



Going Beyond Compliance Fulfillment: a Literature Review on ESG Performance Management

Mathias Münch, Jörg H. Mayer and Reiner Quick

EasyChair preprints are intended for rapid dissemination of research results and are integrated with the rest of EasyChair.

October 8, 2023

Going Beyond Compliance Fulfillment: A Literature Review on ESG Performance Management

Mathias Münch¹, Jörg H. Mayer¹ and Reiner Quick¹

¹ Darmstadt University of Technology, Hochschulstraße 1, 64289 Darmstadt, Germany
quick@bwl.tu-darmstadt.de

Abstract. Sustainability is increasingly entering company activities. While the focus is still on ESG (external) reporting standards, in other words, being as compliant as required, we argue that the internal ESG performance management has the potential to achieve business value – beyond pure compliance fulfillment. However, literature reviews concerning a company’s internal ESG performance are underrepresented. Accordingly, we consolidate the current ESG literature threefold in terms of (1) structural and (2) process organization, as well as (3) supporting IS. By applying the Technology-Organization-Environment framework, we provide ten takeaways that cover main themes, research gaps, and avenues of future research.

Keywords: ESG, Sustainability, Performance Management, Green IS, Literature Review.

1 Introduction

Having suffered substantially from the COVID-19 global pandemic, today’s economic environment is still undergoing massive changes. Climate change stands out, thus, *sustainability* is increasingly entering the focus of a company’s activities [1].

The European Union [2] has established a set of environmental, social, and (corporate) governance (ESG) reporting initiatives. One example is the EU taxonomy, which specifies sustainable economic activities. Effective on January 01, 2025, and therefore already relevant for the fiscal year 2024, the Corporate Sustainability Reporting Directive (CSRD) defines a *reporting framework for non-financial information* that extends both the group of affected companies and the ESG reporting content itself [3].

Focusing on the latter, more and more companies are making sustainability pledges, but far too few have so far worked beyond the ESG regulations and its (external) reporting [4]. Following a sound ESG vision, mission, and strategic program (including departments and roles), it should include threefold: (1) The redesign of the *structural organization* [5]; (2) an adjusted *process organization* including (internal) steering processes including resulting KPIs that are compliant with external regulations [6]; (3) *supporting information systems (IS)* that offer a central access for ESG metrics [7].

With regard to *literature reviews* in accounting, Tsang et al. [8] examined research on ESG disclosure, and Gilian et. al [9], as well as Lombardi and Secundo [10], did so

with an emphasis on ESG and corporate social responsibility (CSR). Ambec and Lanoie [11] focused on the costs and benefits for a company of being “green.” In IS research, Schoormann et al. [12] performed a systematic review on artificial intelligence (AI) for driving sustainability, and Henkel and Kranz [13] reported on pro-environmental behavior and green IS, whereas Harnischmacher et al. [14] focused on green IS research streams.

All these articles focus on being only as compliant as required by law (external ESG perspective) [15]. Making a virtue out of a necessity, we argue that (internal) ESG performance management has the potential to achieve business value – beyond pure compliance fulfillment. In doing so, companies should not see the new ESG rules as a burden. Integrating sustainability into corporate management holds considerable opportunities.

However, we did not find a sufficient body of knowledge on how companies should redesign their structural & process organization and supporting IS – finally to apply the new ESG standards as a differentiator in the market by means of internal strength. Accordingly, the objective of this article is to present *takeaways from a literature review focusing on a company’s (internal) ESG performance management leveraging IS*. Analyzing a data set of 64 publications, we aim to support companies willing to implement ESG performance management. For research purposes, we present main themes, research gaps, and avenues of future research.

We followed the structured literature review approach of Bandara et al. [16] as follows. Motivating this article by gaps in the current literature (*introduction*), we analyze related works (*theoretical background*). Then, we conduct a structured literature review (*review method*), present our findings by outlining several statistics of our data set (*descriptive results*) and identify main themes, research gaps, and avenues of future research (*critical appraisal*). Comparing our results with prior work and examining how they relate back to the article’s objective, we close with a summary, limitations of our work, and avenues for future research (*discussion and conclusion*).

2 Theoretical Background

2.1 ESG frameworks

Starting with the capital market perspective on ESG, the *United Nations Principles of Responsible Investment (UNPRI)* is a framework for asset managers. It is the most widely adopted ESG framework among US asset managers [17]. Its mission is to “[...] believe that an economically efficient, sustainable global financial system is a necessity for long-term value creation. Such a system will reward long-term, responsible investment and benefit the environment and society as a whole” [18].

The *United Nations 2030 Agenda for Sustainable Development Goals (SDGs)* focuses on improving human life. Presented in 2015, it consists of seventeen goals and 169 targets from all aspects of life. With the pledge that no one will be left behind, the participating countries agreed that all stakeholders would act in a partnership in order to embark on a collective journey [19]. Focusing on companies, the *United Nations Global Compact* supports scaling the global collective impact with ten principles and delivering the SDGs through accountable companies that enable change [20].

According to the *Corporate Sustainability Reporting Directive (CSRD)*, companies that are already obliged to report on sustainability will have to report in greater detail in the future. Large corporations or equivalent ones, regardless of their capital market orientation, will be required to prepare a sustainability report in the foreseeable future. In doing so, the European Financial Reporting Advisory Group (EFRAG) appointed drafts for the *European Sustainability Reporting Standards (ESRS)*, which are binding for all companies that have to prepare a sustainability report. Adopting the final standards as delegated acts in June 2023, the European Commission currently consults EU bodies and Member States on the draft standards [21]. Furthermore, the International Sustainability Standards Board (ISSB) approved two disclosure standards for companies, which reference the GRI and the ESRS [22].

The *ESG-ICE framework*, which is from the IS community, examines different ESG interactions [23]. It creates connections between the ESG dimensions and desirable outcomes for individual well-being, community welfare, and economic resilience (ICE) hierarchies, and opportunities by leveraging IS in human lives. The ICE hierarchies drive a community's well-being, which is part of broader economic resilience. Finally, ESG dimensions are not mutually exclusive, and even ESG components are overlapping. The authors of the ESG-ICE framework argue that "in [...] use cases involving this framework, it is often common to think of these elements as combinations." [23].

2.2 Performance management frameworks

While the ESG frameworks in Sect. 2.1 focus on the external perspective, this section focuses on a company's performance management. Management control systems (MCS) cover, beyond other approaches the COSO framework, activity-based management, and value-based management systems.

COSO refers to the Committee of Sponsoring Organizations of the Treadway Commission, comprising five global accountancy and auditing organizations. It published its first joint framework in 1992, called the Internal Control - Integrated Framework, which was continuously updated over time [24].

Activity-based management (ABM) is a procedure to enhance business efficiency by analyzing the profitability of every company segment using the approach of activity-based costing (ABC). According to the ABC theory, costs are consumed by activities, and activities are necessary to manufacture products [25]. While ABC supplies the information, ABM uses this information in various analyses for continuous improvement [26].

In contrast, value-based management (VBM) defines the company's value upon the analysis of its incoming discounted future cash flows. It examines how companies best use their cash flows to make both strategic and operational decisions. According to Copeland et al. [27], it is an approach that aligns a company's overall aspirations, analytical techniques, and management processes to focus decision-making on the key drivers of value.

The *levers of control (LOC)* framework from Simons [28, 29] is most popular for the following reasons. On the one hand, it supports managing a company (practice), and on the other, it contributes to contingency theory (academia). At its core is the

assertion, that companies are characterized by four levers of control: (1) Belief systems; (2) boundary systems; (3) diagnostic control systems; (4) interactive control systems. To achieve a business strategy, they need to be managed in a balance, in the form of equilibrium. Since the initial publication [30–32], many studies have analyzed this framework, so that there is empirical evidence for the assumption of interdependencies and complementary nature of the levers of control mentioned above [33].

2.3 Hybrid frameworks

Combining characteristics of ESG and performance management frameworks, this section is about hybrid frameworks. The *Sustainability Balanced Scorecard (SBSC)* is an extension of the BSC concept from Kaplan and Norton [34] and helps companies to develop, implement, and measure their sustainability. In comparison to the original approach, which consists of four perspectives, that is (1) financial data, (2) customer/markets, (3) internal/processes, and (4) learning and growth, the SBSC adds another perspective on how to make the four existing dimensions more sustainable in terms of ecological and social aspects [35, 36].

The *Technology-Organization-Environment (TOE)* framework comprises technology, organization, and environment, as well as other areas within these dimensions [37]. It was initially applied to technology adoption but subsequently used in various fields within IT. We emphasize the impact of the technological component of the TOE framework in our analysis while considering the organization and environmental aspects [38]. Focusing on the business IT alignment, we see IT support as the main driver in an increasingly digital business world.

Especially for sustainability analysis, data is the most crucial resource [39]. For instance, a cross-sectional field study focusing on the adoption of IS for sustainability reporting, allocated stand-alone sustainability IS, extensions of sustainability applications, and manual systems to the technology dimension. Furthermore, cost of implementation, managerial decision-making, type of (reporting) processes, complexity of requirements to the organizational dimension, compliance, external regulation, and documentation of records to the environment dimension [40]. Another model includes advantage, compatibility, and observability for technology. Furthermore, top management support, firm size, entrepreneurial orientation, and technological orientation for organization and competitive pressure, perceived trend, government support, and legal framework for the environment, were added [41].

2.4 TOE framework in focus

The ESG frameworks have a strong goal-orientation, i.e., they focus rather on what needs to be achieved and not how to manage changes. The LOC framework is appropriate for the internal perspective, but it lacks the outside-in view of the company's environment. The SBSC deals with this issue but refers to sustainability only as an improvement of existing dimensions, and not as a separate pillar.

However, the TOE stands out, as it is best to *analyze, sort, and classify different terms and approaches of prior publications*. This is due to its generalizability of dimensions. It also is flexible regarding subsequent focus areas. Accordingly, we take the *TOE framework, including the focus areas* given in Table 1, as our evaluation scheme for the ESG performance management body of knowledge.

Table 1. Summary of differentiation criteria regarding ESG performance management.

Dimension	Focus area	Characteristics	Source(s)
Technology	Type of application	Stand-alone, extension, manual solution	[40]
	Type of system	Belief, boundary, diagnostic control, interactive control systems	[28]
	Type of task	Automate, inform, transform	[42]
	Use case	Case optimizations, disclosure, green supply chain management, green strategies, IS adoption	[14]; [43]; [44]
Organization	Department	Executive board, management accounting, risk management, self-empowered	[35]; [36]; [40]
	Firm size	Group, SMEs, micro companies	[23]; [41]
	Management support	Executive board support, management support, no direct support	[23]; [41]
	Profit intention	Profit, non-profit	[18]; [19]; [45]
Environment	Competition	Leader, average, follower	[35]; [36]; [41]
	Driver	Regulation, standards, voluntary	[43]; [46]

3 Review Method

Systematic literature reviews (SLR) are a method for studying a body of knowledge to develop insights, critical reflections, future research paths, and important questions [40]. They help to reduce the likelihood of bias and ensure identifying comprehensive knowledge on the chosen subject [41]. Documenting every step, replicability is ensured. Furthermore, systematic literature reviews help in overcoming challenges such as identifying evidence [42] while the body of knowledge expands day by day [43]. Following Webster and Watson [44], as well vom Brocke et al. [42, 45], our literature review comprises four steps: (1) We focused on leading IS journals, selected business, computer science, and environmental journals, complemented by proceedings from major IS conferences (*outlet search*). (2) Accessing these outlets, we used Science Direct, EBSCOhost, AISEL, and the Web of Science (*database search*, Appendix Table A.1.)

To obtain an understanding of keywords, we first conducted an exploratory search. For ESG, we found synonyms, including sustainability, sustainable, environmental, green, societal, and governance. For performance management, we divided it into three areas of (a) process organization, (b) organizational structure, and (c) IS. For (a) we iden-

tified process organization, MCS, and steering processes, for (b) we went for organization structure, organizational structure, organization/organizational hierarchy, risk management, and management accounting, and for (c) we decided to use information systems, green IS, environmental management information system, and its abbreviation EMIS. In order to include both terms related to sustainability, we implemented “sustainab*” in our search string, and for the same reason “organization*.”

Excluding unrelated work, we implemented “societal,” and not “social” to avoid publications in the field of social media. The same applies to the abbreviation “IS” due to the ambiguity of the identically spelled verb. The final search string combines the ESG domain with performance management, using the Boolean Operator “AND.” Within these umbrella areas, all aforementioned keywords are considered for the search with the Boolean Operator “OR” (Figure 1, top).

(3) Applying this strategy (*keyword search*) in April 2023, we initially found a total number of 1.093 publications – limited to the last ten years, but across all publication media (Figure 1, middle). We then performed data cleansing and removed 212 duplicates as well as eight publications with incorrect data (e.g., missing titles/authors/journals). We then performed a title search and reduced the 873 publications to 258 relevant ones, by searching for a combination of ESG concepts for companies focusing on the process organization, organizational structure, or in combination with IS. We continued to read the abstracts in a similar manner (abstract search) and then identified 137 papers. Our full text search yielded 57 relevant publications.

Search Term		
Umbrella term	Sub-category	Keywords used for the database search
ESG	1. ESG	("Sustainab*" OR "Environmental" OR "Green" OR "Societal" OR "Governance")
AND	AND	AND
Performance management	2. Performance Management	("Performance Management" OR
	2.a) Process organization	"Process organization" OR "Management control system" OR "Steering process" OR
	2.b) Organizational structure	"Organization" structure" OR "Organization" hierarchy" OR "Risk management" OR "Management accounting" OR
	2.c) Information system	"Information systems" OR "Green IS" OR "Environmental Management Information System" OR "EMIS")

↓

Databases	
Database (incl. covered journals)	Publications found (limited to the last ten years)
<i>AISelibrary (AMCIS, ECIS, ICIS, JAIS, MISQ, PACIS)</i>	541
<i>EBSCOhost (EJIS, ISJ, ISR, JIT, JMIS)</i>	+ 180
<i>ScienceDirect (DSS, JSIS)</i>	+ 45
<i>Web of Science (TOP 50 Scimago from Business, Computer Science and Environmental Science)</i>	+ 327
Total	= 1.093

↓

Results		
Process steps	Change in publications	Relevant publications
<i>Initial number of publications</i>		1.093
<i>Data Cleansing (removing duplicates or incomplete data)</i>	- 220	873
<i>Title search</i>	- 615	258
<i>Abstract search</i>	- 121	137
<i>Full text search</i>	- 80	57
<i>Forward / Backward search</i>	+ 7	64
Unique dataset for our SLR		= 64

Fig. 1. Process applied in our literature review.

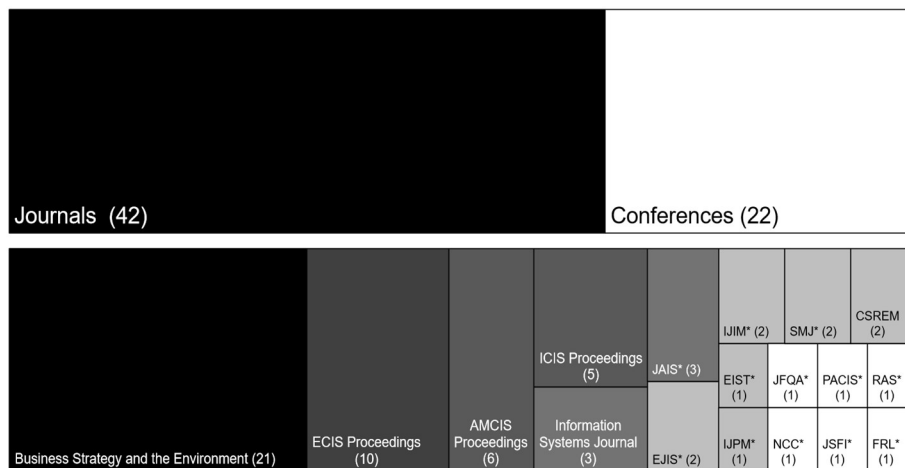
(4) Finally, we conducted a *backward and forward search* and identified another seven publications, which we added to our final assignment for further analysis. We ended up with *64 publications in total* (Figure 1, bottom). To avoid bias, the title, abstract, and full text search were conducted by two researchers independently. After completing each step, they compared and discussed their results until they reached consensus. Figure 1 depicts the results of our search and filtering process.

4 Results

We provide an overview of the descriptive statistics of our selected 64 publications. We then classify them, and by exposing underrepresented areas, we suggest ten takeaways that cover main themes, research gaps, and avenues of future research.

4.1 Descriptive results

Analyzing the metrics of our data set, we condense a first finding regarding the importance of ESG performance management per se. The 64 relevant publications (Sect. 3) encompass 42 top-journal articles and twenty-two conference proceedings (Figure 2, top). We found twenty-one publications in the “Business Strategy and the Environment” journal, followed by ECIS proceedings with ten publications, AMCIS with six, and ICIS proceedings with five hits. Other journals follow with a smaller number of articles. This is an indication regarding the importance of ESG performance management at least in Europe, as the “Business Strategy and the Environment” journal is a top-tier UK-based journal. ICIS, ECIS, and AMCIS, in turn, are the most important conferences for IS researchers [47].



*Abbreviation list (left to right): JAIS = Journal of the Association for Information Systems, EJIS = European Journal of Information Systems, IJIM = International Journal of Information Management, EIST = Environmental Innovation and Societal Transitions, IJPM = International Journal of Project Management, SMJ = Strategic Management Journal, JFOA = Journal of Financial and Quantitative Analysis, NCC = Nature Climate Change, CSREM = Corporate Social Responsibility and Environmental Management, PACIS = PACIS Proceedings, JSFI = Journal of Sustainable Finance & Investment, RAS = Review of Accounting Studies, FRL = Finance Research Letters

Fig. 2. Article distribution among different journals and proceedings.

Examining the publication years, we observed the following: Compared to the previous year, we examined a significant increase in 2015– the year of the SDGs presentation by the UN. In detail, we recognized an increase from three to nine articles from 2014 to 2015, followed by a drop to five publications in 2016. This decline appears high, but the relevant publications in 2016 form a plateau that is still higher than in the years before 2015. Since then, the topic has retained its importance until 2022 with eight papers (Figure 3). As we conducted our literature review in April 2023, it is not surprising that for this year, the number of publications is low.

Takeaway 1: ESG performance management is an emerging topic in the literature. It gained momentum since the presentation of UN's SDGs in 2015.

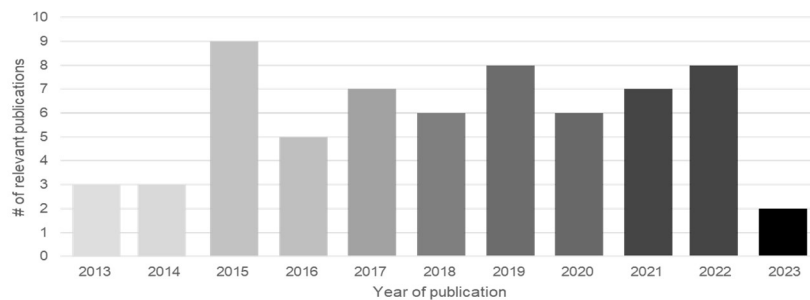


Fig. 3. Paper distribution over time.

4.2 Critical appraisal

Classifying the literature according to the dimensions and focus areas of the TOE framework (Sect. 2.4), Figure 4 depicts our results. **(1) Technology** – we set four focus areas as follows. Regarding the (1a) *types of application*, most publications examine stand-alone applications, managing just one purpose or task. They are cloud- or on-premise solutions and in some companies, they are simple repositories for centrally storing and managing ESG data [40]. Furthermore, we found publications examining extensions beyond other purposes, e.g., ERPs, which store ESG data in addition to other data areas. The last application type is manual solutions, which covers spreadsheets or spreadsheet-based tools.

While stand-alone applications leverage automation, manual solutions lead to manual processes being most often inefficient. Stand-alone solutions offer advantages such as specialization or customized interfaces, which are often used for gathering and consolidating data for a company’s ESG disclosure. However, they typically lack connectivity with other IS within a company. Studies have elaborated on this shortcoming, which often covers poor data quality, availability, and data democratization [7, 40, 48–50]. Poor data quality entails inconsistencies, wrong assignments, or unstructured data. However, if IS are correctly integrated, they bear the potential for detailed analysis to improve business processes or resource allocation beyond compliance objectives [51]. We summarize our findings in a second takeaway.

Takeaway #2: To overcome shortcomings such as poor data quality, availability, and data democratization, stand-alone solutions should be integrated into a company's IS architecture, especially to leverage detailed analysis for business improvement.

For the (1b) *type of system*, we found a mix of belief, diagnostic control, and some interactive control systems. Belief systems address mental concepts and personal behaviors, such as the decision to implement responsible innovation [52], circular economy practices [53], or pro-environmental behavior [7, 54]. Diagnostic control systems are dominant for automating and data presentation [49, 55], covering comprehensive analysis, decision making, and strategy planning, whereas interactive control systems to transform the strategy of a company into action barely exist [7]. Consequently, we conclude.

Takeaway 3: The most frequent IS types for ESG performance reporting are diagnostic control systems. Interactive control systems are still rare to transform a company's vision, mission, and strategic program into action to achieve business value.

Focusing on the (1c) *type of task*, companies use sustainable IS to automate, inform, or transform data [42]. Data visualization can help to break down complex concepts and reveal information flows [53]. In turn, tracking, often referred to as monitoring, is the main reason for IS adoption [40, 56, 57]. More sophisticated IS concepts combine data to provide advice and declare themselves to be decision support systems [58, 59]. Transforming IS has the potential to disrupt the way of work and business models. Stringent company-wide changes are rare by nature. However, there are calls to include existing state-of-the-art, transformative technologies such as predictive analytics for ESG data [60]. Accordingly, our third takeaway is as follows.

Takeaway 4: Most IS focus on automation and data presentation. Transformative technologies such as predictive analytics for ESG performance reporting are currently not elaborated in the literature.

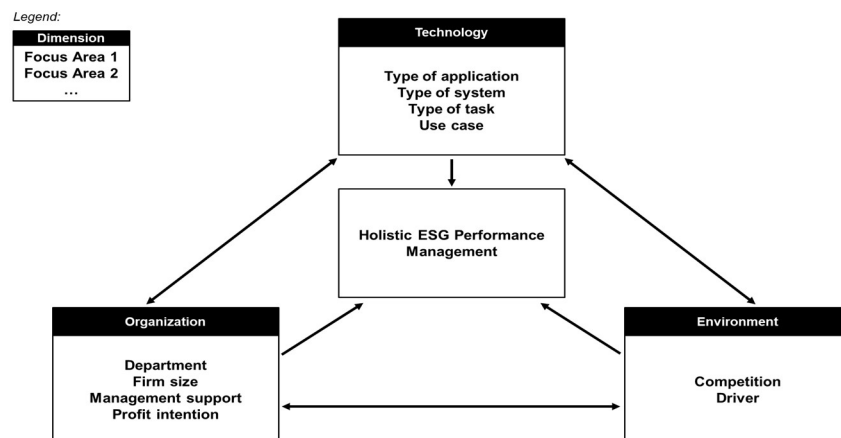


Fig. 4. TOE framework, including set focus areas (based on [37]).

With a focus on specific (1d) *use cases*, some companies use sustainable IS for preparing the ESG disclosure [40, 61]. Other companies examined the adoption of IS [50, 58]. However, another two nuances of use cases were salient: Green supply chain management and case optimizations. On the one hand, as the supply chain is accountable for the majority of a company's externalities, it seems logical to enhance this field in studies [49, 53, 57, 62, 63]. On the other hand, some studies performed single case optimizations, e.g., eco-innovations [5], electric grids [64], eco-effectiveness [56], and decision-making in the energy sector [65]. These cases are operational, while we only found some publications examining green strategies, which were not embedded in an overarching framework [7]. Accordingly, our last takeaway for the technology dimension states as follows:

Takeaway 5: The dominant use cases for ESG performance management cover operational topics, while sustainable strategies are still lacking.

(2) Organization – we adopted four organizational focus areas from the literature, which are department, firm size, management support, and profit intention (Sect. 2). Regarding the (2a) *department*, which should drive a company's ESG performance management, Watson et al. [64] as well as Sadok and Welch [66] suggested a centralized approach in the management accounting department. Other authors reported on self-empowered management for decision-making regarding ESG initiatives [54, 67–69] or assign “managing chances and risks” as the core capability of the risk management department [70–73]. Others suggest the executive board as the driver for sustainability [74–77]. We suggest that each company needs to clarify, which department should drive the ESG performance management. In doing so, it is more important to align ESG strategies with important stakeholders [78], leverage existing processes and IS knowledge [79], and adopt to cope with complex issues in a data-driven manner [64, 75]. We derive our sixth takeaway.

Takeaway 6: ESG strategies need to be clearly communicated across departments. They combine human expertise as well as IS functionalities to be successful in the long run.

We found some publications examining different (2b) *firm sizes*. From micro companies to SMEs, and finally to groups, all sizes were present. Nevertheless, we did not find studies indicating a relationship between a specific firm size and its ESG performance. We only observed mediating influences. So, some studies examined the influence of female board members with regard to a company's sustainability performance. Studies found that heterogeneous boards lead to more socially sustainable initiatives within a company [74]. One explanation is that female senior managers and directors recognize greater value in external relationships [67] that are strengthened by corporate philanthropy [80]. Furthermore, Shahab et al. [74] indicated that different constellations of top management teams (TMT) influence the link between environmental performance and financial distress. In particular, the presence of TMT minorities (e.g., females) contributes to environmental performance, which, in turn, reduces the risk of financial distress. Consequently, we conclude:

Takeaway 7: Company size is used as a control variable. However, by focusing on management board constellations, gender influence is a current theme in the socially sustainable literature. However, there is a need for more factors to be examined than gender, such as ethnicity, or religion.

(2c) We identified *management support* as a key driver for sustainable strategies and its operationalization, i.e., behavior and culture, within a company [5, 57, 64, 79]. As the economic perspective is crucial for performance, there is a significant interdependency between management support and (2d) *profit intention*, so we combine these findings. Even if sustainable initiatives are identified and discussed, research reveals that if they are not instantiated in a company with management commitment, these projects often fail and lead to low or even negative profitability [68]. Management has to put green strategies in the overarching agenda and consciously integrate them into the day-to-day operations for translating strategy into action. [40, 75].

Full integration in a company comprises not only execution, tracking with KPIs, but also regularly reviewing the outcomes of sustainable acting in an end-to-end process, in order to leverage its potential for business value to the greatest possible extent. Sustainable strategies often start with compliance topics as a necessity to avoid penalties. However, more and more managers recognize these initiatives as having the potential not only to ensure compliance but also to drive further business improvements. The positive outcomes of these initiatives can increase reputation, attract investors, and eventually be a market differentiator [81, 82]. These mechanisms help to deliver business value while promoting sustainability. While the literature is still expanding on this topic, this relation was already shown to hold true for various countries or regions [83–85]. The consensus is that if sustainable strategies are to be successful, they need to be backed by executive management to finally highlight the importance to the entire company (signaling effect) [50, 76, 86]. We come up with our eighth takeaway.

Takeaway 8: Management should not only identify and perceive sustainable initiatives as useful. It needs to integrate them into the company's vision, mission, and strategic program and commit them to realizing both the highest economic and sustainable output beyond compliance.

(3) Environment – covering the communication with stakeholders, we found two focus areas, which comprise the influence of competition on and drivers for ESG performance reporting. Focusing on the (3a) *competition*, most firms merely want to comply with requirements as they see ESG performance reporting as a risk [61, 71] and elaborate on mitigating this risk to avoid fines and penalties. Some companies embed ESG in their sustainability strategies as they see ESG as a differentiator in the market. Three studies indicate that this might be a promising strategy [77, 86, 87]. However, studies also conclude twofold: (1) Voluntary ESG disclosure has positive effects on a companies' performance and reputation [77, 88, 89]; but (2) most of the companies report voluntarily, as they expect that regulation will be a “must” in future, and so they already prepare for it. We conclude as follows.

Takeaway 09: Companies align their reporting with current ESG standards to prepare for future regulations. However, they should not only comply with the regulations but leverage their ESG performance reporting as a differentiator in order to gain a competitive advantage.

Examining the (3b) *driver* of ESG performance management, we found evidence that a major share of companies voluntarily discloses their sustainability performance. They align with current standards such as GRI [63], CDP [59], and UNGC [50]. On top of that the EU finalized their adjustments of ESRS (Section 2.3.) which will be effective by 2024. The ESRS will operationalize the CSRD, and thus will be the dominant and seminal standard for companies in the EU [90]. This will affect European regulation and disclosure of ESG performance massively. We conclude our last takeaway as follows:

Takeaway 10: Out of a variety of ESG disclosure standards, the finalized ESRS, operationalizing the CSRD, will be the dominant standard in Europe. Consequently, many European companies will have to align with the ESRS in the future.

We classified relevant publications in the TOE framework and discovered another two observations of interest. Firstly, the distribution of publications between the three TOE dimension was roughly equal. As some publications cover more than a single dimension, we assessed them as not mutually exclusive and assigned them to more than one dimension when needed. Secondly, we examined three publications that handled ESG performance management in a comprehensive manner. However, none of them presented a holistic framework that covers all categories from prior publications. Our findings are depicted in Figure 5, the detailed mapping table can be found in Appendix Table A.3.

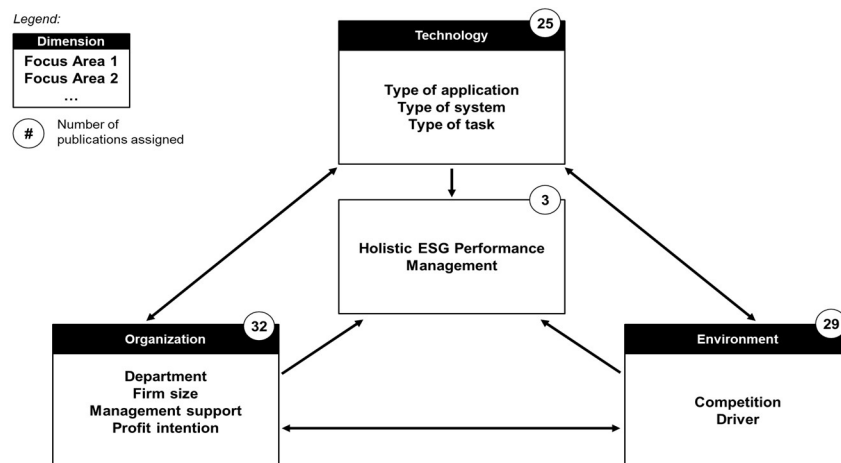


Fig. 5. Publications of our literature review assigned to the TOE framework.

5 Discussion and Conclusion

The objective of this article was to present *findings from a literature review focusing on a company's (internal) ESG performance management leveraging IS*. By applying the TOE framework, we consolidated the current ESG literature threefold in terms of structural and process organization, and supporting IS. We finally provided ten takeaways which cover main themes, research gaps, and avenues of future research.

With regard to the *main themes* for ESG performance management, the literature still elaborates on the operational set-up and the measurement of successful ESG initiatives. Compared to prior studies, we confirmed the tendency that the main focus is on the environmental dimension “E,” followed by “S,” and “G” (Appendix Table A.3). While the accounting literature focuses on ESG vision, mission, and strategic program implementation, heterogenous board structures and the ESG disclosure reception by capital markets, the IS community focuses on single case optimizations, alternative IS solutions, and mechanism for fostering sustainable behavior.

Research gaps that became apparent in our literature review, are besides other topics, the missing link between ESG vision, mission, and strategic program and operations, in other words translating ESG strategy into action. Accordingly, *avenues of further research* include adopting interactive control systems and advanced analytics in a company's ESG performance management, ultimately a framework for a holistic ESG performance management per se.

Furthermore, current ESG performance management typically entails stand-alone applications that should be integrated into a company-wide (more holistic) IS architecture. applications are mainly applied for automation and information tasks, so they gather, load, and monitor data for decision making on an operational, but not for a strategic level aiming to transform a business. In combination with a new mindset and behavior, this is an opportunity to apply ESG reporting standards beyond pure compliance fulfillment and take that as a differentiator in the market by means of internal strength. In doing so, we have not just added a new perspective on how to use the TOE framework but started a *new research stream*.

However, our research is associated with certain *limitations*, which open up avenues for future research. Firstly, we limited our work to *journals and conferences from the last ten years*, which might exclude certain relevant papers, which we did not examine in our backward/forward search. Furthermore, one could argue that including *other keywords* in our search string would yield different results.

Due to the number of identified publications (Sect. 2), we were *not able to read all articles completely and in-depth*. This may rule out some relevant publications as well. Finally, this literature review should be updated from time to time. However, the revealed *research gaps should now be closed step-by-step in follow-up research work*.

References

1. Gartner: Gartner Identifies the Top 10 Strategic Technology Trends for 2023, <https://www.gartner.com/en/newsroom/press-releases/2022-10-17-gartner-identifies-the-top-10-strategic-technology-trends-for-2023>, last accessed 22.04.2023.
2. European Union (ed.): Regulation (EU) 2020/852 on the establishment of a framework to facilitate sustainable investment, and amending Regulation (EU) 2019/2088. Official Journal of the European Union (2020).
3. CSRD. Official Journal of the European Union 65(L 322) (2022).
4. Nash, K., Wakefield, R.: Examining GRI Sustainability Reports through the Lens of the Stakeholder Theory. AMCIS 2022 Proceedings (2022).
5. Hanelt, A., Busse, S., Kolbe, L.M.: Driving business transformation toward sustainability: exploring the impact of supporting IS on the performance contribution of eco-innovations. *Info Systems J* 27(4), 463–502 (2017).
6. Lardo, A., Corsi, K., Varma, A., Mancini, D.: Exploring blockchain in the accounting domain: a bibliometric analysis. *Accounting, Auditing & Accountability Journal* 35(9), 204–233 (2022).
7. Christopher Henkel, Anna-Raissa Seidler, Johann Joachim Kranz, and Marina Fiedler: How to become a Sustainability Leader? The Role of IS Affordances in Enabling and Triggering Sustainability Transformations. ICIS 2017 Proceedings (2017).
8. Tsang, A., Frost, T., Cao, H.: Environmental, Social, and Governance (ESG) disclosure: A literature review. *The British Accounting Review* 55(1), 101149 (2023).
9. Gillan, S.L., Koch, A., Starks, L.T.: Firms and social responsibility: A review of ESG and CSR research in corporate finance. *Journal of Corporate Finance* 66, 101889 (2021).
10. Lombardi, R., Secundo, G.: The digital transformation of corporate reporting – a systematic literature review and avenues for future research. *MEDAR* 29(5), 1179–1208 (2021).
11. Ambec, S., Lanoie, P.: Does It Pay to Be Green? A Systematic Overview. *AMP* 22(4), 45–62 (2008).
12. Schoormann, T., Strobel, G., Möller, F., Petrik, D., Zschech, P.: Artificial Intelligence for Sustainability—A Systematic Review of Information Systems Literature. *CAIS* 52, 199–237 (2023).
13. Henkel, C., Kranz, J.: Pro-Environmental Behavior and Green Information Systems Research - Review, Synthesis and Directions for Future Research. ICIS 2018 Proceedings (2018).
14. Harnischmacher, C., Herrenkind, B., Weillbier, L.: Yesterday, Today, and Tomorrow - Perspectives on Green Information Systems Research Streams, https://aisel.aisnet.org/ecis2020_rp/193/, last accessed 22.04.2023.
15. Arvidsson, S., Dumay, J.: Corporate ESG reporting quantity, quality and performance: Where to now for environmental policy and practice? *Bus Strat Env* 31(3), 1091–1110 (2022).
16. Bandara, W., Furtmueller, E., Gorbacheva, E., Miskon, S., Beekhuyzen, J.: Achieving Rigor in Literature Reviews: Insights from Qualitative Data Analysis and Tool-Support. *CAIS* 37 (2015).

17. Ahmadifar, T.M., Williamson, G.A.: ESG Investing Frameworks and SEC Regulation. *The Investment Lawyer* 29(7), 3–15 (2022).
18. United Nations: About the PRI, <https://www.unpri.org/about-us/about-the-pri>, last accessed 22.04.2023.
19. United Nations: Transforming our world: The 2030 agenda for sustainable development, <https://sdgs.un.org/sites/default/files/publications/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf>, last accessed 22.04.2023.
20. United Nations Global Compact: Our Ambition, <https://unglobalcompact.org/what-is-gc/mission>, last accessed 18.05.2023.
21. EFRAG: First Set of draft ESRS, <https://www.efrag.org/lab6>, last accessed 18.05.2023.
22. ISSB: February 2023 ISSB Update and podcast now available, <https://www.ifrs.org/news-and-events/news/2023/02/february-2023-issb-update-and-podcast-now-available/>, last accessed 18.05.2023.
23. Ketter, W., Padmanabhan, B., Pant, G., Raghu, T.S.: Special Issue Editorial: Addressing Societal Challenges through Analytics: An ESG ICE Framework and Research Agenda. *JAIS* 21(5), 1115–1127 (2020).
24. Committee of Sponsoring Organizations of the Treadway Commission: Achieving effective internal control over sustainability reporting (ICSR). *Building Trust and Confidence through the COSO Internal Control-Integrated Framework* (2023).
25. Swain, M.R., Fawcett, S.E.: ACTIVITY-BASED COSTING. In: Swamidass, P.M. (ed.) *Encyclopedia of production and manufacturing management*, pp. 10–19. Springer US (2006).
26. Turney, P.B.B.: Activity-Based Management. *ABM puts ABC information to work. Management Accounting* (1992).
27. Copeland, T.E., Koller, T., Murrin, J.: *Valuation: measuring and managing the value of companies. Measuring and managing the value of companies*, [9th print.]. John Wiley, New York (1991).
28. Simons, R.: *Levers of control. How managers use innovative control systems to drive strategic renewal*. Harvard Business Review Press, Boston, Massachusetts (1995).
29. Simons, R.: *Performance measurement & control systems for implementing strategy*. Prentice Hall, Upper Saddle River, N.J. (2000).
30. Mundy, J.: Creating dynamic tensions through a balanced use of management control systems. *Accounting, Organizations and Society* 35(5), 499–523 (2010).
31. Baird, K., Su, S., Munir, R.: Levers of control, management innovation and organisational performance. *PAR* 31(3), 358–375 (2019).
32. Journeault, M., Rongé, Y. de, Henri, J.-F.: Levers of eco-control and competitive environmental strategy. *The British Accounting Review* 48(3), 316–340 (2016).
33. Widener, S.K.: An empirical analysis of the levers of control framework. *Accounting, Organizations and Society* 32(7-8), 757–788 (2007).
34. Kaplan, R.S., Norton, D.P.: *The Balanced Scorecard—Measures that Drive Performance* (1992).
35. Epstein, M.J., Wisner, P.S.: Using a Balanced Scorecard to Implement Sustainability. *Environ. Qual. Manage.* 11(2), 1–10 (2001).
36. Schaltegger, S., Wagner, M.: Integrative management of sustainability performance, measurement and reporting. *IJAAP* 3(1), 1 (2006).

37. Tornatzky, L.G., Fleischer, M., Chakrabarti, A.K.: The processes of technological innovation. Lexington, Lexington, Mass., Toronto (1990).
38. Bryan, J.D., Zuva, T.: A Review on TAM and TOE Framework Progression and How These Models Integrate. *Adv. sci. technol. eng. syst. j.* 6(3), 137–145 (2021).
39. Etzion, D., Aragon-Correa, J.A.: Big Data, Management, and Sustainability. *Organization & Environment* 29(2), 147–155 (2016).
40. Ravi Chandra Seethamraju and Geoffrey Frost: Deployment of Information Systems for Sustainability Reporting and Performance. *AMCIS 2019 Proceedings* (2019).
41. Nguyen, T.H., Le, X.C., Vu, T.H.L.: An Extended Technology-Organization-Environment (TOE) Framework for Online Retailing Utilization in Digital Transformation: Empirical Evidence from Vietnam. *JOITmC* 8(4), 200 (2022).
42. Chen, A.J., Boudreau, M.-C., Watson, R.T.: Information systems and ecological sustainability. *Journal of Systems and Information Technology* 10(3), 186–201 (2008).
43. Zopounidis, C., Garefalakis, A., Lemonakis, C., Passas, I.: Environmental, social and corporate governance framework for corporate disclosure: a multicriteria dimension analysis approach. *MD* 58(11), 2473–2496 (2020).
44. Loeser, F., Recker, J., vom Brocke, J., Molla, A., Zarnekow, R.: How IT executives create organizational benefits by translating environmental strategies into Green IS initiatives. *Info Systems J* 27(4), 503–553 (2017).
45. Linnenluecke, M.K.: Environmental, social and governance (ESG) performance in the context of multinational business research. *MBR* 30(1), 1–16 (2022).
46. Global Reporting Initiative: GRI Standards, <https://www.globalreporting.org/how-to-use-the-gri-standards/gri-standards-english-language/>, last accessed 23.04.2023.
47. AIS: AIS Conferences, <https://aisel.aisnet.org/conferences/>, last accessed 21.05.2023.
48. Naser Shekarian and Ronald Ramirez: The Impact of Corporate Sustainability and Technology Investment on Firm Innovation. *AMCIS 2022 Proceedings* (2022).
49. Zampou, E., Karagiannaki, A., Pramatari, K.: Implementation Of Energy And Carbon Management Systems In The Supply Chain: Evidence From The Retail And Consumer Goods Industries. *ECIS 2016 Proceedings* (2016).
50. Hoang, G., Molla, A., Poon, P.L.: Factors Influencing The Adoption Of Environmental Enterprise Systems. *PACIS 2019 Proceedings* (2019).
51. Mervelskemper, L., Streit, D.: Enhancing Market Valuation of ESG Performance: Is Integrated Reporting Keeping its Promise? *Bus Strat Env* 26(4), 536–549 (2017).
52. Cherki El Idrissi, S., Corbett, J., Mellouli, S.: Exploratory Study of Responsible Innovation: Toward a Holistic Approach to Sustainability. *AMCIS 2020 Proceedings* (2022).
53. Zeis, R.: Information Flows In Circular Economy Practices. *ECIS 2019 Proceedings* (2019).
54. Anna-Raissa Seidler, Christopher Henkel, Marina Fiedler, and Johann Kranz: Encouraging Pro-Environmental Behaviour: Affordances and Institutional Logics in IS-enabled Organisational Sustainability Transformations. *ECIS 2018 Proceedings* (2018).
55. Fridgen, G., Saumweber, A., Seyfried, J., Wederhake, L.: Decision Flexibility Vs. Information Accuracy In Energy-Intensive Businesses. *ECIS 2018 Proceedings* (2018).

56. Stefan Seidel, Nadine Székely, and Jan vom Brocke: Green IS: Are We Still Thinking in Mere Economic Imperatives or Are We Striving for Eco-Effectiveness? *AMCIS 2015 Proceedings* (2015).
57. Centobelli, P., Cerchione, R., Esposito, E., Shashi: Evaluating environmental sustainability strategies in freight transport and logistics industry. *Bus Strat Env* 29(3), 1563–1574 (2020).
58. Hendrik Hilpert, Johann Kranz, and Matthias Schumann: An information system design theory for green information systems for sustainability reporting - integrating theory with evidence from multiple case studies. *ECIS 2014 Proceedings* (2014).
59. Corbett, J.: Designing and Using Carbon Management Systems to Promote Ecologically Responsible Behaviors. *JAIS* 14(7), 339–378 (2013).
60. Pan, S.L., Carter, L., Tim, Y., Sandeep, M.S.: Digital sustainability, climate change, and information systems solutions: Opportunities for future research. *International Journal of Information Management* 63, 102444 (2022).
61. Seethamraju, R., Frost, G.: Information Systems for Sustainability Reporting - A State of Practice. *AMCIS 2016 Proceedings* (2016).
62. Zampou, E., Pramatari, K., Mourtos, I.: Design of Environmental Performance Monitoring Systems in the Supply Chain: The Role of Interoperability. *ECIS 2015 Proceedings* (2015).
63. Zampou, E., Mourtos, I., Pramatari, K., Seidel, S.: A Design Theory for Energy and Carbon Management Systems in the Supply Chain. *JAIS* (2021).
64. Watson, R.T., Ketter, W., Recker, J., Seidel, S.: Sustainable Energy Transition: Intermittency Policy Based on Digital Mirror Actions. *JAIS* 23(3), 631–638 (2022).
65. Nuss, C.: Developing an Environmental Management Information System to Foster Sustainable Decision-Making in the Energy Sector. *ECIS 2015 Proceedings* (2015).
66. Sadok, M., Welch, C.: A Socio-Technical Approach To Sustainability In Organizations: An Exploratory Study. *ECIS 2017 Proceedings* (2017).
67. Yang, M.X., Li, J., Yu, I.Y., Zeng, K.J., Sun, J.-M.: Environmentally sustainable or economically sustainable? The effect of Chinese manufacturing firms' corporate sustainable strategy on their green performances. *Bus Strat Env* 28(6), 989–997 (2019).
68. Marnewick, C.: Information system project's sustainability capability levels. *International Journal of Project Management* 35(6), 1151–1166 (2017).
69. Goggins, G., Rau, H.: Alteration spaces: Charting the sustainability potential of large organizations. *Environmental Innovation and Societal Transitions* 40, 435–449 (2021).
70. Reshad, A.I., Biswas, T., Agarwal, R., Paul, S.K., Azeem, A.: Evaluating barriers and strategies to sustainable supply chain risk management in the context of an emerging economy. *Bus Strat Env* (2023).
71. Goldstein, A., Turner, W.R., Gladstone, J., Hole, D.G.: The private sector's climate change risk and adaptation blind spots. *Nature Clim Change* 9(1), 18–25 (2019).
72. Xue, B., Zhang, Z., Li, P.: Corporate environmental performance, environmental management and firm risk. *Bus Strat Env* 29(3), 1074–1096 (2020).
73. Ethirajan, M., Arasu M, T., Kandasamy, J., K.E.K, V., Nadeem, S.P., Kumar, A.: Analysing the risks of adopting circular economy initiatives in manufacturing supply chains. *Bus Strat Env* 30(1), 204–236 (2021).

74. Shahab, Y., Ntim, C.G., Chengang, Y., Ullah, F., Fosu, S.: Environmental policy, environmental performance, and financial distress in China: Do top management team characteristics matter? *Bus Strat Env* 27(8), 1635–1652 (2018).
75. Hristov, I., Appolloni, A., Chirico, A.: The adoption of the key performance indicators to integrate sustainability in the business strategy: A novel five-dimensional framework. *Bus Strat Env* 31(7), 3216–3230 (2022).
76. Chan, R.Y.K.: Do chief information officers matter for sustainable development? Impact of their regulatory focus on green information technology strategies and corporate performance. *Bus Strat Env* 30(5), 2523–2534 (2021).
77. Stadler, L., Lin, H.: Moving to the Next Strategy Stage: Examining Firms' Awareness, Motivation and Capability Drivers in Environmental Alliances. *Bus Strat Env* 26(6), 709–730 (2017).
78. Seidel, S., Chandra Kruse, L., Székely, N., Gau, M., Stieger, D.: Design principles for sensemaking support systems in environmental sustainability transformations. *European Journal of Information Systems* 27(2), 221–247 (2018).
79. Wang, Y., Chen, Y., Benitez-Amado, J.: How information technology influences environmental performance: Empirical evidence from China. *International Journal of Information Management* 35(2), 160–170 (2015).
80. Marquis, C., Lee, M.: Who is governing whom? Executives, governance, and the structure of generosity in large U.S. firms. *Strat. Mgmt. J.* 34(4), 483–497 (2013).
81. Martin, P.R., Moser, D.V.: Managers' green investment disclosures and investors' reaction. *Journal of Accounting and Economics* 61(1), 239–254 (2016).
82. Fatemi, A., Glaum, M., Kaiser, S.: ESG performance and firm value: The moderating role of disclosure. *Global Finance Journal* 38, 45–64 (2018).
83. Velte, P.: Does ESG performance have an impact on financial performance? Evidence from Germany. *JGR* 8(2), 169–178 (2017).
84. Yoon, B., Lee, J., Byun, R.: Does ESG Performance Enhance Firm Value? Evidence from Korea. *Sustainability* 10(10), 3635 (2018).
85. Ademi, B., Klungseth, N.J.: Does it pay to deliver superior ESG performance? Evidence from US S&P 500 companies. *JGR* 13(4), 421–449 (2022).
86. Walker, K., Ni, N., Dyck, B.: Recipes for Successful Sustainability: Empirical Organizational Configurations for Strong Corporate Environmental Performance. *Bus Strat Env* 24(1), 40–57 (2015).
87. Zhou, Z., Zhang, L., Lin, L., Zeng, H., Chen, X.: Carbon risk management and corporate competitive advantages: “Differential promotion” or “cost hindrance”? *Bus Strat Env* 29(4), 1764–1784 (2020).
88. Ben-Amar, W., McIlkenny, P.: Board Effectiveness and the Voluntary Disclosure of Climate Change Information. *Bus. Strat. Env.* 24(8), 704–719 (2015).
89. Sinnewe, E., Yao, T., Zaman, M.: Informing or obfuscating stakeholders: Integrated reporting and the information environment. *Bus Strat Env* 30(8), 3893–3906 (2021).
90. European Commission: The Commission adopts the European Sustainability Reporting Standards, https://finance.ec.europa.eu/news/commission-adopts-european-sustainability-reporting-standards-2023-07-31_en, last accessed .

91. vom Brocke, J., Simons, A., Riemer, K., Niehaves, B., Plattfaut, R., Cleven, A.: Standing on the Shoulders of Giants: Challenges and Recommendations of Literature Search in Information Systems Research. CAIS 37, 205–224 (2015).

Appendix

Further material for this work is available online (<https://tinyurl.com/4mymb9fc>):

Part 1 – Journals and Proceedings (based on [91]).

Part 2 – Result of literature review after outlet, database, and keyword search (limited to the last 10 years) yielding 64 hits.

Part 3 – Classification of ESG Performance Management characteristics.