

Systematic Integration of ESG Criteria into Infrastructural Facility Management – Development of an Evaluation Framework

*Sophie Klinkel, Luca Lucic, Nadine Wills-Stroh
Technische Hochschule Mittelhessen, Germany*

Abstract:

Sustainability is increasingly important in facility management (FM). With a rising focus on Environmental, Social and Governance (ESG) regulatory requirements - especially EU Taxonomy, Corporate Sustainability Reporting Directive (CSRD), and associated European Sustainability Reporting Standards (ESRS) - companies must address sustainability both strategically and operationally in building operations. While existing ESG tools for monitoring building performance and collecting relevant KPIs focus on technical building management, the social dimension of sustainability, which is especially important in infrastructural FM while coordinating external service providers, remains underrepresented. The aim of this paper is to evaluate the relevance of ESG criteria for infrastructural FM and to develop a standardized evaluation framework for use by corporates and facility service providers. First, relevant ESG criteria for controlling, monitoring, and reporting sustainability in infrastructural FM are derived from the internationally recognized Global Reporting Initiative (GRI) framework. Next, the existing gefma ESG-KPI tool is extended to include these criteria by mapping ESG criteria to GRI categories. The criteria are moreover weighted using a scoring tool that rates them from “not fulfilled” to “best practice”. The developed model is validated using data from real university buildings and demonstrates that transparent measures to improve ESG performance can be systematically identified and implemented. The model can be used in any role, such as property management, FM, and FM service providers, enabling application across the various responsibilities within the context of ESG. The developed framework supports the structured collection and evaluation of operational sustainability information that can contribute to ESG reporting processes.

Keywords:

ESG integration, infrastructural facility management, KPI framework, GRI standards, sustainability reporting

1. Introduction

While sustainability is increasingly important in facility management (FM) (Jensen et al., 2024) and environmental, social, and governance (ESG) aspects become more important to FM, standardized approaches for integrating ESG criteria into operational FM processes are still underdeveloped (Santana Tovar et al., 2025). International guidelines and recent research suggest that formal evaluation and implementation models are required, particularly for practical use (International Facility Management Association, 2017; Jensen et al., 2024). Furthermore, regulatory requirements, such as the Corporate Sustainability Reporting Directive (CSRD) and the EU Taxonomy, require organizations to address sustainability both strategically and operationally in daily building operations (Gefma, 2023).

FM ensures the built environment functions through multidisciplinary technical, commercial, and infrastructural services (International Facility Management Association, 2017). Infrastructural FM (IFM) refers to service-oriented activities that support the daily operation and use of buildings, such as cleaning, security, catering, and waste management. (Wills and Díaz, 2022). Besides the economic importance of IFM, standardized procedures for the systematic capture and integration of ESG criteria into FM are missing and are mainly driven by client expectations (Ramantswana et al., 2026). Existing approaches predominantly address technical and energy-related aspects, while IFM services remain insufficiently considered (Nielsen et al., 2016; Okoro, 2023; Opoku and Lee, 2022). In particular, a practice-oriented framework is lacking for identifying and structuring relevant ESG criteria and integrating them into IFM operational processes (Michalski, 2024). As a result, potential improvements in ecological, social, and governance-related performance remain largely underutilized.

This paper aims to systematically integrate ESG criteria into IFM. Therefore, relevant ESG criteria for IFM services are identified, and a functional evaluation grid is derived on this basis. The existing GEFMA ESG-KPI tool, which primarily addresses ESG at building and portfolio level, is extended through GRI mapping and a five-point scoring logic tailored to outsourced, labor-intensive IFM services. The approach therefore operationalizes an established practitioner tool rather than creating a new assessment philosophy. The resulting framework is role-neutral and can be applied

by property managers, FM departments, and service providers alike, providing a shared evaluation language.

The paper is organized as follows: Section 2 outlines the theoretical background on ESG in the real estate and FM context, the relevant regulatory framework, the role of IFM, and the GRI standards as a reference framework for ESG reporting. Section 3 describes the methodological development of the evaluation framework, including the selection of criteria, the mapping to GRI standards, and the scoring logic. Section 4 applies the framework to an empirical case study at a public building. Section 5 discusses the results, the contribution of the framework, and its limitations. The paper concludes with a summary and an outlook on potential future research directions.

2. Theoretical background

ESG assesses sustainability performance across environmental, social, and governance dimensions, including resource use, working conditions, and organizational accountability (Helmold et al., 2024). As facility managers play a key role in the daily delivery of facility services, FM directly influences the ESG performance of an organization. While environmental aspects have traditionally dominated sustainability initiatives, increasing attention is being brought to social and governance issues that arise from operational service delivery and outsourced facility services (Jensen et al., 2024).

The growing relevance of ESG is reinforced by European regulations such as the CSRD and the EU Taxonomy, which require structured sustainability reporting (Kirchhoff et al., 2024). The EU Omnibus Simplification Package aims to simplify sustainability reporting, due diligence requirements, and reduce administrative burdens (EU Commission, 2025). Despite evolving regulations, structured ESG assessments remain relevant for IFM operations.

FM covers technical, commercial, and infrastructural services that support building operations and core organizational processes (Hirschner et al., 2018). Existing ESG assessment approaches primarily focus on technical FM, particularly on energy efficiency, emissions, and building performance. In contrast, infrastructural FM (IFM) includes service-oriented activities such as cleaning, security, catering, waste

management, and outdoor maintenance (GEFMA e.V. Deutscher Verband für Facility Management, 2004).

As IFM services are often outsourced, occupational health and safety, working conditions, supplier management, and compliance are key sustainability aspects (Hirschner et al., 2018; Kaiser et al., 2025).

Despite the growing importance of sustainability in IFM, existing assessment approaches remain fragmented and predominantly address individual service areas rather than IFM as an integrated management domain. In cleaning services, current approaches primarily focus on life cycle assessment (LCA) or hygiene monitoring (Fontana, 2024; Fontana, 2026). Research on catering mainly addresses environmental impacts, food waste, and sustainable procurement (Huang, 2025; Takacs and Borrion, 2020). Studies on gardening and outdoor maintenance focus on ecosystem services, life cycle thinking, and multi-criteria decision analysis (Jato-Espino et al., 2023; Romanovska et al., 2023). Thus, standardized assessment frameworks that systematically integrate ESG aspects across the full spectrum of IFM services are missing.

To facilitate the transfer of the framework to the ESRS context, the identified GRI Standards were additionally related to the corresponding ESRS topics. This mapping is intended for orientation only and does not represent a formal ESRS compliance assessment. The GRI Standards are sustainability reporting standards that provide a structured framework for ESG reporting (Global Reporting Initiative, 2021). For IFM, the most relevant standards relate to energy, emissions, and waste (GRI 302, 305, 306), occupational health and safety, and employment (GRI 401, 403, 404), as well as supplier assessment, anti-corruption, and compliance (GRI 205, 308, 414, 419). These standards form the basis for selecting and structuring the ESG criteria developed in this paper. The GRI Standards were selected as the primary reference framework because they provide an established structure for identifying and categorizing sustainability impacts relevant to the operational delivery of IFM services. The ESRS, in contrast, provide the European regulatory framework for sustainability reporting under the CSRD. To establish a link to this regulatory context, the identified GRI-based criteria were mapped to corresponding ESRS topics (Table

1). This mapping is indicative and does not establish equivalence between individual GRI disclosures and ESRS data points or demonstrate full ESRS compliance.

Table 1: Relevant GRI standards IFM (own representation, based on GRI, 2021)

<i>ESG Criterion</i>	<i>Relevant GRI Standards</i>	<i>ESRS Criterion</i>
E–Resources and emissions	GRI 302, GRI 303, GRI 305, GRI 306	E1
S–Occupational safety	GRI 403	S1
S–Working conditions	GRI 401, GRI 404	S1, S2
G–Supply-chain control	GRI 308, GRI 414	S2
G–Compliance	GRI 205, GRI 419; GRI 2	G1

The framework does not cover all ESRS disclosure requirements or data points. It focuses on sustainability criteria that are relevant and operationally assessable within the six IFM service areas; therefore, additional ESRS-specific requirements may need to be addressed separately when using the framework to support regulatory reporting.

Despite its international recognition, the application of GRI in the building sector has limitations, as not all sector-specific aspects are covered and practical interpretation may vary (Kaiser et al., 2025; May et al., 2022). Moreover, the risk of greenwashing highlights the need to ensure that ESG measures result in measurable improvements rather than mere formal compliance.

3. Development of the ESG evaluation framework

The ESG evaluation framework is developed in three steps, as shown in Figure 1.

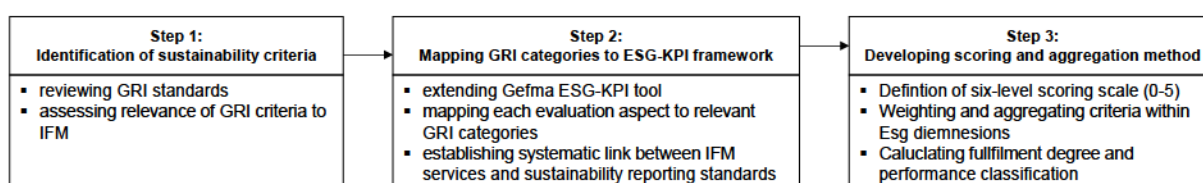


Figure 1: Process of framework development (own representation, 2026).

First, relevant sustainability criteria were identified based on the GRI standards. Second, these criteria were integrated into the existing GEFMA ESG-KPI tool and

linked to relevant GRI categories. Third, a standardized scoring and aggregation methodology was developed to evaluate ESG performance across IFM service areas.

The framework follows a hierarchical structure, translating overarching ESG dimensions into specific evaluation criteria for individual IFM service areas (Table 2).

The evaluation criteria were selected according to the following principles:

1. relevance to sustainability-oriented IFM and
2. empirical measurability based on available operational proof.

Criteria were included only if they could be meaningfully assessed through documented processes, operational practices, or measurable indicators. Less relevant or non-evaluable aspects were excluded or consolidated. The environmental dimension focuses on resource consumption, including chemicals, machinery, and operational products. The social dimension addresses human and organizational aspects of IFM service delivery, including subcontractor management. The governance dimension covers compliance, documentation, transparency, control mechanisms, and supplier management.

To translate general sustainability requirements into measurable operational indicators, the identified ESG criteria were assigned to the relevant IFM service areas.

The framework considers six major IFM service areas:

- security and reception services,
- catering services,
- waste and disposal management,
- outdoor and green-space maintenance,
- winter and caretaker services, and
- cleaning services.

This operationalization ensures that sustainability performance is assessed not at an abstract organizational level but at the level of individual FM processes and responsibilities. Consequently, each criterion can be evaluated based on service-specific evidence and operational practices.

To ensure compatibility with established sustainability reporting practices, the operationalized ESG criteria were mapped to relevant GRI Standards. The mapping

establishes traceability between operational FM activities and internationally recognized sustainability disclosure categories.

The mapping used a content-based approach. Each evaluation criterion was assigned to the GRI Standards that best represent the sustainability impact addressed. Where individual IFM activities influence multiple sustainability dimensions, multiple GRI references were applied. For example, mobility within security and reception services was linked to GRI 302 (Energy) due to fuel and energy consumption and to GRI 305 (Emissions) due to associated greenhouse gas emissions. The use of cleaning products was linked to GRI 301 (Materials) and GRI 306 (Waste), reflecting resource consumption and disposal impacts. Occupational safety criteria across all IFM services were mapped to GRI 403 (Occupational Health and Safety). Supplier-related governance aspects were connected to GRI 308 (Supplier Environmental Assessment) and GRI 414 (Supplier Social Assessment), reflecting the relevance of subcontractor management in IFM service provision. Governance-related criteria, including compliance, documentation, transparency, and subcontractor management, were primarily linked to GRI 2 (General Disclosures), GRI 308 (Supplier Environmental Assessment), and GRI 414 (Supplier Social Assessment). Documentation was explicitly considered as a governance criterion because the availability of verifiable records, procedures, and monitoring mechanisms is essential for demonstrating the implementation and traceability of sustainability practices in operational FM. The evaluation criteria developed in this study are operational indicators designed to assess the implementation and documentation of sustainability practices in IFM services. They are not intended to replace ESRS disclosure requirements or their associated data points. The GRI mapping provides a first orientation for connecting operational evidence to sustainability reporting topics, while a detailed alignment with applicable ESRS disclosure requirements remains a task for future development.

Table 2 presents the mapping between IFM service areas, ESG criteria, and relevant GRI Standards.

Table 2: Operationalization of ESG criteria for IFM service areas and mapping to GRI Standards (own representation, 2026).

<i>IFM service area</i>	<i>ESG dimension</i>	<i>(ESG)-Evaluation criterion</i>	<i>Relevant GRI Standards</i>
Security and reception	Environmental	Mobility	GRI 302 Energy; GRI 305 Emissions
	Social	Occupational safety	GRI 403 Occupational Health and Safety
	Social	Qualifications	GRI 404 Training and Education
	Social	Working conditions	GRI 401 Employment
	Governance	Compliance & Transparency	GRI 2 General Disclosures
	Governance	Documentation	GRI 2 General Disclosures
Catering	Environmental	Food origin	GRI 204 Procurement Practices; GRI 308 Supplier Environmental Assessment
	Environmental	Waste management	GRI 306 Waste
	Social	Occupational safety	GRI 403 Occupational Health and Safety
	Social	Employee qualification	GRI 404 Training and Education
	Social	Nutritional diversity	GRI 416 Customer Health and Safety
	Governance	Hygiene management	GRI 416 Customer Health and Safety
	Governance	Supply-chain transparency	GRI 308 Supplier Environmental Assessment; GRI 414 Supplier Social Assessment
	Governance	Reporting	GRI 2 General Disclosures
Waste and disposal management	Environmental	Recycling rate	GRI 306 Waste
	Environmental	Hazardous-substance management	GRI 306 Waste

	Environmental	Waste management	GRI 306 Waste
	Social	Occupational safety	GRI 403 Occupational Health and Safety
	Social	User information	GRI 306 Waste
	Governance	Documentation	GRI 2 General Disclosures
	Governance	Compliance	GRI 2 General Disclosures
Outdoor and green-space maintenance	Environmental	Biodiversity	GRI 304 Biodiversity
	Environmental	Chemical use	GRI 301 Materials; GRI 306 Waste
	Environmental	Machinery use	GRI 302 Energy
	Social	Occupation safety	GRI 403 Occupational Health and Safety
	Governance	Documentation	GRI 2 General Disclosures
	Governance	Compliance	GRI 2 General Disclosures
Winter and caretaker	Environmental	De-icing and cleaning materials	GRI 301 Materials
	Environmental	Material efficiency	GRI 301 Materials
	Environmental	Resource efficiency	GRI 302 Energy; GRI 303 Water and Effluents
	Social	Occupation safety	GRI 403 Occupational Health and Safety
	Social	Working conditions	GRI 401 Employment; GRI 403 Occupational Health and Safety
	Governance	Documentation	GRI 2 General Disclosures
	Governance	Liability management	GRI 2 General Disclosures
Cleaning	Environmental	Cleaning products	GRI 301 Materials; GRI 306 Waste
	Environmental	Resource intensity	GRI 302 Energy

	Environmental	Emission impacts	GRI 305 Emissions
	Social	Working conditions	GRI 401 Employment; GRI 403 Occupational Health and Safety
	Social	Qualifications	GRI 404 Training and Education
	Governance	Documentation	GRI 2 General Disclosures
	Governance	Compliance	GRI 2 General Disclosures
	Governance	Subcontractor management	GRI 308 Supplier Environmental Assessment; GRI 414 Supplier Social Assessment

The integration of GRI references differentiates the developed framework from generic sustainability assessment approaches by linking operational FM practices with established sustainability reporting structures. However, the mapping does not imply direct compliance with regulatory reporting frameworks such as CSRD or the European Sustainability Reporting Standards (ESRS). Instead, it provides a structured foundation for improving the traceability and potential reuse of operational FM information within sustainability reporting processes.

The evaluation framework uses a six-point ordinal rating scale ranging from 0 to 5. Points are assigned based on the quality, completeness, and verifiability of the available documentation. A score of 0 indicates a lack of documentation or non-fulfillment. Scores between 1 and 2 indicate limited implementation, in which intentions regarding sustainability are present, but operational evidence remains insufficient. A rating of 3 indicates measures that have been implemented with partial documentation. Ratings of 4 and 5 indicate advanced stages of implementation characterized by documented processes, measurable results, and established control mechanisms. Table 3 shows the scoring scale.

Table 3: Scoring scale for the evaluation of ESG criteria (own representation, 2026).

Score	Meaning	Rationale
0	Not fulfilled	No evidence or corresponding information available

1	Insufficient	Criterion mentioned only as general intention
2	Partially fulfilled	Initial approaches identifiable, limited operational evidence
3	Fulfilled	Measures implemented, but documentation remains incomplete
4	Above average	Clearly documented processes, responsibilities, or measurable data available
5	Best practice	Comprehensive documentation, measurable outcomes, and established governance structures

The evaluation approach follows the principle: higher scores require not only the existence of sustainability measures but also their active implementation, documentation, and verifiability.

For aggregation, the individual scores are first combined within each ESG dimension, resulting in separate values for the ESG performance. These dimension-specific values are compared to a predefined target value, which represents the expected performance level when all criteria are met and is rated as a 4. A target value of 4 represents advanced implementation without assuming maximum maturity for all criteria. The overall degree of fulfillment is calculated as the ratio of achieved scores to target scores, as shown on the following form.

$$\text{Degree of fulfillment} = \frac{\sum \text{achieved scores}}{\sum \text{target scores}} * 100$$

To account for realistic limitations of operational sustainability implementation and avoid interpreting maximum maturity as a universal expectation, the framework applies the following performance classification:

- ≥80%: very good performance,
- 60–79%: good performance,
- 40–59%: potential for improvement identified,
- <40%: critical area requiring priority action.

The classification represents a maturity-oriented benchmarking approach rather than an absolute sustainability assessment. It is intended to identify strengths, improvement opportunities, and governance priorities.

4. Results

The evaluation of the developed tool is conducted through a case study of buildings owned by a public-sector institution in Hesse, Germany. For confidentiality reasons, the case study organization is anonymized. The empirical data basis consists of the following sources:

- (i) a structured interview with the head of the FM department, addressing all six investigated IFM service areas; conducted on 23rd April 2026, 11:30-13:00
- (ii) sustainability-related information reported in the sustainability report (2022–2023) of the organization
- (iii) energy and resource consumption data from the energy and resource report, covering the period 2014–2024
- (iv) publicly available information on sustainable mobility measures published by the organization.

Environmental Dimension

In security and reception services, mobility was rated 3, reflecting that employee arrivals are dominated by car and public transport, added by active cycling-promotion measures (e.g. bicycle service stations) and a bicycle-friendly-employer certification. A mobility concept is still under development and mobility is not organizationally anchored within FM. In catering, food origin was rated 1 and waste management 2: sustainability criteria are applied selectively, but a systematic regional or organic procurement is missing. Waste and disposal management scored rather strongly: recycling rate 3, hazardous-substance management 5 (fully organized storage, labeling, digital recording and training), and general waste management 4 (separation systems in place, though user information gaps remain). In outdoor and green-space maintenance, biodiversity scored 4 (green roofs, planted areas and land-use projects already implemented), while chemical use and machinery use both scored 0 due to a lack of available data, and tree care scored 3 (managed via a tree cadaster, though details for externally contracted work remain unclear). In winter and caretaker services,

de-icing/cleaning scored 3, material efficiency 2 (limited steering capacity due to external service delivery), and resource efficiency 4, reflecting extensive energy-efficiency measures at the Friedberg site (hydraulic balancing of heating systems, valve replacement, intelligent control systems). Cleaning services scored consistently high, with ecological products (5), reduced resource intensity through lower cleaning frequency (4, approx. 30% savings) and moderate emission impact (3). Table 4 shows the scoring results of the environmental dimension

Table 4: Scoring results environmental dimension (own survey, 2026). Sum of scores: 46

<i>IFM Service Area</i>	<i>Criterion</i>	<i>Score (0–5)</i>
Security & reception	Mobility	3
Catering	Food origin	1
	Waste management	2
Waste & disposal management	Recycling rate	3
	Hazardous-substance management	5
	Waste management	4
Outdoor & green-space maintenance	Biodiversity	4
	Chemical use	0
	Machinery use	0
	Tree care	3
Winter & caretaker	De-icing / cleaning agents	3
	Material efficiency	2
	Resource efficiency	4
Cleaning	Products used	5
	Resource intensity	4
	Emission impact	3

Social Dimension

Occupational safety was rated 5 in security and reception (in-depth training, personal protective equipment and risk assessments) and 5 in outdoor maintenance, while qualification and working-conditions scores in most service areas ranged between 2 and 3, showing regulated working hours and ergonomic checks but only partial documentation (especially in terms of working hours documentation). Customer/visitor interaction (security) and staff qualification/nutritional diversity (catering) each scored 0. The reason therefor is a lack of available information, proving data gaps particularly where services are fully outsourced. Waste management scored moderately on occupational safety (4) and user information (2), reflecting continued difficulties with waste separation in shared areas. Comfort quality in outdoor areas scored 4, supported by seating, shading and sports/leisure facilities.

Table 5: Scoring results social dimension (own survey, 2026). Sum of scores: 41

<i>IFM Service Area</i>	<i>Criterion</i>	<i>Score (0–5)</i>
Security & reception	Occupational safety	5
	Qualifications	3
	Working conditions	3
	Customer/visitor interaction	0
Catering	Occupational safety	3
	Staff qualification	0
	Nutritional diversity	0
Waste & disposal management	Occupational safety	4
	User information	2
Outdoor & green-space maintenance	Occupational safety	5
	Amenity quality	4
Winter & caretaker	Occupational safety	4
	Working conditions	2

Cleaning	Working conditions	3
	Qualifications	3

Governance Dimension

Governance scores (see Table 6) were highest in security and reception (documentation 5, transparency 4, compliance 3, supported by contractual performance records, inspections, and regular reporting and in cleaning services (documentation 5, compliance 4, subcontractor management 3). Catering again scored weakest across the board (hygiene management 0, reporting 0, supply-chain transparency 1), consistent with the fully externalized delivery model and the absence of systematic supplier controls. Waste management scored consistently well (documentation and compliance both 4), while outdoor maintenance scored lower on documentation (2) because of only partial documentation (e.g., incomplete tree-cadaster data).

Table 6: Scoring results governance dimension (own survey, 2026). Sum of scores: 45

<i>IFM Service Area</i>	<i>Criterion</i>	<i>Score (0–5)</i>
Security & reception	Compliance	3
	Transparency	4
	Documentation	5
Catering	Hygiene management	0
	Supply-chain transparency	1
	Reporting	0
Waste & disposal management	Documentation	4
	Compliance	4
Outdoor & green-space maintenance	Documentation	2
	Compliance	3
Winter & caretaker	Documentation	3

	Liability management	4
Cleaning	Documentation	5
	Compliance	4
	Subcontractor management	3

Aggregation of the individual scores resulted in 46 points for the environmental dimension, 41 for the social dimension, and 45 for the governance dimension, corresponding to an overall fulfillment degree of 71.74% (Table 7). While this indicates solid sustainability performance, the largest gap between actual and target values was observed in the social dimension (19 points), highlighting catering and, to a lower extent, winter/caretaker services as priority areas for improvement.

Table 7: Aggregated ESG fulfillment: actual versus target values (own survey, 2026).

<i>ESG Dimension</i>	<i>Actual score</i>	<i>Target score</i>
Environmental (E)	46	64
Social (S)	41	60
Governance (G)	45	60
Total fulfilment	132	184

5. Conclusion

This paper developed and tested an ESG evaluation framework for IFM by integrating GRI-based criteria into the GEFMA ESG-KPI tool and applying a transparent scoring logic. The tool was tested through a case study. Application to public buildings shows that structured sustainability evaluation in IFM is feasible. Combining criteria helps identify strengths (e.g., cleaning and waste management) and weaknesses (e.g., catering) that might otherwise remain hidden. However, the value of the framework depends on data quality and includes a degree of subjectivity.

Future work should focus on three areas: validating the framework across more case studies and building types, integrating it with digital building models and automated

data collection (e.g., BIM, IoT sensors) to reduce manual effort, and regularly updating the criteria to reflect changing regulations. Overall, the study shows that a standardized evaluation framework can help operationalize ESG requirements in FM by supporting systematic assessment and reporting of ESG-related information.

6. Discussion

The case study shows that the evaluation framework allows structured assessment of sustainability in varied IFM service areas. In-house managed services (cleaning, waste management, security) achieved higher ESG scores, while fully outsourced catering scored lowest, especially in governance. This highlights that social and governance risks in outsourced services are harder to assess than technical or energy parameters, and existing ESG tools do not capture this gap.

The framework extends the GEFMA ESG-KPI tool by integrating IFM-specific criteria, GRI references, and a transparent scoring approach. Limitations include subjective selection and weighting of criteria, dependence on data quality and completeness, and the need for ongoing updates as regulations change. The study is based on a single case, limiting generalizability, and uses data from different reporting periods, preventing a uniform temporal assessment.

7. References

- EU Commission (2025). Simplification, online. Available at https://commission.europa.eu/law/law-making-process/better-regulation/simplification-implementation-and-enforcement/simplification_en
- Gefma (2023), gefma definiert ESG im Facility Management – neue Richtlinie gibt Orientierung [Online], online. Available at <https://www.gefma.de/hashtag/detail/nachhaltigkeit/gefma-definiert-esg-im-facility-management-neue-richtlinie-gibt-orientierung>.
- GEFMA e.V. Deutscher Verband für Facility Management (2004) 100-2: Facility Management, Berlin: Beuth Verlag GmbH.
- Global Reporting Initiative (2021), Consolidated set of the GRI Standards.
- Helmold, M., Treu, J., Fritz, J. and Hummel, F. (2024), "ESG, CSR und SDG: Gegenstand, Definition und Begriffe", Helmold, M., Treu, J., Fritz, J. and Hummel, F. (eds) ESG, CSR und SDG als langfristiger Wettbewerbsvorteil, Wiesbaden, Springer Fachmedien Wiesbaden, pp. 1–51.
- Hirschner, J., Hahr, H. and Kleinschrot, K. (2018), Facility Management im Hochbau, Springer Fachmedien Wiesbaden, Wiesbaden.
- Huang, H. (2025), "Environmental, Social and Governance Practice Exploration of Catering Enterprises", Journal of Education, Humanities and Social Sciences, vol. 61, pp. 1–6.

- International Facility Management Association (2017), What is Facility Management? [Online]. Available at <https://www.ifma.org/> (Accessed 14 July 2026).
- Jato-Espino, D., Capra-Ribeiro, F., Moscardó, V., Del Bartolomé Pino, L. E., Mayor-Vitoria, F., Gallardo, L. O., Carracedo, P. and Dietrich, K. (2023), "A systematic review on the ecosystem services provided by green infrastructure", *Urban Forestry & Urban Greening*, vol. 86, p. 127998.
- Jensen, P. A., Behrens, C., Martens, S. and Nielsen, S. B. (2024), "How FM can improve organisations' ESG reporting: Compliance or Strategy as driver?".
- Kaiser, C., Nusser, J. and Schrammel, F. (2025), *Praxishandbuch Facility Management*, Springer Fachmedien Wiesbaden, Wiesbaden.
- Kirchhoff, K. R., Niefünd, S. and Pressentin, J. A. von (2024), *ESG: Nachhaltigkeit als strategischer Erfolgsfaktor*, Springer Fachmedien Wiesbaden, Wiesbaden.
- May, M., Krämer, M. and Schlundt, M. (2022), *BIM im Immobilienbetrieb*, Springer Fachmedien Wiesbaden, Wiesbaden.
- Michalski, D. (2024), "Operationalization of ESG-Integrated Strategy Through the Balanced Scorecard in FMCG Companies", *Sustainability*, vol. 16, no. 21, p. 9174.
- Nielsen, S. B., Sarasoja, A.-L. and Galamba, K. R. (2016), "Sustainability in facilities management: an overview of current research", *Facilities*, vol. 34, 9/10, pp. 535–563.
- Okoro, C. S. (2023), "Sustainable Facilities Management in the Built Environment: A Mixed-Method Review", *Sustainability*, vol. 15, no. 4, p. 3174.
- Opoku, A. and Lee, J. Y. (2022), "The Future of Facilities Management: Managing Facilities for Sustainable Development", *Sustainability*, vol. 14, no. 3, p. 1705.
- Ramantswana, T., Awuzie, B., Mompoti, L. and Khafiso, T. (2026), "Embedding ESG in facility management practices: a South African corporate real estate perspective", *International Journal of Building Pathology and Adaptation*, vol. 44, no. 5, pp. 1246–1266.
- Romanovska, L., Osmond, P. and Oldfield, P. (2023), "Life-cycle-thinking in the assessment of urban green infrastructure: systematic scoping review", *Environmental Research Letters*, vol. 18, no. 6, p. 63001.
- Santana Tovar, D., Torabi Moghadam, S. and Lombardi, P. (2025), "Shaping Sustainable Practices in Italy's Construction Industry: An ESG Indicator Framework", *Sustainability*, vol. 17, no. 3, p. 1341.
- Takacs, B. and Borrión, A. (2020), "The Use of Life Cycle-Based Approaches in the Food Service Sector to Improve Sustainability: A Systematic Review", *Sustainability*, vol. 12, no. 9, p. 3504.
- Wills, N. and Díaz, J. (2022), "BIM-based information model for the provision of the demand-oriented facility management services janitorial cleaning", *The 21st EuroFM Research Symposium*. Breda, 15.-16.06.2022, pp. 79–90.