



Toward a Methodology for Social Sustainability Assessment: a Review of Existing Frameworks and a Proposal for a Catalog of Criteria

Fanny Richter · Wladislaw Gawenko · Uwe Götze · Michael Hinz

Received: 20 May 2022 / Accepted: 12 October 2023 / Published online: 14 November 2023
© The Author(s) 2023

Abstract Social sustainability and, in particular, its measurement and reporting are gaining importance in society, politics and business but are facing major challenges. This is because there are no standardized and uniform approaches or frameworks. The existing approaches cover social issues, but no systematic presentation has been proposed. Moreover, there is no approach that can be applied in both management accounting and financial reporting. The aim of this paper is to present a catalog of criteria for addressing this issue and thus to close the research gap. For this purpose, frameworks utilizing catalogs of criteria for social sustainability assessment and reporting are analyzed and critically reviewed. One major weakness found is that all frameworks are oriented around only socially protected values in their catalogs. As social sustainability is focused on the impact on stakeholders, these are frequently missed. One solution to this problem is to adopt a 1:1 ratio of socially protected values to stakeholders, which is developed and described in this paper via a catalog of criteria. Furthermore, a systematic presentation of social issues using a four-level

Availability of data and materials Not applicable

✉ Fanny Richter · Uwe Götze

Management Accounting and Control, Faculty of Business Administration and Economics, Chemnitz University of Technology, Thüringer Weg 7, 09126 Chemnitz, Germany
E-Mail: fanny.richter@wiwi.tu-chemnitz.de

Uwe Götze

E-Mail: uwe.goetze@wiwi.tu-chemnitz.de

Wladislaw Gawenko · Michael Hinz

International Accounting and Auditing, Faculty of Business Administration and Economics, Chemnitz University of Technology, Thüringer Weg 7, 09126 Chemnitz, Germany

Wladislaw Gawenko

E-Mail: wladislaw.gawenko@wiwi.tu-chemnitz.de

Michael Hinz

E-Mail: michael.hinz@wiwi.tu-chemnitz.de

structure is proposed. Social indicators are, in turn, assigned to subcategories, to supercategories, and finally to stakeholders. This not only improves transparency and comprehensibility but also simplifies decision-making. A procedure model for the application of the catalog is also suggested. Such a catalog has not been described in previous research.

Keywords Social sustainability assessment · Catalog of criteria · Social sustainability reporting · SLCA · Social sustainability framework comparison · Global Reporting Initiative

1 Introduction

Measuring, assessing and reporting on sustainability are becoming increasingly important for companies. This is mainly because a growing number of stakeholders are interested in transparent sustainability-related information to obtain a better overview of the situation of either the company or of society (Tkaczyk et al. 2014; Duque-Grisales and Aguilera-Caracuel 2021; Wen and Deltas 2022). Therefore, companies endeavor to accurately assess sustainable opportunities and risks as part of their planning process. Additionally, companies intend to satisfy stakeholders and to provide them with concrete information through their sustainability reports (Schaltegger and Hörisch 2017; Gangi and D'Angelo 2016; Benoit-Norris et al. 2019). Furthermore, since 2017, large European listed companies have been obligated to publish information related to corporate sustainability (European Commission 2014). This is attributed to the Directive of the European Union on nonfinancial reporting, which was published in 2014 and revised in 2022. The new Corporate Sustainability Reporting Directive was published in December 2022 and is set to be applied in fiscal year 2024. In this context, a new common European concept for unified sustainability reporting is being developed (European Commission 2022).

In particular, the social dimension of sustainability is a major challenge for companies in terms of their assessment and reporting (Benoit-Norris et al. 2012; Weidema Pedersen 2018). In contrast to environmental and economic sustainability, the social dimension often involves many stakeholders, issues and data that are difficult to quantify (Gawenko et al. 2020). There is also a strong dependence on the scope of use; e.g., different user groups have different intentions and goals (Jørgensen et al. 2009). A systematic presentation of social issues and stakeholders can be leveraged to resolve these challenges. These should be structured in such a way that supports reporting as well as assessment (for planning, preparing decisions and maintaining control). Although some social approaches exist, they are neither fully developed nor standardized (UNEP 2020; Gawenko et al. 2020; Goedkoop et al. 2018; WBCSD 2016; Schmidt et al. 2004; McElroy 2008). Furthermore, there is no social approach that can be used in both management accounting and financial reporting, although taking such an approach could avoid the duplication of work and divergent interpretations in companies.

Based on this, the main aim of this paper is to present a systematic structuring of social issues and stakeholders. This is done by developing a catalog of criteria.

In the development process, as part of our literature review, we first searched for the existing approaches to social sustainability assessment and reporting. We noted that there are frameworks that include a catalog of criteria for measuring and/or reporting social sustainability. Then, we compared the contents and conducted a critical review based on the specific requirements for these frameworks and their catalogs. Such a procedure has not yet been applied in the literature but seems to be highly relevant in identifying the strengths and weaknesses of the existing catalogs.¹ Using the results of the analysis as a basis, we then developed and described our own catalog of criteria. As mentioned above, it offers a systematic presentation of social issues and stakeholders for companies. It can be used for sustainability assessment for planning, decision-making and control (management accounting) and for sustainability reporting to stakeholders outside the company (as an extension of financial reporting) (European Commission 2022). Thus, the catalog contains relevant information for both internal and external stakeholders. This consequently simplifies the assessment of social sustainability and improves the transparency of those social impacts caused by corporate actions. To clarify the application of the catalog, a procedure model is also proposed. Previous studies have not (concretely) taken this aim.

Furthermore, there are different definitions for social sustainability, and they can be systematized in regard to the purpose and perspective considered. In this paper, we address this problem, and based on the findings, we provide our own, more detailed understanding of social sustainability. In particular, the catalog of criteria (and its procedure model) is aimed at more specifically and transparently operationalizing the ambiguous concept of social sustainability, including its social issues, indicators and stakeholder groups to form the conceptual basis for sustainability assessment and reporting. Thus, this paper advances a further theoretical contribution.

For these purposes, the work is structured as follows: In Sect. 2, we illustrate the theoretical background and provide our own definition of social sustainability. Section 3 deals with the analysis of assessment and reporting frameworks and their catalogs of criteria, thus laying the foundation for Sect. 4, where we present, critically discuss and describe a systematic way of applying our catalog of criteria. Section 5 provides a brief conclusion.

2 Theoretical Background and Current State of Research

The term *sustainability* was first used in 1713 by Carl von Carlowitz, who was the head of the Saxon mining authority, in his work about the long-term use and preservation of raw wood material in the field of forestry, *Sylvicultura Oeconomica*.

¹ Only the framework of the World Business Council for Sustainable Development (WBCSD) presents a brief comparison of the content of some of these frameworks, and this is in tabular form. However, there is no critical review (WBCSD 2016). Jørgensen et al. 2009 also conducted a review comparing SLCA approaches. However, that study deals with approaches published before 2008 and only covers methodological differences.

By his definition, the number of trees logged should be limited to the number of trees projected to grow again (von Carlowitz 1713).

Currently, there are various understandings of what sustainability means (Valdivia et al. 2021; Moore et al. 2017). However, the definition of the United Nations World Commission on Environment and Development is widely accepted. According to the Brundtland Report of 1987, development is sustainable if “[...] it meets the needs of the present without compromising the ability of future generations to meet their own needs” (UN 1987). Sustainable development concerns economic, environmental and social goals, which can be understood as the three pillars (dimensions) of sustainability (Purvis et al. 2019; Azapagic et al. 2016). To achieve sustainable development, companies should align their activities with these three dimensions. These dimensions should not be considered in isolation from one another (Hinz 2014).

The economic dimension represents the economic activities of companies undertaken with the aim of securing economic continuity (the going concern) (Müller and Pflieger 2014; Correia Salome 2019). The environmental dimension addresses the responsible use of natural resources; hence, this dimension concerns the impact of corporate actions on the environment. Topics such as water and energy consumption, CO₂ emissions, and biodiversity belong to this dimension (Correia Salome 2019; Vezzoli 2018). Compared to the economic and environmental dimension, the social dimension is the least developed, but in recent years, an increasing number of studies have been discussing the term *social sustainability* (Lee and Jung 2019). Nevertheless, no common understanding of it has been established. There are several reasons for this: on the one hand, the field of social sustainability is a dynamic one, and this dynamism is partly due to attitudes toward social sustainability as well as changes of society and/or in legal norms. At the beginning of its emergence, the understanding of social sustainability primarily covered protecting livelihoods in rural areas. Over the past decades, an increasing number of additional social issues have been identified. In particular, human, employment and intercommunity issues have become more important. In the last few years, the assessment of social sustainability has emerged more prominently (Lee and Jung 2019).

On the other hand, when considering the existing studies that deal with social sustainability, it is notable that the definitions of social sustainability can be systematized in terms of the purpose of the study and the perspectives in question. From this perspective, studies can be theory-based, practical and/or empirical, so different definitions of social sustainability can arise. Furthermore, the common adoption is either of a general view regarding the well-being of society (e.g., McKenzie 2004) or a corporate view where social sustainability is defined as “[...] the relationship between a firm and the (broader) community the company operates within” (Sisson 2020).

The purpose of this study is to contribute to the methodology for measuring the (positive and negative) impacts of corporate actions through the use of specific indicators, so the corporate view is adopted. This should, among other things, clarify our understanding of social sustainability.

Therefore, we use the following self-developed and specific definition in this paper: social sustainability means attaining the social well-being of the stakeholders

of a company, who are socially affected by the company's actions. Companies must act in such a way that satisfies their stakeholders. It should be noted that social well-being includes the subjective perceptions of stakeholders, which in turn have to be included in the assessment process. Additionally, the perception of when and to what extent satisfaction/social well-being is achieved is a subjective one. Conflicts among objectives may arise in the decision-making process; in particular, the maximization of the social well-being of one stakeholder may be achieved at the expense of another (Cap et al. 2023). As a result, trade-offs are probably unavoidable and have to be considered in decision-making processes (see the suggested procedure model in Sect. 4.2.).

This definition and these insights serve as the basis for the catalog of criteria developed in Sect. 4.

There are already assessment approaches for measuring economic and environmental sustainability. Some of them are even standardized and partly applied by companies in practice (Gawenko et al. 2020). Examples include life cycle assessment (LCA) (ISO 2006a) and carbon footprint (Günther 2008) for the environmental dimension and life cycle costing (LCC) (Götz 2010) for the economic dimension.

To obtain an overview of the social dimension, we searched for social approaches to sustainability assessment and synonyms in all the available literature databases (Google Scholar, Science Direct, EconBiz and EBSCOhost). We identified that the most well-known approaches in the literature are social footprint, SEEBalance and social life cycle assessment (SLCA). These approaches were mentioned in approximately 80% of the studies found. The remaining 20% include approaches such as social value, social return on investment and value to society. Notably, these approaches have not yet been standardized or established in practice (UNEP 2020). This is mainly due to the challenge of assessing and reporting social issues, which are mostly represented qualitatively and need to be quantified for decision-making and reporting purposes.

The social footprint was first described by McElroy in his publication in 2008. Thereby, McElroy proposed transferring the ecological footprint to the social dimension. Even though he describes a procedure model for the evaluation of the social footprint, only a few social issues are considered in this method. Weidema presents a further developed and compressed method for assessing the social footprint but does not propose any criteria for assessing social impacts (Weidema Pedersen 2018). The SEEBalance approach was developed by Schmidt et al. and is used by BASF SE. It covers socioeco-efficiency but does not assess pure social sustainability (Schmidt et al. 2004).

The social life cycle assessment (SLCA) is primarily the most considered approach in the literature. It was first presented by Benoit et al. 2007 (Benoit et al. 2007). The idea in SLCA is to transfer the standardized LCA to the social dimension. Thus, the stages of SLCA are basically based on those of LCA, namely, (1) goal and scope definition, (2) inventory analysis, (3) impact assessment and (4) interpretation. Each of these stages can be described as follows (ISO 2006a; UNEP 2020):

1. Determination and definition of the goal, functional unit, system boundaries, affected stakeholders and impact categories of the social assessment.
2. Preparation of a social life cycle inventory, with data identification and collection for all unit processes within the system boundaries. The impact categories and indicators are determined.
3. Evaluation of the social impacts of a product throughout its life cycle (resulting from company activities and product use). For this, the results of the life cycle inventory are applied. The links between impact categories and indicators are identified, and measurements are made.
4. Interpretation of the results from stages 2 and 3 and the subsequent derivation of recommendations for improvements.

The main focus of SLCA is on recording the impact of the company's actions on the affected stakeholders (UNEP 2020).

This SLCA approach of Benoit et al. was adapted by some organizations in their frameworks and further developed. These organizations include Guidelines for Social Life Cycle Assessment of Products of the United Nations Environment Programme (UNEP Guidelines, UNEP 2020), Roundtable Handbook for Product Social Impact Assessment by Goedkoop and Indrane and de Beer (Roundtable Handbook, Goedkoop et al. 2018) and Social Life Cycle Metrics for Chemical Products of the World Business Council for Sustainable Development (WBCSD Social Metrics, WBCSD 2016).

A framework is considered a stand-alone concept that provides a structured template for applying an assessment approach or reporting to achieve a specific objective (European Commission 2017; IASB 2018). The structured template is usually presented in the form of a so-called catalog of criteria. A catalog of criteria is a list of criteria that can be structured through the use of different categories. Social sustainability includes various social issues and stakeholders. It provides indicators for the considered social issues that can be used to assess the social impact of companies. Such a catalog is therefore important for a transparent sustainability assessment. Accordingly, only those studies that contain a catalog of criteria are relevant for the purpose of this paper. These are:

- UNEP Guidelines,
- Roundtable Handbook,
- WBCSD Social Metrics.

Therefore, in Sect. 3, we analyze these frameworks, and the results are used as the basis for developing our own catalog (Sect. 4). Since these frameworks include assessment approaches, they are referred to as “assessment frameworks” throughout the manuscript. Furthermore, primarily in external reporting, there are some frameworks that contain a catalog of criteria but do not describe an assessment approach. These frameworks enable transparent reporting on social sustainability, among other things. They are aimed at providing stakeholders with relevant information about

the company. Among them, the most extensive and commonly used frameworks by companies worldwide² are further considered in detail in this paper as follows:

- The standards of the Global Reporting Initiative (GRI)
- The standards of the Sustainability Accounting Standards Board (SASB).

In the following, these are referred to as “reporting frameworks.”

3 Social Sustainability Framework Analysis

3.1 Framework Description and Comparison

We start our analysis with a description and comparison of these frameworks. Three assessment frameworks, namely, UNEP Guidelines, Roundtable Handbook and WBCSD Social Metrics, are considered first, followed by the GRI and SASB reporting frameworks. The comparison includes the *basic characteristics* of the frameworks, including their target, conceptual foundation, reference object and considered stakeholders. Thereafter, the *structure and content of the catalogs of criteria* of the frameworks, with subdivisions into (number of) level divisions, supercategories, subcategories, indicators and stakeholder assignment, are examined. We perform a comparison from general to specific features to achieve a comprehensible presentation.

3.1.1 Basic Characteristics

The UNEP, Roundtable Handbook and WBCSD frameworks present a methodology for measuring social sustainability related to products. WBCSD refers especially to chemical products. The UNEP framework may be considered the first to comprehensively address SLCA (UNEP 2020). It is based on the ISO 14040 life cycle assessment standard (ISO 2006a) and has been adapted to the social sustainability dimension. The first version was published in 2009, and it was revised in 2020 (UNEP 2020). In addition to the framework, so-called Methodological Sheets were published in 2010 (and updated in 2013 and 2021) to complete these guidelines. According to UNEP, the framework and the Methodological Sheets are to be used together when carrying out SLCA (United Nation Environment Programme and Society of Environmental Toxicology and and Chemistry (UNEP SETAC) 2013). The Roundtable Handbook was published in 2014 and has been updated several times.

² Based on a stand-alone analysis of the largest companies worldwide (measured by market capitalization) by Thomson Reuters in 2021 and a study by KPMG in 2022 (KPMG International 2022). Due to the new Corporate Sustainability Reporting Directive (CSRD), the European Union intends to publish a stand-alone framework. The first part of drafts was adopted by EFRAG in November 2022, as the so-called European Sustainability Reporting Standard (ESRS). Since the full version is expected to be published in summer 2024, it will not be considered further. The first (general) set was adopted by the European Commission in July 2023 and has still to be approved by the European Parliament and the European Council. When accepted, it is expected to be used by companies for their sustainability reports of the financial year starting on or after January 1, 2024.

The current version is from 2018 (Goedkoop et al. 2018). The WBCSD Social Metrics were published in 2016 and have not yet been revised (WBCSD 2016). It is worth mentioning that the Roundtable Handbook and the WBCSD Social Metrics refer to the 2009 UNEP Guidelines (Goedkoop et al. 2018; WBCSD 2016), and the WBCSD Social Metrics rely on the first version of the Roundtable Handbook published in 2014 (WBCSD 2016). Therefore, there are connections between all three frameworks.

According to all three assessment frameworks, the potential impacts on concrete stakeholders need to be measured or recorded. The frameworks consider different numbers and groups of stakeholders. The UNEP framework generally differentiates six types of stakeholders: workers, local communities, value chain actors, society, consumers and children (UNEP 2020). The Roundtable Handbook addresses four stakeholder groups: workers, local communities, small-scale entrepreneurs and users (Goedkoop et al. 2018). The WBCSD is limited to only three stakeholders: workers, local communities and consumers (WBCSD 2016).

The GRI and SASB reporting frameworks are structured differently than the other frameworks, as their target is to present standards and indicators for corporate sustainability reporting. The GRI Standards have been developed over time, and the current version is from 2022. The SASB standards were first published in 2015. Over the years, new standards were added, and the latest version is from 2022. It should be mentioned that the SASB was taken over by the ISSB in August 2022. They are currently developing their own framework that will replace the existing SASB standards. In contrast to the UNEP, Roundtable Handbook and WBCSD frameworks, the reference object of reporting frameworks is the corporate level (GRI 2022; SASB 2022). Furthermore, these frameworks consider all three dimensions of sustainability and thus address a wide range of stakeholders, such as business partners, civil society organizations, consumers, etc (GRI 2022). However, the SASB does not explicitly name stakeholders, who can only be derived from the indicators listed in the respective standards.

The basic characteristics of the considered frameworks are summarized in Table 1.

3.1.2 Structure and Content of the Catalogs of Criteria

To measure the impact on individual stakeholders, social issues are identified in all three assessment frameworks but are only partially grouped into categories and quantified by indicators. Moreover, the frameworks differ in terms of how they classify these social issues, which results in structure and content differences among the assessment approaches.

When analyzing the catalogs of criteria of the assessment frameworks, we identified that there are either two- or three-level divisions. These can be superordinated as indicators, subcategories and supercategories. However, they are named differently among the respective frameworks. This is visually summarized in Fig. 1.

The UNEP Guidelines use three levels when measuring social impact (UNEP 2020), differentiating between six impact categories (as supercategories), 40 subcategories and some inventory indicators. The subcategories include specific key social issues and are measured using inventory indicators (UNEP 2020). However,

Table 1 Framework comparison—basic characteristics

	Assessment frameworks		Reporting frameworks	
	UNEP Guidelines (2020)	Roundtable Handbook (2018)	WBCSD Social Metrics (2016)	GRI Standards (2022)
Target	A catalog of criteria for measuring social sustainability based on SLCA	A catalog of criteria for assessing positive and negative social impacts of products	A catalog of criteria for assessing the social sustainability of chemical products	Standards and indicators for corporate sustainability reporting
Conceptual foundation	LCA ISO 14040	UNEP Guidelines 2009 (UNEP 2009)	UNEP Guidelines 2009 (UNEP 2009), Roundtable Handbook 2014 (Roundtable for Product Social Metrics 2014)	Specific standards and indicators for corporate sustainability reporting for 77 sectors
Reference object	Product level	Product level	Product level	Corporate level
Considered stakeholders	Workers, local communities, value chain actors, society, consumers, and children	Workers, local communities, small-scale entrepreneurs, and users	Workers, local communities, and consumers	Business partners, civil society organizations, consumers, customers, employees and other workers, governments, local communities, non-governmental organizations, shareholders and other investors, suppliers, trade unions, and vulnerable groups
				Several (e.g. employees, business partners, local communities, consumers, and customers), but they are not directly listed

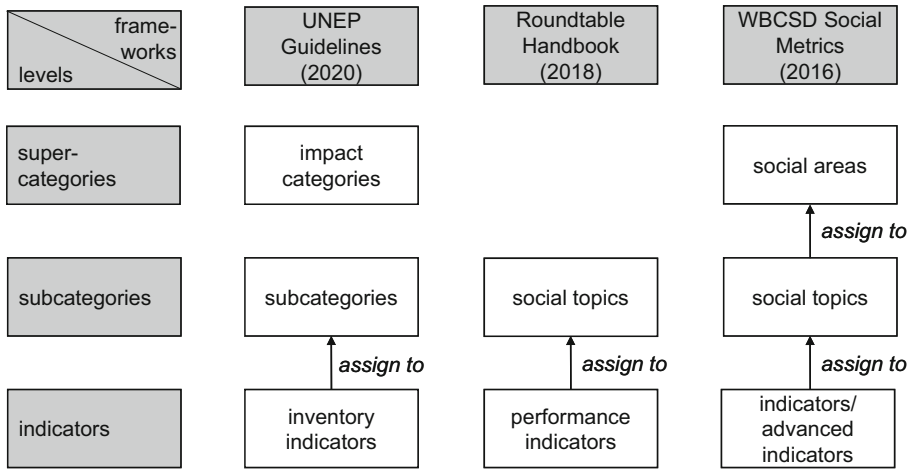


Fig. 1 Structure of considered catalogs of criteria of the assessment frameworks

subcategories are not assigned to supercategories, and indicators are only mentioned in a few examples.

Similar to the UNEP, the WBCSD also has three levels, although it uses different terminology (WBCSD 2016). Here, a distinction is made between the five social areas used as supercategories, the 25 social topics used as subcategories and the few exemplary indicators (WBCSD 2016). Furthermore, all the categories are assigned to each other.

In contrast, the Roundtable Handbook considers only two levels by classifying 21 social topics and several performance indicators. There are no supercategories as in the UNEP Guidelines or the WBCSD Social Metrics (Goedkoop et al. 2018).

It is noticeable that in the assessment frameworks, stakeholders are assigned, but only to the subcategories. For example, in the catalog of criteria of WBCSD, the subcategories *fair wages* and *no child labor* are assigned to the stakeholder group worker. The subcategory *respect for indigenous rights* is assigned to the local community and has a *direct impact on the basic needs* of customers. However, these subcategories are related to the supercategory *basic rights and needs* and exert an impact on three different stakeholder groups. The supercategories thus affect several stakeholders, and the social impacts on individual stakeholders are not clearly separated.

As mentioned above, in comparison to assessment frameworks, the structure and content of the GRI and SASB catalogs of criteria differ. Rather than using supercategories and subcategories, these use so-called standards. The GRI standards are structured into three series: universal, sector and topic specific. The standards of the latter two series contain numerous indicators (GRI 2022). GRI 1, 2 and 3 are universal standards that describe basic information, general information and material information. The GRI sector standards focus on sector-specific reporting and highlight concrete economic, environmental and social issues for the respective industry. However, at present, there exist only three sector standards concerning oil,

Table 2 Framework comparison—Structure and content of the catalogs of criteria

Level division	Assessment frameworks		Reporting frameworks	
	UNEP Guidelines (2020)	Roundtable Handbook (2018)	WBCSD Social Metrics (2016)	GRI Standards (2022)
	Three levels	Two levels	Three levels	No super- and subcategories, but rather topic-specific standards with indicators and some sector specific standards with indicators
Supercategories	6 impact categories (human rights, working condition, health and safety, cultural heritage, governance, and socioeconomic repercussion)	None	5 social areas (basic rights and needs, employment, health and safety, skills and knowledge, and well-being)	None
Subcategories	40 subcategories (not assigned to supercategories)	21 social topics	25 social topics (assigned to social areas)	None
Indicators	Inventory indicators (only some examples; assigned to subcategories in methodological sheets)	Several performance indicators (assigned to social topics)	Indicators and advanced indicators (only some examples; assigned to social topics)	Several
Stakeholder assignments	Stakeholders assigned to subcategories but not assigned to impact categories	Stakeholders assigned to social topics	Stakeholders assigned to social topics but not assigned to social areas	None

coal and the agriculture, aquaculture and fishing sectors (GRI 11, 12, 13). According to the GRI, other sectors will follow over the next few years (GRI 2022). The topic-specific standards are categorized into three areas according to the dimensions of sustainability: economic (200), environmental (300) and social (400) (GRI 2022). The standards of the series 400 include certain essential social issues that companies are required to report. These social issues are listed under GRI standard headings. Indicators for reporting on them are proposed (e.g., GRI 404 considers the social issue *training and education* and presents relevant indicators).

The SASB has published 77 sector-specific standards, which generally share the following structure: these standards start with an introduction that describes the SASB and the objectives and purposes of sustainability reporting according to the SASB. Subsequently, the sustainability disclosure topics, accounting metrics, technical protocols and activity metrics are presented. For each standard, approximately two to twelve topics are listed, and these topics include quantitative and qualitative indicators. The topics concern the economic, environmental and social dimensions of sustainability. It is noticeable that the included social topics are very limited.

A summary of the descriptions and comparisons of the structure and content of the catalogs of criteria for all frameworks is given in Table 2.

Overall, all considered frameworks have certain strengths and weaknesses, which are examined in more detail below.

3.2 Critical Review of the Frameworks

To achieve a transparent and holistic assessment of the social impacts on stakeholders (Rudolph et al. 2021) and the reporting of social issues (GRI 2022), a catalog of criteria should at least meet the requirements of relevance, timeliness, applicability and consistency. These have emerged from a literature review dealing with the requirements for assessment approaches and standards, including among other studies, Becker et al. (2012), Schmidt (2014), Bach (2009), Rudolph et al. (2021), GRI (2022) and UNEP (2020).³ We selected the requirements that were most frequently mentioned and considered as important. Additionally, we combined requirements that had overlapping content. Overall, these requirements enable a consistent analysis of the existing frameworks. Together with the results of the analysis, they formed the basis for developing our own catalog of criteria in Sect. 4.

3.2.1 Relevance

According to Becker et al., a model is relevant when it includes all material factors or elements (Becker et al. 2012). A model for assessing social impacts should be useful for decision-making, should affect decisions and should have a high level of significance.

³ The literature databases Google Scholar, Science Direct, EconBiz, EBSCOhost and Emerald Insight were searched for requirements for assessment approaches. It should be noted that the requirements in the standards refer to implementation in companies rather than referring to reviews of the approaches per se.

This is achieved by covering both social issues and stakeholders. Moreover, such social issues must be categorized, linked to each other and to the stakeholders, and quantified by indicators. If they are not categorized, assigned and quantified, then the significance of the model is limited.

When analyzing the frameworks, differences were found in the nomenclature, level of detail and number of social issues and stakeholders.

The UNEP Guidelines contain the most detailed classification of social issues (40 subcategories) and stakeholders (six stakeholders are listed, and five are specifically considered in the catalog of criteria) and therefore cover more relevant groups than the other frameworks. Additionally, the social issues are divided into supercategories and subcategories. However, only the subcategories are assigned to stakeholders. Furthermore, indicators are not proposed for each subcategory. This limits its significance and therefore its relevance for decision-making.

The Roundtable Handbook presents the fewest social issues and considers four stakeholders. It is notable that it lists *small-scale entrepreneur* as a stakeholder, as it is not mentioned in any other framework. This group includes independent persons who can be seen as suppliers on a small scale (Goedkoop et al. 2018). However, the group of suppliers as a whole is not considered as a stakeholder, not is its exclusion explained. As mentioned above, the Roundtable Handbook is the only framework that applies a simple two-level division. Thus, decision-making can be hindered, as social topics (as subcategories) are not summarized in supercategories and additional calculations are needed to assess the overall social impact. However, subcategories are linked to stakeholders, and several indicators for all the subcategories are provided. The significance is higher in this context than in the other frameworks.

In the WBCSD framework, only three stakeholders are covered. Suppliers, who can be seen as affected stakeholders (Crane et al. 2019), are not mentioned at all. Furthermore, no justification is given for this decision. However, in comparison to other frameworks, the WBCSD provides a detailed presentation of supercategories and subcategories, and they are assigned to another. This increases the relevance of the model. However, as is the case for the UNEP Guidelines, indicators are not provided for all subcategories, and there is no assignment of stakeholders to supercategories.

The GRI and SASB standards mention numerous social issues and stakeholders, but they do not categorize them. This can negatively affect the decision-making process. However, a broader perspective on customers is included in the reporting frameworks. While the assessment frameworks only refer to stakeholder consumers (UNEP 2020; WBCSD 2016) and users (Goedkoop et al. 2018), in the sense of end users, and thus only address the business-to-consumer perspective, the GRI and SASB standards are the only ones that include stakeholder customers and business partners. Therefore, they refer to the business-to-consumer (B2C) and business-to-business (B2B) perspectives (GRI 2022, SASB 2022).

The SASB standards also list indicators, but most of them concern environmental issues (SASB 2022). In contrast, and similar to the Roundtable Handbook, the GRI standards list numerous social indicators. In comparison, however, the indicators in the GRI standards are mostly quantitative and somewhat more detailed and concrete

than those in the Handbook, as the latter more often use qualitative (descriptive) indicators (yes/no indicators). In contrast to the Handbook, the GRI standards do not assign indicators to stakeholders (GRI 2022). Overall, the indicators of the GRI standards are the most significant and therefore the most relevant for decision-making.

Moreover, it is remarkable that in the UNEP, Roundtable Handbook and WBCSD assessment frameworks, the categories (supercategories/subcategories) are oriented toward socially protected values. Socially protected values are intangible social assets of society that should remain unharmed (Bundesamt für Bevölkerungsschutz und Katastrophenhilfe website, viewed on 30.03.2023). For example, the WBCSD addresses the socially protected values of *health and safety, basic rights and needs*, etc., and specifies them as supercategories. The problem with this procedure is that the impacts on each stakeholder cannot be directly and clearly identified. This is because the supercategories (socially protected values) impact different stakeholders. The impacts on stakeholders that arise from changes in the behavior of companies are not directly recognizable. In this case, the stakeholders and the socially protected values are not clearly related to each other. Among other effects, this reduces the significance and complicates the process of finding information, thereby compromising decision-making in general. The UNEP addresses the socially protected values of *health and safety, human rights and cultural heritage*; however, these also cover several stakeholders. For example, in the catalog of criteria of the UNEP, *health and safety* has an impact on the following stakeholders: workers, consumers and local communities. *Working condition* is the only supercategory that refers to only a single stakeholder, namely, workers (UNEP 2020). In the Roundtable Handbook, there is no subdivision into supercategories and subcategories, but some subcategories also cover several stakeholders, so the social impact on each stakeholder cannot be directly derived. In the reporting frameworks, an orientation of the standards toward socially protected values can be only partly identified.

3.2.2 Timeliness

Timeliness is another important requirement for a catalog of criteria. Here, it describes whether the frameworks have been revised in the last few years due to the increasing importance of sustainability and the related development in companies and society, especially those due to legal requirements. It indicates that these frameworks are thus not outdated (GRI 2022). Timeliness is assessed through date of publication and references to other published works. The UNEP Guidelines, GRI and SASB standards are the latest publications, but the UNEP refers to outdated Methodological Sheets from 2013. These sheets were only updated in 2021, and therefore they have not yet been taken into account in the latest UNEP Guidelines. It would make more sense to publish both documents without a significant delay. The Roundtable Handbook has been updated several times, and the latest version was released in 2018. Nevertheless, the latest edition refers to the old version of the UNEP Guidelines (UNEP 2009). The current version of the WBCSD Social Metrics is from 2016. However, this version refers to old editions of the UNEP Guidelines

(UNEP 2009), the Roundtable Handbook (Roundtable for Product Social Metrics 2014) and the GRI standards (GRI 2014) and therefore appears outdated.

3.2.3 Applicability

Applicability indicates the extent to which the catalog of criteria can be used to make rational decisions. This means that a catalog of criteria should be presented clear to reduce time and financial expense and should be flexible to facilitate adaptation to changing conditions (e.g., sector-specific, regulatory, etc.) (Schmidt 2014). Thus, applicability is primarily determined by flexibility and clarity (Rudolph et al. 2021).

Flexibility describes a model's adaptability (Schmidt 2014). The catalogs of criteria of the UNEP and the Roundtable Handbook are flexibly applicable to the assessment of the social impacts of products across all sectors. Furthermore, the UNEP explicitly mentions that a SLCA can be used either in isolation or in combination with an LCA (UNEP 2020). In contrast, the WBCSD framework is specifically designed for products in the chemical industry only. Adapting this framework to products from other sectors seems to be rather difficult, so the application scope is limited.

The GRI standards are meant only for financial/nonfinancial reporting. However, they can be applied by companies in all sectors. Additionally, they can be used in accordance with two different options. On the one hand, companies can claim that their reports are prepared according to GRI standards. In this case, the company must comply with nine requirements in the Standards (e.g., apply the reporting principles, report disclosures in GRI 2, determine material topics, etc.). Reporting according to GRI standards provides a comprehensive picture of companies' actions in the sustainability dimensions (GRI 2022). Nevertheless, the use of this option limits flexibility. However, it is possible to omit certain disclosures (with the appropriate justifications) and still use this option (GRI 2022). On the other hand, the GRI standards can be partially applied by companies; in this case, the phrase *in reference to the GRI standards* is used. However, companies must comply with three requirements: they must publish a GRI content index, provide a statement of use and notify the GRI that the standards have been used (GRI 2022). This option allows for more flexibility than the previous option. The SASB standards can be voluntarily applied by companies in the 77 considered sectors. They must select their relevant standards and choose the disclosure topics as well as the accounting metrics that are important to them. This means that they have greater flexibility than the GRI standards. However, their use is also intended for financial/nonfinancial reporting only.

Clarity refers to the simple readability of a model and a comprehensible, transparent and traceable presentation of the information it contains (Becker et al. 2012). For each framework, we evaluated how clearly the respective catalog of criteria is displayed and explained. In particular, we examined the structure of the catalog. For example, the division of social issues (e.g., three levels recommended by UNEP) has an impact on the traceability and transparency of information. Subsequently, we investigated the assignment of categories. Maintaining links between categories and stakeholders is important for good clarity. We also examined the extent of the

definitions and explanations and the covered/affected stakeholders for each category (supercategories, subcategories, indicators).

With regard to the clarity of the structure itself, the UNEP provides no assignment of subcategories to supercategories. This limits the transparency of the information presented. In addition, UNEP considers the supercategories as important and mentions them but does not define them. Therefore, it is not clear what exactly they mean by the term. Subcategories are also mentioned but only partially explained. In addition, UNEP refers to the outdated Methodological Sheets from 2013 for detailed definitions of the subcategories (UNEP 2020). In this context, it is important to note that the current UNEP Guidelines contain new subcategories that are not included or defined in those outdated Methodological Sheets. Definitions for those subcategories were published only afterward in the Methodological Sheets from 2021.

In comparison to UNEP, the Roundtable Handbook does not consider any supercategories. Thus, the clarity of the information is reduced. Only subcategories are presented (so-called social topics), which are then assigned to stakeholders. However, in comparison to the UNEP, the subcategories are described in greater detail. As stated above, the stakeholder group *small-scale entrepreneur* is mentioned only in this framework. Although a brief definition of this stakeholder group is provided, it is not obvious what is truly meant. Furthermore, it is not precisely explained why this stakeholder group in particular and not others (such as suppliers or value chain actors) is included in this framework.

As noted, there are three levels in the WBCSD Social Metrics and the assignments among them. In this context, however, it is not clear why certain subcategories that could fit into the *employment* category were assigned to other supercategories (e.g., fair wages were assigned to *basic rights and needs*). Neither is it explained why *employment* was included as a separate supercategory, as it overlaps with other categories. Furthermore, the assignment of some subcategories to relevant stakeholders is not clear. For example, the WBCSD links the subcategory *job creation* to the supercategory *employment* but states that it has an impact on the local community as a stakeholder. It is not clear why it has no impact on workers as stakeholders. Against this, it should be emphasized that the WBCSD Social Metrics provide definitions for all subcategories. Furthermore, the supercategories (so-called social areas) are defined, for the most part, in the WBCSD Social Metrics, and thus, generally, they provide a higher level of comprehensibility than the UNEP or the Roundtable Handbook. Nevertheless, the supercategory *employment* is not properly explained and not precisely distinguished from other categories.

As mentioned above, there are no categories in the GRI standards. However, they contain a list of significant social issues, particularly the GRI 400 series. For each social issue, the standards include requirements and recommendations (for financial/nonfinancial reporting) that use specific indicators. Furthermore, there are guidance sections for each standard containing background information, explanations and examples provided for better understandability (GRI 2022). However, these guidance sections seem incomprehensible and imprecise in some places, and the exact purpose of some sections is not clear.

There are also no categories used in the SASB standards. However, accounting metrics (indicators) are given for each disclosure topic and are described in detail.

Although only a few social topics are considered (as mentioned above), these topics are all described clearly.

3.2.4 Consistency

Consistency is present when there are no contradictions (Bach 2009). Thus, the information presented in the examined frameworks should be uniform rather than contradictory. In particular, we analyzed whether the descriptions and the use of categories and stakeholders are consistent within the frameworks.

This is not the case in the UNEP regarding the stakeholder group *children*. At the beginning, the UNEP names six stakeholders (including children); however, this grouping is not treated consistently. Thus, children are mentioned in some places as an extra stakeholder (e.g., UNEP 2020) but omitted in other sections. As a result, only five stakeholders appear to be relevant. The reasons for this inconsistent approach are not given.

Furthermore, UNEP uses the term *health and safety* as both a supercategory and a subcategory. Consequently, there is no precise delimitation of these categories. In addition, the supercategories are regarded as groups of subcategories (UNEP 2020), but there is no precise assignment between them.

In the Roundtable Handbook, terminology is used inconsistently across some subcategories. For example, it lists the following three categories individually: *health*, *safety* and *health and safety*. Only when assigning these categories to stakeholders is it possible to understand and distinguish the content of these categories; e.g., the subcategories *health* and *product safety* are related to users. Whereas, the subcategory *health and safety* is related to three stakeholder groups (workers, local communities and small-scale entrepreneurs). However, it is unclear why health and safety are divided when assessing the social impact on users and not divided when assessing the social impact on other stakeholders.

In the framework of the WBCSD, no significant inconsistencies were identified.

In the GRI topic-specific standards, in addition to the GRI 400 series, which includes all social issues, some parts of the GRI 200 series (economic issues) should also be considered in regard to social sustainability. For example, standard 205-3 addresses anticorruption, which is also an important social issue, but it is not mentioned in the standards of the GRI 400 series. In the SASB standards, social issues (as disclosure topics) are not applied consistently. There is no explanation as to why some social issues (e.g., data privacy, workforce health and safety) are only described in certain industries, even though they should be important in all/many sectors.

A summary of the critical review of the frameworks and their catalogs of criteria is presented in Table 3.

Table 3 Framework review

Relevance	Assessment frameworks			Reporting frameworks	
	UNEP Guidelines (2020)	Roundtable Handbook (2018)	WBCSD Social Metrics (2016)	GRI Standards (2022)	SASB Standards (2022)
Contains the most detailed classification of social issues and stakeholders	Contains the most detailed classification of social issues and stakeholders	Contains the smallest number of social issues	Has only three stakeholders (no supplier)	No categories	No categories
Subcategories are not assigned to supercategories	Subcategories are not assigned to supercategories	Supplier partly covered; society is not mentioned	Subcategories are assigned to supercategories	Social issues are not assigned to stakeholders	Social issues are not assigned to stakeholders
Subcategories are assigned to stakeholders	Subcategories are assigned to stakeholders	No supercategories	Subcategories are assigned to stakeholders	Indicators are proposed for most social issues	Indicators are proposed for some social issues
No indicators are proposed for most social issues	No indicators are proposed for most social issues	Subcategories are assigned to stakeholders	No indicators are proposed for most social issues	Considers both B2B and B2C (stakeholder customer)	–
Considers only B2C (stakeholder consumer)	Considers only B2C (stakeholder consumer)	Indicators are proposed for most social issues	Considers only B2C (stakeholder consumer)	–	–
Supercategories are focused on socially protected values	Supercategories are focused on socially protected values	Considers only B2C (stakeholder user)	Supercategories are focused on socially protected values	–	–
–	–	Subcategories are focused on socially protected values	–	–	–

Table 3 (Continued)

	Assessment frameworks UNEP Guidelines (2020)	Roundtable Handbook (2018)	WBCSD Social Metrics (2016)	Reporting frameworks GRI Standards (2022)	SASB Standards (2022)
Timeliness	Current version 2020; first published in 2009 Methodological Sheets refer to GRI G3 (GRI 2006)	Updated several times Refers to the first version of the UNEP Guidelines (UNEP 2009)	Current version 2016 Refers to the first versions of the UNEP Guidelines (UNEP 2009) and Roundtable Handbook (2014) Refers to GRI G4 (GRI 2014)	Current version 2022	Current version 2022
Applicability (flexibility and clarity)	Refers to Methodological Sheets from 2013. Methodological Sheets were updated in 2021, but are not considered in the current UNEP Guidelines Applicable for all sectors; product level only; internal use a combination with LCA is possible	Applicable for all sectors; product level only; internal use Subcategories are described in more detail	Globally applicable to different chemical products for various industries a three level division with assignment	Applicable for all sectors; corporate level only; external use Two options: <i>in accordance with GRI standards and in reference to GRI standards</i>	Applicable for 77 sectors; corporate level only; external use Clear description of disclosure topics
	a three level division, but no assignment	a two level division with assignment	Supercategory <i>employment</i> not clearly defined	Guidance sections partly not comprehensible/transparent	–
	Missing definition for supercategories; definitions for only some subcategories	Stakeholders 'small-scale entrepreneurs' not clearly presented	–	–	–
	Methodological Sheets (UNEP SETAC 2013) with definitions are outdated; in the 2021 Methodological Sheets, all UNEP subcategories are explained	–	–	–	–

Table 3 (Continued)

	Assessment frameworks UNEP Guidelines (2020)	Roundtable Hand- book (2018)	WBCSD Social Metrics (2016)	Reporting frameworks GRI Standards (2022)	SASB Standards (2022)
Consistency	Stakeholders <i>children</i> not consistently considered	No consequent use of subcategories	No significant inconsistencies	GRI 200 (economic topics) consider some social issues as well	Social issues not applied consistently
	<i>Health and safety</i> is a supercategory as well as a subcategory	–	–	–	–
	Regards supercategories as summaries of subcategories; no linkage between them proposed	–	–	–	–

4 Catalog of Criteria and Its Application

4.1 Presentation of the Developed Catalog of Criteria

The analysis presented in Sect. 3 shows that the existing catalogs of criteria used in the considered frameworks have some weaknesses. Therefore, in this section, we present our own catalog for assessing social sustainability, which retains the advantages of the existing frameworks and introduces additional positive aspects. Therefore, the focus is on the third phase of SLCA, i.e., impact assessment. Accordingly, the social impacts on stakeholders can be assessed. This can be done at either the company or product level. The entire catalog of criteria is shown in the Appendix in Figs. 5, 6, 7 and 8.

As mentioned in Sect. 1, a catalog that considers the objectives from a bilateral perspective (management accounting and financial reporting) does not yet exist. However, such a catalog would help to avoid duplication of work in companies and provide more concrete information that could be used for internal assessment as well as external reporting to material stakeholders. Accordingly, the catalog of criteria proposed in this section is intended to be used for both management accounting and financial reporting. Among other effects, the use of this catalog should increase transparency, traceability and comprehensibility in the assessment of social sustainability and external reporting. When developing the catalog, we also considered the requirements of the models presented in Sect. 3.2. Furthermore, this catalog can serve as a basis for coping with the problem of socialwashing⁴ in the context of external reporting because it provides reliable and relevant information to stakeholders.

In comparison to the considered frameworks, we divide our catalog of criteria into four interconnected and interdependent levels (see Fig. 2). Thus, in our case, the stakeholders form an own level. This is because the impacts on stakeholders are measured directly. This four-level division enables greater transparency and traceability and avoids the overlapping of social issues. The top level involves the impacts on stakeholder groups. Determining these is the main objective of social sustainability assessment (UNEP 2020). Then, there are the supercategories (second level), which represent the grouping of social issues (third level). The social issues themselves, which are constituted as subcategories, are measured by indicators (fourth level). These levels and the interdependencies among them are discussed in greater detail below.

4.1.1 First Level: Stakeholder Groups

As already explained in Sect. 3, the analyzed assessment frameworks pursue the goal of measuring the social impact on stakeholders. However, when grouping social issues, they are oriented toward so-called socially protected values (e.g., health and safety, human rights). Thus, there is no clear (transparent) stakeholder assign-

⁴ Socialwashing is a term that describes companies portraying themselves and/or their products as more socially responsible/friendly than they actually are (Lenzi 2021; Rizzi et al. 2020).

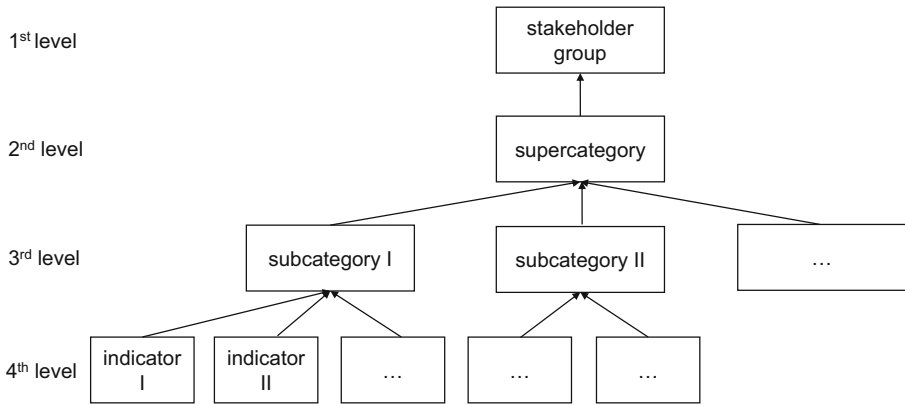


Fig. 2 Structure of the developed catalog of criteria

ment, and the stakeholder reference is accordingly somewhat weakened. To avoid this problem, we propose that the grouping of social issues should primarily be based on stakeholders and their relationships with the company rather than on socially protected values. This would enable the assessment of social impact to have a stronger stakeholder orientation.

When defining stakeholder groups, the focus was basically on those who are affected by social sustainability or the social actions of companies. Stakeholders that had been considered in other concepts, particularly in the related literature (for example, Töpfer 2007; Crane et al. 2019), were included. As in the UNEP framework, more stakeholder groups are covered to avoid any overlapping. Unlike the frameworks of the Roundtable Handbook and WBCSD, this enables a transparent delimitation.

Overall, the proposed catalog of criteria considers four main stakeholder groups: workers, business partners, local community and governmental and nongovernmental actors, while the stakeholder group business partners can be split into suppliers, other cooperation partners, customers and competitors. These stakeholder groups are defined against the background of concrete relationships with companies. A similar classification of stakeholders can be found in Töpfer (2007). These four stakeholder groups exhibit different four types of relationships with companies.

Workers describes the group that has a work-contract relationship with the company.

The stakeholder group business partners represent the business relationship maintained by the company. Suppliers and other cooperation partners are groups in the procurement area. Cooperation indicates the existence of a relationship among several companies in which the economic independence of these companies is limited in those areas affected by the cooperation while it is in effect. The legal independence of each of the cooperation partners, however, remains completely unaffected (Franz Xaver et al. 2011). Cooperation can be divided into three types: vertical, horizontal and lateral. If the companies operate in the same industry but along different stages of the value chain, they are engaged in vertical cooperation (e.g., an

automotive parts manufacturer delivers tires to a car manufacturer). In horizontal cooperation, the companies cooperate in the same industry and at the same stage of the value chain (e.g., one car dealer cooperates with another). In lateral cooperation, the companies belong neither to the same value chain nor to the same industry (e.g., a car manufacturer cooperates with a charging station manufacturer) (Friese 1998). In comparison to the analyzed frameworks, we more comprehensively consider cooperation. On the one hand, we include suppliers as a separate stakeholder group (vertical cooperation), which is also the case in other frameworks. This emphasizes the high importance of suppliers (i.e., due to the Act on Corporate Due Diligence Obligations in Supply Chains 2021). On the other hand, we also consider the stakeholder group of other cooperation partners, which includes those engaged in either horizontal or lateral cooperation. This is not considered in other frameworks. Customers are groups in the sales area. Customers can be end consumers (business-to-consumer) and/or businesses at various trade levels (business-to-business) (Töpfer 2007). Unlike other assessment frameworks, this catalog allows for full consideration of this group. Competitors are defined as rivals for the same customers (Töpfer 2007).

The local community is indirectly connected to companies on a local level, i.e., they have a local relationship (Töpfer 2007). The local community is a group of people residing in the neighborhood of the company, and it is affected by its activities. Local represents a limited geographical area, and this area is understood in different ways. Therefore, no common definition exists. Rather, the distance radius must be defined individually by each company, but it should not extend outside of the company's own region (e.g., federal state). The local community includes, for example, citizens, municipalities, and organizations in the neighborhood area (Goedkoop et al. 2018; Crane et al. 2019).

Governmental and nongovernmental actors are the group with a remote social relationship with the company. These actors are indirectly affected and do not reside in the neighborhood. In addition to the government, this group includes NGOs and other communities that may be socially affected (Töpfer 2007; Crane et al. 2019).

4.1.2 *Second Level: Supercategories*

Similar to the UNEP Guidelines and the WBCSD Social Metrics, we propose the grouping of social issues into supercategories. Basically, the supercategories offer a transparent illustration of social issues as a structuring system rather than for assessment per se. For a pure assessment, it is also possible to consider social issues without grouping them into supercategories, as is done in the Roundtable Handbook. However, due to the transparency of the presentation, the ease of comprehensibility and the quick pace of the information gathering (in the context of reporting), we recommend utilizing supercategories. As mentioned above, supercategories should be linked to stakeholder relationships and thus to specific stakeholder groups. This is done to avoid overlapping and to develop a stronger stakeholder reference.

On the top of the catalog there are therefore the, stakeholder groups, and they are characterized by their specific relationships with companies. Based on the stake-

stakeholder relationships		work-contract relationship	business relationship	local relationship	remote social relationship
supercategories (socially protected values)		working conditions	social interests of business partners	local well-being	social interests of governmental and nongovernmental actors
stakeholder groups					
workers		x			
suppliers	business partners		x		
other cooperation partners			x		
customers			x		
competitors			x		
local community				x	
governmental and nongovernmental actors					x

Fig. 3 Stakeholder groups, stakeholder relationships and socially protected values

holder groups, the socially protected values are defined and set as supercategories (described below), as illustrated in Fig. 3.

As seen in Fig. 3, stakeholder groups and socially protected values in the proposed catalog are in a 1:1 ratio. Each supercategory represents a socially protected value. These can be assigned to a stakeholder group. It should be noted that the stakeholder group business partners should be categorized in greater depth (suppliers, other cooperation partners, customers and competitors) to reach a higher level of transparency and detail. This serves as an extension of the other frameworks.

To define the supercategories, we evaluated the examined frameworks and the UN Global Compact, OECD Guidelines and ISO 26000.⁵ This was because these frameworks and standards describe important socially protected values. Overall, this procedure resulted in four categories: working conditions, the social interests of business partners, local well-being and the social interests of governmental and nongovernmental actors.

Working conditions refers to social impacts in the context of the work contract relationship, i.e., in relation to the employees. This category measures the company’s commitment to the well-being of its employees. The social interests of business partners encompass the business relationships of an organization and thus are used to describe the responsibilities of suppliers, other cooperation partners, customers and competitors.⁶ This category is used to measure the extent to which correct and

⁵ UN Global Compact, OECD Guidelines and ISO 26000 are considered important in the context of sustainability worldwide. They address certain social issues, but do not represent social sustainability approaches (UN 2000; OECD 2011; ISO 2010).

⁶ The new GRI Standards also use the terms *business partner* and *business relationship*. However, this paper takes a broader perspective by considering consumers as business partners as well, with the aim of including B2B and B2C transactions in their entirety (GRI 2022).

transparent information is published and the fair settlement of transaction contracts is carried out. Local well-being addresses social issues at the local level for groups with indirect relationships to the company. That is, it measures the strength of the company's contribution to local sustainability. In contrast to local well-being, the social interests of governmental and nongovernmental actors involve social impacts on a nonlocal level. However, the nature of the relationship is also indirect.

The advantage of including these supercategories is that they enable the most important social issues to be grouped under one heading, thus making it possible to find information more quickly. As the supercategories are assigned to actual stakeholders or stakeholder relationships, the social impacts on stakeholders can be directly assessed based on the supercategories. For example, the supercategory *well-being* that is used in the WBCSD Social Metrics covers several stakeholders, making the impact on the individual specific stakeholder groups unable to be distinguished. In the catalog of criteria presented here, the category *local well-being*, for example, covers several social issues and shows the impact on the local community as a single stakeholder group (see Fig. 7 in the Appendix).

The supercategory *social interests of business partners* addresses a single type of relationship with four stakeholder groups; thus, it is important to subdivide it according to these stakeholders, for example, by starting with suppliers, then proceeding to other cooperation partners and customers and finally moving on to competitors. Therefore, the social impact on all of these stakeholder groups can also be derived directly (see Fig. 6 in the Appendix).

4.1.3 Third Level: Subcategories

Subcategories represent social issues. Similar to supercategories, subcategories were developed based on the evaluation of all the considered frameworks as well as the UN Global Compact, the OECD Guidelines and ISO 26000. In the course of the evaluation, duplicated names and of social issue contents were removed to avoid overlapping and overloading in the catalog of criteria. In addition, the identified social issues in the catalog are dependent on the previously presented supercategories and defined stakeholders.

Overall, as shown in the Appendix, the catalog of criteria contains 36 social issues grouped under the abovementioned supercategories. These 36 social issues can vary and be expanded depending on the sector of the company. In reporting, omitting specific social issues is possible, but such an omission must be explained (as with the comply or explain approach used in financial reporting).⁷ The subcategories are listed in Figs. 5, 6, 7 and 8 in the Appendix.

4.1.4 Fourth Level: Indicators

Indicators are used to measure the impact of social issues on stakeholders. The presented list of indicators is primarily based on those of the GRI because, as the

⁷ For example, the proposed social issues do not apply to all sectors, so it is possible to omit them with appropriate justification (Bundestag 2016; Inwinkl et al. 2015).

previous analysis showed, these are the most specific ones. Furthermore, indicators from the Roundtable Handbook are also included so that there is an almost comprehensive catalog (see Figs. 5, 6, 7 and 8 in the Appendix). Extensions are also possible.

4.1.5 Interdependencies

The structure of the levels with their interdependencies is illustrated in Fig. 2 and in Figs. 5, 6, 7 and 8 in the Appendix. As shown in Figs. 5, 6, 7 and 8, the individual subcategories are grouped into supercategories. Each supercategory refers to a single stakeholder group and thus directly reflects the impact on that particular stakeholder group. The supercategory *social interests of business partners* refers to four stakeholder groups. The stakeholder assignment can be identified by order and/or color. In the illustration in Fig. 6, suppliers are on the left side and colored a bright shade of violet, cooperation partners and customers are in the middle in a darker shade, and competitors are on the right in the darkest shade of violet.

The social issues for each stakeholder group are presented, creating a transparent and clear structure. The arrows represent the links between stakeholder groups, supercategories, subcategories and indicators.

In the following chapter, we describe a procedure model that shows how the developed catalog can be adapted and applied for specific assessment and reporting tasks in individual companies.

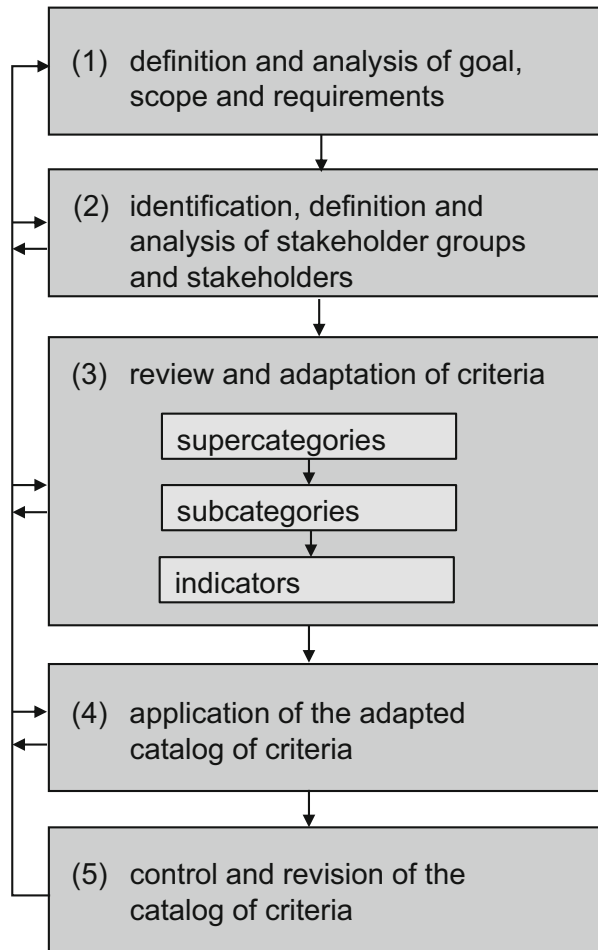
4.2 Procedure Model for the Application of the Developed Catalog of Criteria

The catalog of criteria developed and described above is generic and includes stakeholders, supercategories, subcategories and indicators that are not tailored to a specific industry or even a specific company. However, in specific industries and companies, some of the criteria included may not be relevant for a given assessment or reporting task. In contrast, the high relevance of specific criteria or interests of stakeholders might induce the need to extend or refine the catalog through the addition of further criteria. Furthermore, over time, changes in the perception and relevance of social issues will raise the need to adapt criteria.

For these reasons, the catalog of criteria should be understood as a basic structure that can or even should be concretized and adapted for specific cases of application. To support this adaptation process and the systematic and structured application of the catalog of criteria, the use of a procedure model is suggested.

Procedure models have been developed in different scientific fields, including IT, engineering and economics. A procedure model represents a systematic and coordinated process for realizing complex tasks or projects. In this process, subjects are subdivided into single steps. These steps are connected by feed-forward and feedback loops (Leihmeister 2015).

The usefulness of procedure models is already reflected in some of the existing approaches for assessing and reporting social sustainability. The UNEP suggests a four-step procedure for SLCA (see Sect. 2), which is based on the standardized LCA of the ISO standard 14040 (UNEP 2020, ISO 2006a). It can be understood as

Fig. 4 Procedure model

a comprehensive generic procedure model. McElroy suggested a five-step procedure model in the context of his Social Footprint method (McElroy 2008). Furthermore, procedure models have been suggested for the similar task of developing ratio systems in an economic context or ratio systems in the production sector (Götze et al. 2010). Additionally, the Multi Actor Multi Criteria Analysis (MAMCA) is a method that describes a procedure model with seven steps. This method involves the interests of stakeholders in the decision-making process (Macharis and Baudry 2018).

These approaches are used here to suggest a procedure model that is tailored to the assessment and reporting of social sustainability based on the catalog of criteria. The procedure model contains five steps, which are illustrated in Fig. 4.

In the first step, as in the procedures for LCA and SLCA, the goal and scope as well as requirements should be analyzed and clarified (ISO 2006a, b). Concerning the goal of the application of the catalog of criteria, it might be relevant to know whether it is the assessment tasks, the reporting tasks or both that are focused.

Furthermore, the intended result can be the outcomes of indicators or categories solely or one quantitative value reflecting the total impact on stakeholders. The scope might comprise the social impacts of the entire company or those of specific products or value chain activities. Additionally, the time frame has to be defined. Furthermore, the target system of the company should be regarded to answer the question which criteria are relevant. An analysis of the as-is-state of target achievement and the satisfaction of stakeholders might also provide insights for relevant criteria. Based on that, the generic requirements described in Sect. 3.2 should be specified with respect to the format and content of the catalog of criteria for a specific case of application (ISO 2006a, b).

The second step concerns the identification, definition and analysis of relevant stakeholder groups and stakeholders (Töpfer 2007). First, whether all stakeholder groups are relevant for a specific sector, company and situation needs to be assessed (see the 1st level in the structure of the catalog of criteria in Fig. 2). The omission of stakeholder groups that are not significantly relevant simplifies the catalog and its application. Then, the remaining stakeholder groups can be analyzed regarding their homogeneity and the question of whether they should be additionally differentiated in the further process of adapting and applying the catalog (e.g., the local community can be subdivided (like the stakeholder business partners) depending on the situation) (Macharis and Baudry 2018). Afterward, the relevant stakeholders in the single stakeholder groups should be identified and clearly defined. Finally, interviews, surveys and workshops can be used to identify the needs and wishes of stakeholders (Macharis and Baudry 2018; UNEP 2020). This is relevant for the next step.

In the third step, the supercategories, subcategories and indicators are reviewed, adapted, extended and specified with respect to the defined stakeholder groups and stakeholders. Therefore, a top-down approach with feedback loops starting with the stakeholder group-specific supercategories, selecting and revising the subcategories for the supercategories and finally defining the indicators for the subcategories (see the 2nd, 3rd and 4th levels in the structure of the catalog of criteria in Fig. 2) is suggested. The review and adaptation should consider the specifics of industries, companies and the present situation, e.g., hot topics of a sector or the common indicators of a sector or company. Since the criteria are used to assess and report the social impacts on stakeholders, they should be formulated from the perspective of stakeholders (Macharis and Baudry 2018). Therefore, the inclusion of stakeholders and/or the persons that are responsible for the stakeholder relationships in a company seems to be mandatory (Töpfer 2007). The indicators at the lowest level of the catalog have to be measurable and therefore operationalized in an adequate way. Finally, the criteria should be clearly defined to ensure a common understanding.

In the fourth step, the adapted catalog of criteria is applied for assessment and/or reporting purposes. This requires measures for the indicators, at the least. If the intended result is a single quantitative value that reflects the total impact on stakeholders, an aggregation procedure is necessary to condense the values of indicators to outcomes regarding social impacts for each of the subcategories, supercategories and stakeholders. Additionally, weightings might be necessary to include the different relevance of the indicators, subcategories and supercategories (and thereby the stakeholder groups). For weighting and aggregation, the following scoring models

and multicriteria methods can be used: utility value analysis, analytic hierarchy process, multiattribute utility theory, PROMETHEE and the Refinitiv ESG score (Götze et al. 2015; Refinitiv 2021). Here, the stakeholders should be reinvolvement. The results of the aggregation procedure indicate the social impacts for the single subcategories, supercategories, and stakeholder groups as well as the total social impact. Therefore, the social impacts on stakeholder groups are depicted explicitly. In this step, it should be noted that trade-offs can arise, which should be considered in the decision-making process. For instance, maximizing the well-being of one stakeholder group may result in the expense for another stakeholder group. As a final part of this step, these results should be interpreted, reviewed, edited for presentation and documented.

In the final step, the adapted catalog of criteria is controlled and revised. Based on the insights and experiences from application, the catalog as a whole and its single criteria are critically reviewed with respect to the usefulness, applicability and fulfilment of specified requirements. Furthermore, whether changes in the policy and/or in the situation of the company, its social environment or even its assessment or reporting requirements might motivate adaptations of the catalog is scrutinized. For such adaptations, the first three steps can be conducted again.

4.3 Critical Review of the Developed Catalog of Criteria

The proposed catalog of criteria describes a structure for transparent mapping for reporting and assessing social impacts on stakeholders. All of the requirements described in Sect. 3.2 are considered.

Relevance is achieved by addressing all the social issues and all of the stakeholder groups who are socially affected by a company's actions. In addition, we carried out a categorization and established a link between each social issue and the corresponding stakeholder groups. Further, we proposed indicators for quantifying each social issue. In comparison to the other catalogs of criteria used in the frameworks analyzed, we comprehensively considered the stakeholder group cooperation partners. We included not only suppliers but also other cooperation partners, representing both horizontal and lateral cooperation. Furthermore, we also covered the stakeholder group governmental and nongovernmental actors. The stakeholder groups thus represent society as a whole.

Our catalog is newly developed and considers all of the current versions of the analyzed frameworks; thus, the criterion of *timeliness* is met. Accordingly, it can be adjusted over time.

Furthermore, the catalog is flexible, as it can be used in all industrial sectors, as well as for products and companies as a whole. In addition, depending on the company's target, the catalog can form the basis for sustainability assessment and/or reporting. We present a clear structure and linkages and provide short, clear definitions for all considered categories and levels. When considering the developed catalog of criteria, it is also notable that, compared with other frameworks, there is a 1:1 ratio of stakeholder groups to socially protected values (as described above). This approach in particular allows for greater transparency and clarity in the presentation of results and the direct derivation of social impacts. Consequently, the

effort involved in the assessment of social impacts is reduced. Contrary to the other frameworks, in our catalog of criteria, the social issues *human rights* and *health and safety* are not considered as their own supercategories. Instead, they are subordinated to other categories (working conditions, social interests of business partners, and local well-being).⁸ This is done because these two social issues affect several stakeholders; therefore, the 1:1 ratio cannot be maintained. Due to the flexibility and clear structure of the catalog, the *applicability* criterion is met. The criterion is also supported by the procedure model presented in Sect. 4.2.

To meet the criterion of consistency, we sought a uniform description of the catalog and its components to avoid contradictions. It is noticeable that the stakeholder group business partners is categorized in greater depth. For a more consistent procedure, the supercategory *social interests of business partners* could be divided into four individual supercategories: the *well-being of suppliers*, the *well-being of other cooperation partners*, the *well-being of customers* and the *well-being of competitors*. However, this leads to the bloating of the catalog. Thus, a division of this supercategory is unnecessary and in contradiction to the criterion of clarity. Furthermore, the nomenclature business relationship indicates that these can also be aimed at economic sustainability. Accordingly, there may be overlaps between social and economic impacts. Within our catalog of criteria, we have consistently ensured that only those indicators that are aimed at capturing social impacts are recorded. For example, the subcategory fair social competition concerns social anti-competitive behavior. Rather than economic factors such as price regulation, only social factors such as false statements or negative publicity toward competitors are regarded as important.

In addition to the fulfilment of the requirements, the aggregation of social impacts into one quantitative value reflecting the total impact on stakeholders is not further addressed in this paper. This is only mentioned briefly in the description of the procedure model (Sect. 4.2) in the fourth step, where some of the methods used for aggregation and weighting are listed. In general, the challenge with aggregation is that qualitative and quantitative data have to be combined and weightings have to be defined. For an aggregation, a clear structure of the social issues is important, as proposed in this paper.⁹

Nevertheless, the proposed catalog of criteria has the advantage that information can be found more quickly based on the clear structure of stakeholder groups, supercategories and subcategories. In the context of external reporting, such a structure could be transferred to sustainability reports or nonfinancial statements. The supercategories can be used as section headings presenting the information on social issues. This facilitates the traceability of social issues for external stakeholders. For example, issues related to employees are listed within the *working conditions* supercategory, which has the advantage of preventing disclosure overload by keeping

⁸ Any resulting duplications of indicators have been eliminated.

⁹ In the assessment frameworks of the UNEP, Roundtable Handbook and WBCSD, aggregation is only partially and incompletely described, and a clear structure of the criteria is often missing. Generally, the frameworks propose a scoring model, but this is only superficially applied.

information under one heading rather than spreading it out and repeating it several times. This results in time savings for readers.

Furthermore, it should be stated that the catalog is generic and can be applied for reporting and assessment. However, regarding usage, no specific differentiation is made between reporting or assessment, which can be seen as a limitation of the catalog. The catalog provides a coherent presentation that covers the information required for meeting both purposes. However, this limit is weakened by the procedure model described in Sect. 4.2.

5 Conclusion

The first aim of this paper was to analyze the assessment and reporting frameworks in use currently, including their catalogs of criteria. It was revealed that the analyzed catalogs do not meet all the requirements of a social sustainability assessment model. Therefore, as the second aim of this paper, we developed a catalog of criteria that meets all of these requirements. From a stakeholder orientation, a novel four-level approach to structuring and assessing social issues that has not yet been considered in the literature is proposed.

In addition, the procedure model presented in Sect. 4.2 suggests a structured way to apply the catalog from a company's point of view. The catalog can be used in management accounting and financial reporting to avoid duplication of work and assure consistency of internal and external reporting. This catalog should facilitate social sustainability assessment and increase the level of transparency. The proposed structure of social issues and indicators can increase the comprehensibility of reporting and improve the process of finding information.

The catalog can be used as a proposal for revising the structure of the topic-specific GRI 400 standards as well as the SASB standards. In addition, the forthcoming sets of the European Sustainability Reporting Standards (ESRS) and their continuous revision can potentially be inspired by the proposed catalog.

The presented catalog (particularly the indicators) refers to both the product and company levels. Extending the catalog to the process and resource levels is possible and can be considered in more detail in further research. In addition, adaptations based on other perspectives (e.g., politics) are conceivable since the catalog was created from the point of view of companies. Moreover, the catalog can be applied to specific sectors (e.g., agriculture, IT); however, adjustments would be needed to facilitate this application.

In addition to its practical contributions, this paper also offers several theoretical contributions. We identified the fact that the existing definitions of social sustainability can be systematized in terms of purpose and perspective. This was followed by the introduction of our own definition of social sustainability, which formed the basis for this paper. To operationalize the concept of social sustainability more specifically and transparently and to enable assessment, we presented the catalog of criteria, including its social issues and indicators. It is worth mentioning that the catalog, which serves as the basis for measuring social sustainability, can be embedded in a comprehensive sustainability assessment and reporting (based on Life

Cycle Sustainability Assessment, LCSA). This is intended to eliminate the excessive focus on one sustainability dimension and to handle the conflicts that arise between the different dimensions. Furthermore, a uniform/consistent database and consistent system boundaries contribute to reducing the effort and enhancing the significance of sustainability assessment (Schramm et al. 2020; Klöpffer 2008).

In further studies, a specific assessment should be carried out using a concrete example, and aggregation methods should be examined in more detail and then refined.

Overall, the paper contributes to improving the assessment and reporting of social sustainability, which will become increasingly important in the future.

6 Appendix

stakeholder group	workers														
super-category	working condition (work-contract relationship) refers to social impacts in the context of the work contract relationship; assesses the company's commitment to the well-being of its employees														
sub-categories	management reorganization	social benefits	appropriate working hours	fair wages/fair salary	privacy	diversity and equal opportunity	job satisfaction	skills and knowledge	no discrimination	no forced labor	no child labor	freedom of association and collective bargaining	no sexual harassment	investments to human rights	workers occupational health risk and safety
	impacts through structural changes on the company (layoffs, disinvestment, closing down, etc.)	non-negotiable employment compensation	normal working hours defined by applicable laws and industry standards (e.g. 48h per week, 6 consecutive days)	the wages paid for normal working week depending on law (e.g. minimum wage), industry average and qualification of the worker	respect and protection of workers data and information	equal recognition of different groups in companies	comfortable feeling at work	programmes to improve the competence of the employees	equal treatment of workers regardless of age, gender, origin, etc.	avoiding unfair recruitment through violence or intimidation	avoiding work that is harmful to children and socially or dangerous, as well as damaging to physical and mental development	respect of the right of workers to form and join organizations of their own choice and to negotiate with their groups	avoiding unwanted, sexually determined behaviour that violates the dignity of a person involved	promote the empowerment of staff to address human rights in the context of their work	maintenance and promotion of physical, mental and social compliance of workers
indicators	-minimum notice periods regarding operational reorganization -the company offers significant compensation to workers who are victims of reorganization	-benefits provided to full-time employees -workers that benefit from flexible working arrangements	-hours worked in a normal working week, not including overtime, are below the limits set by law or international standards -hours worked in a normal working week, not including overtime, exceed 48 hours	-ratios of standard entry level wage by local minimum wage -legal or industry minimum wage relates to compensation per hour or other unit of time for employment allowed under legal minimum wage -the industry average	-number of worker complaints related to breach of privacy or loss of data within the last year	-percentage of individuals within the organization's governance bodies -percentage of employees per employee -ratio of the basic salary and remuneration of women to men	-total number of employees -rate of new employee turnover -parental leave return rate -percentage of employee workload	-average hours of training per year per employee -type and scope of programs implemented and provided to employees -percentage of employees receiving regular performance and career development reviews	-total number and status of incidents of workers -anonymous application -equal pay for work provided -mechanisms for workers to report a complaint or raise concerns about any practice that violates non-discrimination policy	-operations considered to have significant impact on the health of child labor -measures to abolish child labor	-operations in which workers' rights to decrease association or bargaining may be violated or at significant risk	-number of incidents of sexual harassment	-total number of hours devoted to training on human rights policies or procedures concerning human rights aspects of occupational health and safety -percentage of employees trained in human rights policies -percentage of occupational health and safety management aspects of human rights that are relevant to operations	-rate of total recordable injuries and illnesses -total number of fatalities -hours of worker training on occupational health and safety -absentee rate -percentage of employees trained in human occupational health and safety management aspects of hazard identification that are relevant to operations	

Fig. 5 Catalog part I (for stakeholder group: workers)

stakeholder group	suppliers, other cooperation partners, customers, competitors										
super-category	social interests of business partners (business relationship) <i>refers to responsibilities towards suppliers, other cooperation partners, customers and competitors; addresses to what extent correct and transparent information is published, fair settlement of contracts/transactions is carried out and the company's commitment to the well-being of its business partners</i>										
sub-categories	integrating sustainability aspects into supplier assessment (suppliers)	fair cooperation (other cooperation partners)	integrating sustainability aspects into cooperation partner assessment (other cooperation partners)	customers product experience (customers)	privacy (customers)	promotion of skills and knowledge (customers)	inclusiveness (customers)	responsible communication (customers)	customers' health and safety (customers)	fair social competition (competitors)	
	auditing whether suppliers act in a socially responsible way	conducting cooperations in a fair way and in compliance with law	auditing whether cooperation partners act in a socially responsible way	feedback from customers on products and services	respect and protection of customers data and information	educating the customer about products, services and their impacts	ensure financial and material access to products and services for all groups of people	disclosing transparent information on corporate social responsibility	contribution to maintaining and improving customers' health and safety	conduct of activities in a fair way and in compliance with law	
indicators	-number of supplier assessments -number of agreed code of conduct that protect human rights of workers among suppliers	-legal or industry minimum provisions or other fees -number of payments on time to suppliers	-number of cooperation partner assessments -number of agreed code of conduct that protect human rights of workers among cooperation partners	-satisfaction rate through customer interviews -number of complaints received	-number of customer complaints related to breach of privacy or less of data	-amount of financial capital invested in skills and knowledge of customer -providing additional information about product (social media activities) or services	-number of vulnerable products/income groups that would not otherwise be able to afford it	-total number of non-compliance with regulations and/or voluntary codes concerning product and service information and labeling	-total number of non-compliance with regulations and/or voluntary codes concerning the health and safety impacts of products and services	-number of false statements, negative publicity, discrimination regarding competitors -number of violations in which the reporting organization has been identified as a participant	

Fig. 6 Catalog part II (for stakeholder group: business partners)

stakeholder group	local community							
super-category	local well-being (local relationship) <i>refers to social issues at the local level, addresses how strong the company's contribution to local sustaiment is</i>							
sub-categories	nuisance reduction	creation/ promotion of local jobs	local community engagement	delocalization and migration	respect for indigenous rights	access to material and immaterial resources	cultural heritage	health and safety of local community's living conditions
indicators	actions to minimize noise, odours, dust, etc. generated by the company	providing local jobs without removing and harming existing employment	commitment in local affairs, e.g. in local products, culture, sports	contribution to integrating immigrants into the local community and facilitating resettlement	non-violation of the rights of indigenous peoples	the extend to which companies provide local communities with material (water, land etc.) and immaterial resources (intellectual property, human capital etc.)	preservation of human cultural assets	activities to improve the safety and health of the local community
indicators	-number of efficient equipment has been installed in order to limit noise levels (for noisy activities) -percentage of expenses for nuisance reduction -the activity does not generate recurrent nuisances (highly noisy activities, regularly unpleasant odours)	-total number and rate of new local employees -local number of local jobs -no incidents harming local community -company or facility provides a grievance mechanism or other feedback loop for the local community -percentage of operations with implemented local community engagement and/or development programs	-number of local community development programs based on local communities' needs -implemen-tation of formal local community grievance processes -percentage of products and services -tax payments to local community -donations to local community	-number of migrant workers in the local community (integrating migrant workers into the local community)	-total number of identified incidents of violations involving the rights of indigenous peoples	-expenses for community education initiatives -developed projectrelated infrastructure with mutual community access and benefit -access to healthcare	-number of policies to protect cultural heritage	-number of records of public complaints due to product/ production -efforts to strengthen local community health

Fig. 7 Catalog part III (for stakeholder group: local community)

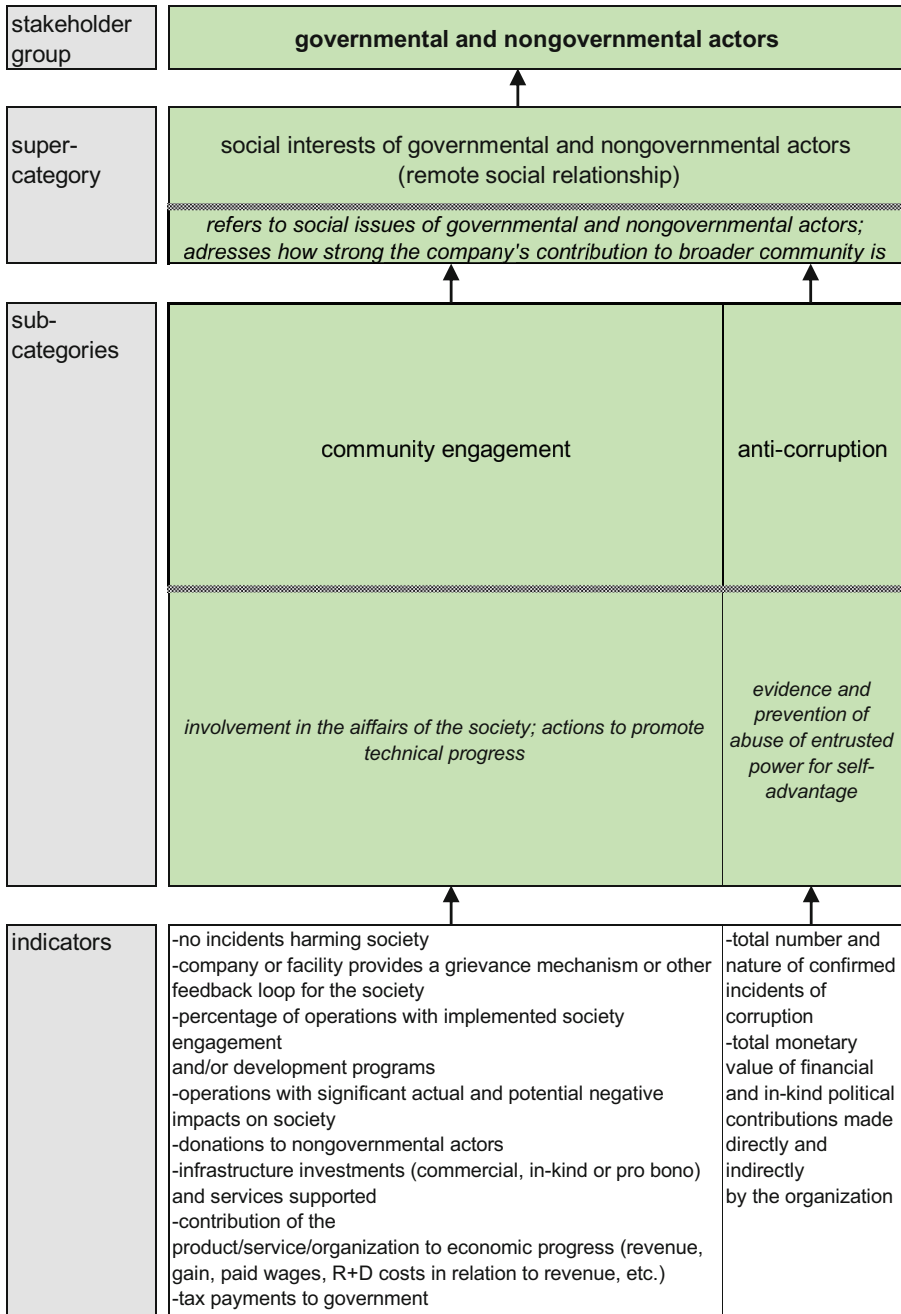


Fig. 8 Catalog part IV (for stakeholder group: governmental and nongovernmental actors)

Funding Open Access funding enabled and organized by Schmalenbach-Gesellschaft and German Academic Association for Business Research.

Conflict of interest F. Richter, W. Gawenko, U. Götze and M. Hinz declare that they have no competing interests.

Open Access This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by/4.0/>.

References

- Azapagic, Adisa, Laurence Stamford, Lorraine Youds, and Christian Barteczko-Hibbert. 2016. Towards sustainable production and consumption: A novel DEcision-Support Framework IntegRating Economic, Environmental and Social Sustainability (DESIREs). *Computer and Chemical Engineering* 91:93–103. <https://doi.org/10.1016/j.compchemeng.2016.03.017>.
- Bach, Alexander. 2009. *Modellbasierte Analyse von Führungsinformationssystemen*. Bamberg: University of Bamberg Press.
- Becker, Jörg, Wolfgang Probandt, and Oliver Vering. 2012. *Grundsätze ordnungsmäßiger Modellierung*. Berlin, Heidelberg: Springer. <https://doi.org/10.1007/978-3-642-30412-5>.
- Benoit, Catherine, Julie Parent, Isabelle Kuenzi, and Jean-Pierre Révéret. 2007. Developing a methodology for social life cycle assessment, the north American tomato's CSR case. <http://userpage.fu-berlin.de/fu/calcas/Benoit.pdf>. Accessed 30 Mar 2023.
- Benoit-Norris, Catherine, Deana Cavan Aulisio, and Gregory A. Norris. 2012. Identifying social impacts in product supply chains: overview and application of the social Hotspot database. *Sustainability* 4(9):1946–1965. <https://doi.org/10.3390/su4091946>.
- Benoit-Norris, Catherine, Gregory A. Norris, Lina Azuero, and John Pflueger. 2019. Creating social handprints: method and case study in the electronic computer manufacturing industry. *Resources* 8(4):1–15. <https://doi.org/10.3390/resources8040176>.
- Bundesamt für Bevölkerungsschutz und Katastrophenhilfe (BBK), and Federal Office for Civil Protection and Disaster Assistance. Schutzgut. <https://www.bbk.bund.de/SharedDocs/Glossareintraege/DE/S/schutzgut.html?jsessionid=A4D91E7FC503960796C3BFC09911DABD.live132>. Accessed 30 Mar 2023.
- Bundestag. 2016. *Entwurf eines Gesetzes zur Stärkung der nichtfinanziellen Berichterstattung der Unternehmen in ihren Lage- und Konzernlageberichten*. Drucksache 18/9982.
- Cap, Stephanie, Pieter Bots, and Laura Scherer. 2023. Environmental, nutritional and social assessment of nuts. *Sustainability Science* 18:933–949. <https://doi.org/10.1007/s11625-022-01146-7>.
- von Carlowitz, Hans Carl. 1713. *Sylvicultura Oeconomica oder Haußwirthliche Nachricht und Naturmäßige Anweisung zur Wilden Baum-Zucht*. Leipzig.
- Correia Salome, Maria. 2019. An overview of the triple bottom line and sustainability implementation. *International Journal of Strategic Engineering* 2(1):29–38. <https://doi.org/10.4018/IJoSE.2019010103>.
- Crane, Andrew, Dirk Matten, Sarah Glozer, and Laura Spence. 2019. *Business ethics*. Oxford: Oxford University Press.
- Duque-Grisales, Eduardo, and Javier Aguilera-Caracuel. 2021. Environmental, social and governance (ESG) scores and financial performance of multinationals: moderating effects of geographic international diversification and financial slack. *Journal of Business Ethics* 168(2):315–334. <https://doi.org/10.1007/s10551-019-04177-w>.
- European Commission. 2014. *Directive 2014/95/EU*
- European Commission. 2017. *Guidelines on non-financial reporting 2017/C 215/01*
- European Commission. 2022. *Directive 2022/2464/EU*
- Franz Xaver, Bea, Franz Xaver, and Jürgen Haas. 2011. *Strategisches Management*. München: UKV. <https://doi.org/10.36198/9783838587530>.

- Friese, Marion. 1998. *Kooperation als Wettbewerbsstrategie für Dienstleistungsunternehmen*. Wiesbaden: Gabler.
- Gangi, Francesco, and Eugenio D'Angelo. 2016. The virtuous circle of corporate social performance and corporate social disclosure. *Modern Economy* 7(12):1396–1418. <https://doi.org/10.4236/me.2016.712129>.
- Gawenko, Wladislav, Fanny Richter, Michael Hinz, and Uwe Götze. 2020. Interne Ansätze zur Nachhaltigkeitsbewertung in der externen Berichterstattung - konzeptionelle und empirische Analyse der DAX-Unternehmen. *Die Unternehmung* 74(3):264–284. <https://doi.org/10.5771/0042-059X-2020-3-264>
- Global Reporting Initiative (GRI). 2022. *Consolidated Set of the GRI Standards 2022*
- Global Reporting Initiative (GRI). 2006. *GRI G3 Sustainability Reporting Guidelines*.
- Global Reporting Initiative (GRI). 2014. *GRI G4 Sustainability Reporting Guidelines*.
- Global Reporting Initiative (GRI). 2022. Universal Standards 2021, Frequently Asked Questions (FAQs). https://www.globalreporting.org/media/zaui12g3/public-faqs-universal-standards_18-january.pdf. Accessed 5 May 2022.
- Goedkoop, Mark, Diana Indrane, and Ilonka de Beer. 2018. *Product social impact assessment handbook 2018*. Amersfoort. <https://doi.org/10.1007/s11367-016-1125-6>.
- Götze, Uwe. 2010. *Kostenrechnung und Kostenmanagement*. Berlin, Heidelberg: Springer.
- Götze, Uwe, Susan Krönert, and Barbara Mikus. 2010. Kennzahlensysteme als Instrument des Produktionsscontrolling. *Der Betriebswirt* 51(2):10–17. <https://doi.org/10.3790/dbw.51.2.10>
- Götze, Uwe, Deryl Northcott, and Peter Schuster. 2015. *Investment Appraisal*. Berlin, Heidelberg: Springer.
- Günther, Edeltraud. 2008. *Ökologieorientiertes Management*. Stuttgart: Lucius & Lucius.
- Hinz, Michael. 2014. Nachhaltigkeitsorientierte Berichterstattung. In *Perspektiven der Wirtschaftswissenschaften*, ed. Dagmar Gesmann-Nuissl, Ronald Hartz, and Marcus Dittrich, 257–278. Wiesbaden: Springer.
- International Accounting Standards Board (IASB). 2018. *Conceptual framework*
- International Organization for Standardization(ISO). 2006a. *ISO 14040:2006. Environmental management—life cycle assessment: principles and framework*
- International Organization for Standardization (ISO). 2006b. *ISO 14044:2006. Environmental management—life cycle assessment: requirements and guidelines*
- International Organization for Standardization (ISO). 2010. *ISO 26000:2010. Guidance on social responsibility*
- Inwinkl, Petra, Sofia Josefsson, and Marie Wallman. 2015. The comply-or-explain principle: Stakeholders' views on how to improve the 'explain' approach. *International Journal of Disclosure and Government* 12(3):210–229. <https://doi.org/10.1057/jdg.2014.6>.
- Jørgensen, Andreas, Michael Z. Hauschild, Michael S. Jørgensen, and Arne Wangel. 2009. Relevance and feasibility of social life cycle assessment from a company perspective. *The International Journal of Life Cycle Assessment* 14(3):204–214. <https://doi.org/10.1007/s11367-009-0073-9>.
- Klöpffer, Walter. 2008. Life cycle sustainability assessment of products (with comments by Helias A. Udo de Haes). *The International Journal of Life Cycle Assessment* 13:89–95.
- KPMG International. 2022. *Big shifts, small steps. Survey of sustainability reporting*
- Lee, Keeheon, and Hosang Jung. 2019. Dynamic semantic network analysis for identifying the concept and scope of social sustainability. *Journal of Cleaner Production* 233:1510–1524.
- Leihmeister, Jan Marco. 2015. *Einführung in die Wirtschaftsinformatik*. Berlin, Heidelberg: Springer.
- Lenzi, Diletta. 2021. Corporate social bonds: a legal analysis. *University of Oslo Faculty of Law Research Paper* 14:1–23. <https://ssrn.com/abstract=3867151>.
- Macharis, Cathy, and Gino Baudry. 2018. The multi actor multi criteria analysis framework. In *Decision-making for sustainable transport and mobility. Multi actor multi criteria analysis*, ed. Cathy Macharis, Gino Baudry, 2–27. Cheltenham: Edward Elgar Publishing.
- McElroy, Mark Wayne. 2008. *Social Footprints. Measuring the social sustainability performance of organizations*. Vermont: Thetford Center.
- McKenzie, Stephen. 2004. *Social Sustainability: towards some definitions*. Hawke research institute working paper series 27. University of South Australia.
- Moore, Julia E., Alekhya Mascarenhas, Julie Bain, and Sharon E. Straus. 2017. Developing a comprehensive definition of sustainability. *Implementation Science* 12:110. <https://doi.org/10.1186/s13012-017-0637-1>.
- Müller, Anna-Luisa, and Regina Pflieger. 2014. Business transformation towards sustainability. *Business Research* 7(2):313–350. <https://doi.org/10.1007/s40685-014-0011-y>.

- Organisation for Economic Co-operation and Development (OECD). 2011. *Guidelines for multinational enterprises*. <https://doi.org/10.1787/9789264115415-en>.
- Purvis, Ben, Yong Mao, and Darren Robinson. 2019. Three pillars of sustainability: in search of conceptual origins. *Sustainability Science* 14:681–695. <https://doi.org/10.1007/s11625-018-0627-5>.
- Refinitiv. 2021. *Environmental, social and governance scores from refinitiv*
- Rizzi, Francesco, Natalia Gusmerotti, and Marco Frey. 2020. How to meet reuse and preparation for reuse targets? Shape advertising strategies but be aware of “social washing”. *Waste Management* 101:291–300. <https://doi.org/10.1016/j.wasman.2019.10.024>.
- Roundtable for Product Social Metrics. 2014. *Handbook for Product Social Impact Assessment 2.0*.
- Rudolph, Mike, Anika Stüß, Florian Lindner, Kristina Hoese, Josephin Haenel, Fanny Richter, and Uwe Goetze. 2021. Identifikation, Analyse und Systematisierung von Anforderungen an betriebswirtschaftliche Entscheidungsmodelle - Entwicklung einer Anforderungshierarchie. *Chemnitz Economic Papers*: 1–20.
- Schaltegger, Stefan, and Jacob Hörisch. 2017. In search of the dominant rationale in Sustainability management: legitimacy- or profit-seeking? *Journal of Business Ethics* 145(2):259–276. <https://doi.org/10.1007/s10551-015-2854-3>.
- Schmidt, Steffen. 2014. *Investitionsentscheidungen unter Unsicherheit. Eine vergleichende Gegenüberstellung individueller und kapitalmarktorientierter Konzeptionen zur Entscheidungsvorbereitung*. Chemnitz: GUC.
- Schmidt, Isabell, Manfred Meurer, Peter Saling, Andreas Kicherer, Wolfgang Reuter, and Carl-Otto Gensch. 2004. SEEBalance®: managing sustainability of products and processes with the socio-eco-efficiency analysis by BASF. *Greener Management International* 45:79–94.
- Schramm, Anika, Fanny Richter, and Uwe Götze. 2020. Life Cycle Sustainability Assessment for manufacturing – analysis of existing approaches. *Procedia Manufacturing* 43:712–719. <https://doi.org/10.1016/j.promfg.2020.02.115>
- Sisson, Vivian. 2020. Environmental, social, and governance (ESG) initiatives. In *The Palgrave encyclopedia of interest groups, lobbying and public affairs, section E*, ed. Phil Harris, Alberto Bitonti, Craig S. Fleisher, Anne Skorkjaer Binderkrantz, and Section E.. Cham: Palgrave Macmillan, Springer. https://doi.org/10.1007/978-3-030-13895-0_179-1.
- Sustainability Accounting Standards Board (SASB). 2022. *SASB-Standards 2022*
- Tkaczyk, Stanislaw, Joanna Kuzincow, and Grzegorz Ganczewski. 2014. Life cycle assessment in management of socially responsible enterprise. *Foundations of Management* 6:71–82. <https://doi.org/10.1515/fman-2015-0019>.
- Töpfer, Armin. 2007. *Betriebswirtschaftslehre. Anwendungs- und prozessorientierte Grundlagen*. Berlin, Heidelberg: Springer. <https://doi.org/10.1007/978-3-540-49395-2>.
- United Nation Environment Programme and Society of Environmental Toxicology and Chemistry (UNEP SETAC). 2013. *The methodological sheets for subcategories in social life cycle assessment (S-LCA)*
- United Nations (UN). 1987. *Report of the world commission on environment and development: our common future*
- United Nations (UN). 2000. *UN global compact*
- United Nations Environment Programme (UNEP). 2009. *Guidelines for Social Life Cycle Assessment of Products and Organizations 2009*, ed. Catherine Benoit and Bernard Mazijn.
- United Nations Environment Programme (UNEP). 2020. *Guidelines for social life cycle assessment of products and organizations 2020*. ed. Catherine Benoit Norris, Marzia Traverso, Sabrina Neugebauer, Elisabeth Ekener, Thomas Schaubroeck, Sara Russo Garrido, Markus Berger, Sonia Valdivia, Annkatrin Lehmann, Matthias Finkbeiner, and Gabriella Arcese.
- Valdivia, Sonia, Jana Gerta Backes, Marzia Traverso, Guido Sonnemann, Stefano Cucurachi, Jeroen B. Guinée, Thomas Schaubroeck, Matthhisi Finkbeiner, Noemie Leroy-Parmentier, Cássia Ugaya, Claudia Peña, Alessandra Zamagni, Atsushi Inaba, Milena Amaral, Markus Berger, Jolanta Dvarioniene, Tatiana Vakhitova, Catherine Benoit-Norris, Martina Prox, Rajendra Foolmaun, and Mark Goedkoop. 2021. Principles for the application of life cycle sustainability assessment. *The International Journal of Life Cycle Assessment* 26(9):1900–1905. <https://doi.org/10.1007/s11367-021-01958-2>.
- Vezzoli, Carlo. 2018. *Design for environmental sustainability*. London: Springer. <https://doi.org/10.1007/978-1-4471-7364-9>.
- Weidema Pedersen, Bo. 2018. The social footprint. A practical approach to comprehensive and consistent social LCA. *The International Journal of Life Cycle Assessment* 23(3):700–709. <https://doi.org/10.1007/s11367-016-1172-z>.

- Wen, Hui, and George Deltas. 2022. Global corporate social responsibility reporting regulation. *Contemporary Economic Policy* 40(1):98–123. <https://doi.org/10.1111/coep.12548>.
- World Business Council for Sustainable Development (WBCSD). 2016. *Social life cycle metrics for chemical products*

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.