and addressing SDG-related matters. However, our review informs academic researchers that the research in this area is at an early stage. There are avenues for further contribution to this field. To effectively address the complexity of SDG reporting, it is necessary to have a strong research methodology, a thorough assessment framework, and a sound theoretical foundation. The existing research also highlights fragmented approaches to measuring SDG reporting. As a response, we propose a four-level hierarchy of SDG reporting quality, which could provide a foundational framework for future studies to build upon and enhance.

For national policymakers, the crucial concern is whether the current corporate efforts are on track in contributing to SDGs at the macro level by 2030. Our results show that the overall level of engagement in SDG 1 (no poverty), SDG 2 (end hunger), SDG 14 (life on land), and SDG 15 (life below water) is relatively low. If policymakers require a substantial contribution to these goals, certain policies such as tax incentives and responsible investment schemes may need to be formulated to promote the uptake of those goals.

For standard setters, they aim to set SDG-related guidelines or standards that meet the user expectations. We present some practical issues with regard to SDG reporting that could be integral to their deliberation process when establishing standards. These issues include an ambiguous definition of value creation, poor reporting quality, and symbolic disclosure practices.

Additionally, our findings enhance the understanding of effective reporting techniques and challenges among business practitioners. We also recommend the implementation of a reporting framework that seamlessly integrates SDGs into their disclosure strategies. The present research offers insights into the potential influence of younger and female board members in advancing SDGs despite inconclusive evidence. This should motivate companies to embrace SDG 5 (gender equality) by having a board of governance that is gender balanced.

Our systematic literature review is limited to research on SDG reporting by private companies, which poses several limitations. Any research on other types of organisations was not included. Also, we employed a manual search and identification process. Despite utilising Excel's automated functions and applicable software, there remains a potential for overlooking relevant studies due to the inherent subjective nature of interpretation. Our study is also susceptible to the risk of biases when extracting the key themes that emerge from the articles. We recommend replicating our systematic review criteria and expanding the inclusion criteria to incorporate other types of organisations, such as the public sector or not-for-profit entities for future research.

Appendix

Table 5 The articles under review

No	Author(s)	Area of focus	Methodology	Main objective	Main findings
1	Acuti et al. (2020)	Nature of SDG disclosure	Descriptive	Analyse how the concept of urban resilience (closely related to SDGs 1, 2, 9, 11, and 14) is communicated in SDG reporting	The adoption of GRI standards drive more reporting on biodiversity strategy, governance, and prevention measures
2	Al Lawati and Hussainey (2022)	Effect of SDG reporting on firm performance	Quantitative	Examine the impact of SDG reporting on firm performance	There is a positive impact of SDG reporting on return on equity
3	Andrian et al. (2021)	Engagement in SDG	Descriptive	Examine whether CSR activities of companies align with SDGs	There is a significant lack of disclosure on SDGs, while an alignment is more profound between CSR activities and SDGs 3, 4, 6, 8, and 17
4	Arena et al. (2022)	Engagement in SDG	Quantitative	Examine the characteristics of companies that engage in SDGs	Firm size, geographical location of headquarter, level of internalisation, and economic performance influence SDG reporting
5	Avrampou et al. (2019)	SDG disclosure level	Descriptive	Examine the extent to which company performance aligns with SDGs	Limited disclosure on SDGs, indicating overall low SDG contribution
6	Bohnett et al. (2022)	Nature of SDG disclosure	Descriptive	Explore the depth of disclosure on two specific SDGs, i.e., SDG 14 and SDG 15	Engagement with SDGs 14 and 15 appears to be lacking, as only a few entities are reporting on the influence of their environmental initiatives on SDGs
7	Borges et al. (2022)	Engagement in SDG	Descriptive	Analyse how firms address SDGs in reports particularly SDGs 7, 9, 11, and 12	Most companies employ the GRI standard for reporting, with a dominant focus on keywords such as social, environment, waste, R&D, and the 3Rs in their disclosures
8	Bose and Khan (2022)	Engagement in SDG Determinants of SDG reporting	Descriptive	Examine the role of country-level institutional factors in influencing SDG reporting	Level of SDG reporting is generally low Firms in shareholder-oriented/developing countries have higher level of SDG reporting
9	Calabrese et al. (2021)	Application of assessment framework	Descriptive	Propose a GRI-linked framework that assesses disclosure quality	The proposed framework potentially enriches assessment and monitoring of SDG engagement and contribution
10	Calabrese et al. (2022)	Engagement in SDG	Quantitative	Assess the of environmental, social, and economic impacts on SDGs	Low level of SDG contribution with symbolic element in reporting
		Determinants of SDG contribution		Analyse factors affecting SDG contribution	Firm size, sector type, and national income level are influential factors in SDG contribution
11	Calvo-Centeno et al. (2022)	Engagement in SDG	Quantitative	Investigate the level of SDG engagement	A 2-year comparison shows that the level of SDG engagement has increased
12	Cosma et al. (2020)	Determinants of SDG reporting	Descriptive	Examine the factors that differentiate the SDG contribution among firms	The extent of contribution to SDGs seems to differ based on factors such as the country of origin, legal framework, and the implementation of integrated reporting practices
13	Costa et al. (2022)	Engagement in SDG	Descriptive	Analyse the level of SDG prioritisation and sustainability challenges	The opacity in SDG reporting creates challenges in evaluating firms' effective contributions to the SDGs, as the absence of a clear alignment between sustainability challenges and their business activities hinders accurate assessment
14	Curto-Pages et al. (2021)	Engagement in SDG	Descriptive	Investigate the level of SDG engagement	Despite the increase of quantity in SDG reporting, the commitment to engage in SDG is low The tendency to report on SDG is likely associated with GRI standard adoption, UNGC signatory and type of report published
15	Di Vaio and Varriale (2020)	Nature of SDG disclosure	Descriptive	Analyse how airport industry contributes to two specific SDGs, i.e., SDG 11 and SDG 17	Limited disclosure on the link between key performance indicators and meeting SDG targets

Table 5 (continued)

No	Author(s)	Area of focus	Methodology	Main objective	Main findings
16	Di Vaio et al. (2021)	Nature of SDG disclosure	Descriptive	Analyse the disclosure orientation and gaps in assessing SDG performance	Information disclosed is mostly qualitative in nature, lacking quantitative indicators to measure and assess SDG performance
17	Di Vaio et al. (2022)	Nature of SDG disclosure	Descriptive	Analyse the effectiveness of disclosure practices in assessing social performance to fulfil SDGs	Case study on Costa Crociere S.p.A reveals the substantial role of disclosure in understanding how sustainability initiatives contribute to SDGs
18	Diaz-Sarachaga (2021a)	Application of framework to measure economic contribution	Descriptive	Propose a framework that monetises the value generated by business activities on the achievement of SDGs	The application of the in a case study suggests unequal economic contribution to each SDG, with SDG 8 receiving 90% of the contribution while no support for 12 other goals
19	Diaz-Sarachaga (2021b)	Nature of SDG disclosure	Descriptive	Analyse how companies report on SDG contribution with reference to GRI standards	There is a low degree of effective reporting on SDG contribution, with an unclear link between the disclosed information and the actual actions taken
20	Elalfy et al. (2021)	Determinants of SDG reporting	Quantitative	Explore the factors that lead to the adoption of SDG reporting practice	Firm size, listing status, industry sensitivity, region, and external assurance are influential factors in SDG reporting
21	Erin et al. (2022)	Nature of SDG disclosure	Others	Evaluate the extent of SDG reporting	The limited extent of SDG disclosure indicates a potential absence of strong commitment or interest among firms to engage in reporting on SDGs
22	Erin et al. (2022)	Nature of SDG disclosure	Descriptive	Examine the depth of SDG information disclosed	Low level of SDG reporting
23	Fonseca and Carvalho (2019)	Engagement in SDG	Descriptive	Investigate the interaction between companies having certified management systems and their involvement in Sustainable Development Goals (SDGs)	The level of disclosure is moderate Companies that have high turnover, UNGC membership, and reports on website engage more in SDGs
24	Gambetta et al. (2021)	Determinants of SDG reporting	Quantitative	Analyse the effect of firm's risk profile on SDG contribution	Capital risk, management efficiency, and market risk are influential factors that drive higher SDG contribution
25	García-Meca and Martínez-Ferrero (2021)	Effect of SDG reporting on firm performance	Quantitative	Examine the impact of SDG reporting on firm performance Examine the potential moderating impact of industry-level factors	The impact of SDG reporting on firm performance is not significant across all industries, except for environmentally and socially sensitive sectors
26	García-Sánchez et al. (2020)	Communication strategies	Descriptive	Investigate the use of impression management techniques in communicating SDG initiatives	While 16% of sample companies use impression management tactics to legitimise their SDG contribution, 84% of them adopt a neutral approach when engaging in SDG discourse
27	García-Sánchez et al. (2022)	Determinants of SDG reporting	Quantitative	Analyse the internal and external factors related to SDG integration into non-financial information system	Institutional pressures, firm size, analyst coverage, investor demand, board size are influential factors that drive SDG integration into the information system
28	Garcia-Torres et al. (2017)	Nature of SDG disclosure	Descriptive	Analyse the challenges and content of reporting in order to identify discrepancies between what is reported and the actual actions taken	Due to lack of action-oriented reporting, a framework is proposed to redirect the focus of disclosure towards value creation within supply chains
29	Gazzola et al. (2020)	Engagement in SDG	Quantitative	Examine the approaches used in disclosing SDG contribution	Accessibility to SDG information on corporate website has improved over time
30	Gerged and Almontaser (2021)	Determinants of SDG reporting	Quantitative	Explore the determinants influencing the adoption of SDG reporting practices	The adoption of SDG reporting is influenced by national-level SDG performance, and environmental sensitivity of the oil industry moderates the relationship between these variables
31	Giron et al. (2022)	Determinants of SDG reporting	Quantitative	Explore the factors that lead to the adoption of SDG reporting practice	Economic performance, female and young directors, and external assurance drive companies in less developed nations to adopt SDG reporting

Table 5 (continued)

No	Author(s)	Area of focus	Methodology	Main objective	Main findings
32	Gulluscio et al. (2020)	Systematic review	Non-empirical	Review of existing literature on the climate change accounting and reporting aspects (related to SDG 13)	The current research primarily focuses on the external reporting and accounting aspects, with relatively less emphasis on areas such as auditing, governance, management control/strategy, and performance measurement
33	Gunawan et al. (2020)	Nature of SDG disclosure	Descriptive	Explore how companies contribute to SDGs in accordance with national prioritisation	The contribution from companies towards the SDGs is not fully aligned with national priorities, particularly in the case of SDGs 5, 6, and 8
34	Hamilton and Waters (2022)	Nature of SDG disclosure	Quantitative	Analyse how firms in business sector address SDGs in their reports in comparison with higher education institutions	There is a lack of compliance with standardised framework when reporting on SDGs
35	Hatayama (2022)	Engagement in SDG	Quantitative	Explore how companies engage in SDGs	Most addressed SDGs are SDG 8, 3, and 12 while the least addressed SDGs are SDG 14, 2, and 1
36	Haywood and Boihang (2021)	Engagement in SDG	Descriptive	Investigate the level of SDG engagement	Low level of SDG engagement, mostly lack of SDG integration into business activities
37	Heras-Saizarbitoria et al. (2022a, b)	Engagement in SDG	Descriptive	Investigate the level of SDG engagement	Despite the SDG integration in reporting, the changes are symbolic rather than substantive
38	Hummel and Szekely (2022)	Quality of SDG reporting	Quantitative	Assess the quality of SDG disclosure	Increased quality of reporting despite lack of quantitative-based and forward-looking information
39	Ionascu et al. (2020)	Quality of SDG reporting	Descriptive	Evaluate the depth of the SDG information disclosed	The quality of disclosure varies with each SDG priority rank A low level of SDG engagement with lack of specific quantitative targets to show real actions taken to achieve SDGs
40	Izzo et al. (2020a)	Nature of SDG disclosure	Descriptive	Investigate the extent and type of SDG information disclosed	Increased presence of SDG information, although lack of SDG integration into business activities
41	Izzo et al. (2020b)	Nature of SDG disclosure	Descriptive	Investigate the extent and type of SDG information disclosed	The level of SDG disclosure is moderate, with an emerging trend on human rights and carbon emission disclosure
42	Jiménez-Yáñez and Fontrodona (2022)	Communication strategies	Descriptive	Examine the influence of SDG discourse on the non-financial reporting structure	A case study on CaixaBank demonstrates a consistent SDG narrative developed over a 2-year period
43	Kazemikhasragh et al. (2021)	Determinants of SDG reporting	Quantitative	Explore the factors that lead to the adoption of SDG reporting practice	Companies in less developed nations are driven to adopt SDG reporting based on factors such as their type, economic performance, engagement in sustainability programs, and the presence of external assurance
44	Kim (2021); Hatayama (2022)	Themes in SDG disclosure	Descriptive	Identify the key themes used in SDG disclosure	For industrial sectors, the key themes are sustainability, energy, approach, environmental, and people For overall national origins, the key themes are business, employees, financial, energy, and suppliers
45	Krasodomska et al. (2022)	Determinants of SDG reporting	Quantitative	Analyse the factors influencing SDG reporting	UNGC engagement and experience in reporting on sustainability are influential factors that drive SDG reporting
46	Kucukgul et al. (2022)	Application of alignment framework	Others	Propose a framework to align GRI and IIRC guides for enhancement of SDG reporting performance	The proposed six-step alignment approach has the potential of aligning and internalising the SDG contribution into business activities
47	Kuswantoro et al. (2022)	Engagement in SDG	Descriptive	Evaluate the extent of SDG disclosure before and during COVID-19 pandemic	There is no major difference in the disclosure practice pre- and post-pandemic The level of SDG engagement is moderately high at goal level

Table 5 (continued)

No	Author(s)	Area of focus	Methodology	Main objective	Main findings
48	Landau (2020)	Engagement in SDG	Descriptive	Assess how companies engage with SDG using GRI framework	Case studies on Marriott, Booking, and Soneva reveal that companies put more initiatives and resources to achieve SDGs 8, 10, 13, and 17
49	Lashitew (2021)	Institutionalisation of SDGs	Non-empirical	Examine the institutional changes that potentially improve SDG reporting practice	Identify drivers of institutionalisation that could facilitate corporate sustainability accountability and reporting
50	Lodhia et al. (2022)	Nature of SDG disclosure	Descriptive	Analyse the depth of SDG information to determine whether the disclosure is symbolic or substantive	The level of SDG reporting is moderate, with top priority given to SDGs 13, 5, 8, 12, and 9
51	Lopez (2020)	Engagement in SDG	Descriptive	Analyse how SGD is integrated and communicated in reports	Although sample companies have integrated SDGs in their CSR strategy, the lack of specific SDG indicators makes measurement of their SDG contribution difficult
52	Macellari et al. (2021)	Quality of SDG reporting	Descriptive	Analyse the transparency and balance level of information related to SDGs	There is lack of transparency in reporting negative events and lack of substance in SDG commitment
53	Malay (2021)	Engagement in SDG	Descriptive	Investigate whether the SDG engagement at business level aligned with national level	The SDGs at business level are not aligned with the SDGs focused at national level especially SDG 9, 10, and 11
54	Manes-Rossi and Nicolo (2022)	Nature of SDG disclosure	Descriptive	Investigate the approaches used in disclosing SDG contribution	Despite the SDG integration in reporting, the changes are symbolic rather than substantive
55	Martínez-Ferrero and García-Meca (2020)	Determinants of SDG reporting	Quantitative	Investigate how corporate governance mechanisms affect the practice of SDG reporting	CEO and board independence are influential factors in driving SDG reporting
56	Mehmood et al. (2022)	The role of social media in SDG communication	Quantitative	Examine the attributes of social media posts and their impact on stakeholder engagement with regards to the SDGs	The natures of content, industry sector, and the geographical location of a company are determining factors that influence stakeholder engagement levels
57	Moore and Sciulli (2022)	Nature of SDG disclosure	Descriptive	Investigate the type of SDG disclosure and level of engagement	Limited SDG disclosure
58	Nechita et al. (2020)	Determinants of SDG reporting	Quantitative	Examine the impact of financial indicators on the extent of SDG reporting	The cash flows per turnover, cost of debts, return on assets, and R&D intensity do not exhibit statistically significant impacts on SDG reporting
		Quality of SDG reporting		Assess the quality of SDG disclosure	The quality of disclosure varies with each SDG
59	Nicolò et al. (2022)	Nature of SDG disclosure	Descriptive	Investigate the approaches used in SDG communication	Despite addressing SDG issues, companies use SDGs as a symbolic tool to enhance legitimacy
60	Nylund et al. (2022)	Nature of SDG disclosure	Descriptive	Investigate the level of SDG engagement	The SDGs that receive higher prioritisation are those that have government regulations in place
61	Olofsson and Mark-Herbert (2020)	Value creation via SDG reporting	Non-empirical	Explain how two apparel companies create value via SDG integration	A motive-method and communication-SDG contribution connections create shared values related to SDGs
62	Opferkuch et al. (2022)	Nature of SDG disclosure	Descriptive	Analyse how the concept of circular economy (closely related to SDG 12) is communicated in SDG reporting	There is lack of direct link shown between circular economy and social-related SDGs
63	Oppong (2022)	Engagement in SDG	Quantitative	Examine the association between firm characteristics and SDG engagement	Listed small and medium enterprises as well as firms from less developed countries will demonstrate a higher propensity for engagement in SDGs
64	Perello-Marin et al. (2022)	Nature of SDG disclosure	Descriptive	Analyse whether SDG disclosure shows clear link between GRI metrics and SDGs	Due to lack of standardisation in disclosure, a methodology is proposed to align sustainability drivers key performance indicators and SDGs
65	Perryman et al. (2022)	Engagement in SDG	Descriptive	Investigate the level of SDG engagement	Level of SDG engagement varies, with strong association between existing sustainability initiatives and higher level of SDG engagement

Table 5 (continued)

No	Author(s)	Area of focus	Methodology	Main objective	Main findings
66	Pineda-Escobar (2019)	Nature of SDG disclosure	Descriptive	Explore how companies address SDGs in reports	Despite the increasing attention given to incorporating SDGs into reporting, there is still a notable absence of comprehensive analyses regarding the attainment of specific SDG targets
67	Pizzi et al. (2021)	Bibliometric analysis Systematic review	Quantitative	Identify the predominant research themes on SDGs and business sectors	The themes explored within the reviewed studies encompass technological innovation, companies operating in developing nations, and the significance of non-financial reporting and education in the pursuit of SDGs
68	Pizzi et al. (2022)	Determinants of SDG reporting	Quantitative	Examine the role of cultural factors on SDG reporting	Companies are driven to disclose on SDGs when they operate within societies that are long-term oriented and exhibit a balanced perspective between optimism and pessimism
69	Ramos et al. (2022)	Effect of SDG reporting on firm performance	Quantitative	Examine SDG coverage effect on firm performance	There is no discernible impact of SDG coverage on firm performance
		Level of SDG prioritisation		Identify the most engaged SDGs	The most frequently adopted SDGs are SDGs 13, 8, and 5
70	Rosati and Faria (2019a)	Determinants of SDG reporting	Quantitative	Analyse the institutional factors affecting SDG reporting	Politics/law, society/culture, education/labour, and sustainability are influential factors that drive SDG reporting
71	Rosati and Faria (2019b)	Determinants of SDG reporting	Quantitative	Analyse the organisational factors affecting SDG reporting	Firm size, presence of female/younger directors, commitment to sustainability framework, and external assurance are influential factors that drive SDG reporting
72	Sardianou et al. (2021)	Application of materiality assessment framework	Descriptive	Develop a materiality analysis framework that evaluates the correlation between disclosed materiality items and SDGs	Using the proposed framework in banking sector, companies are found to emphasise more on certain SDG (e.g., SDG 8) in line with the corporate mission
73	Sekarlangit and Wardhani (2021)	Determinants of SDG reporting	Quantitative	Explore the corporate governance effect on SDG reporting	The attendance in board and CSR committee meetings is significant factor that impact the adoption of SDG reporting
74	Sierra García et al. (2022)	Assurance	Quantitative	Explore the role of assurance in driving companies to report on SDGs	The companies that report on SDG performance are likely to have their assurance on their reports
75	Silva (2021)	Nature of SDG disclosure	Descriptive	Analyse how companies utilise legitimisation strategies to address SDGs	There are four strategies used, i.e., conciliatory, transparency, stimulation, and transformation. The dominance of symbolic legitimisation strategies leads to a lack of substantive disclosure
76	Singh and Rahman (2021)	Engagement in SDG	Descriptive	Investigate the degree to which companies are involved with and committed to engaging with SDGs	The level of SDG engagement depends on a firm's listing age and industry type
77	Song et al. (2022)	Engagement in SDG	Descriptive	Investigate the level of SDG engagement	The level of engagement varies with each SDG, with IT companies showing the highest interest in the SDGs
78	Tsalis et al. (2020)	Quality of SDG reporting	Descriptive	Develop a GRI-aligned framework to evaluate the quality of SDG information	While the disclosure demonstrates corporate engagement in SDGs, there is no substantial change in the existing reporting structure
79	Vallet-Bellmunt et al. (2022)	Level of SDG engagement	Descriptive	Assess how companies engage with SDG 12 using GRI framework	The communication efforts on achieving SDG 12 are inadequate, with a limited connection between SDG 12 and concepts such as the circular economy or responsible consumption
80	van den Broek (2020)	Communication strategies	Descriptive	Analyse how firms communicate on SDG by identifying the type of narratives used	There are four narratives, i.e., descriptive, past, present, and future

Table 5 (continued)

No	Author(s)	Area of focus	Methodology	Main objective	Main findings
81	van der Waal and Thijssens (2020)	Nature of SDG disclosure	Quantitative	Explore the depth of SDG coverage	Limited engagement in SDG with disclosure being symbolic rather than substantive
		Determinants of SDG reporting		Discover the link between SDG reporting and corporate attributes	The level of SDG engagement depends on firm size, sustainability commitment, and country of origin
82	Wang et al. (2020)	Engagement in SDG	Descriptive	Investigate the scope and depth of sustainability initiatives in alignment with the SDGs	A comprehensive framework is constructed to categorise the SDGs into primary responsibilities (SDGs 8, 9, 12, and 14), facilitating goals (SDGs 2, 7, 13, and 16), and extended responsibilities (SDGs 1, 3, 4, 5, 6, 10, 11, and 15)
83	Whittingham et al. (2022)	Nature of SDG disclosure	Descriptive	Explore how firms engage with SDGs and link SDGs with sustainability reporting	A shift from selective engagement to alignment with most SDGs
84	Zhou et al. (2022)	Stakeholder engagement	Quantitative	Examine the sentiment views of stakeholders on social media	Stakeholders perceive SDGs 5, 6, 8, 11, and 14 as of utmost importance

The array of 17 Sustainable Development Goals (SDGs) encompasses the following: SDG 1, no poverty; SDG 2, zero hunger; SDG 3, good health and well-being; SDG 4, quality education; SDG 5, gender equality; SDG 6, clean water and sanitation; SDG 7, affordable and clean energy; SDG 8, decent work and economic growth; SDG 9, industry, innovation, and infrastructure; SDG 10, reduced inequalities; SDG 11, sustainable cities and communities; SDG 12, responsible consumption and production; SDG 13, climate action; SDG 14, life below water; SDG 15, life on land; SDG 16, peace, justice, and strong institutions; SDG 17, partnerships for the goal

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Data availability Data available on request from the authors.

Declarations

Ethics approval This article does not contain any studies with human participants or animals performed by any of the authors.

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