

Sustainability Maturity Grids in Procurement: A Literature Review of Existing Frameworks

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Abstract—This literature review explores how sustainability can be effectively integrated into procurement processes through the use of maturity grids. The study provides an overview of existing sustainability maturity grids in procurement. It identifies key drivers, current trends, and barriers to implementation. The literature review highlights the growing influence of key driver concepts such as the Triple Bottom Line (TBL) and Environmental, Social and Governance (ESG) criteria. A critical analysis of existing maturity grids reveals significant gaps including the lack of well-defined KPIs, insufficient differentiation between sustainability dimensions and limited coverage of the procurement process stages. The findings underline the need for a more detailed and practical sustainability maturity grid that can guide companies in assessing and improving their procurement strategies. This paper lays the theoretical foundation for the development of such a grid in future research.

Keywords—sustainable procurement, maturity grid, Environmental, Social and Governance (ESG), triple bottom line, Triple Bottom Line (TBL)

I. INTRODUCTION

Sustainable procurement has become a strategic priority for companies due to increasing pressure from stakeholders, governments, and the public. Sustainability is no longer a question of branding or voluntary corporate giving. It is now recognized as a key element of long-term business stability and competitive success (Truant *et al.*, 2023; Yun *et al.*, 2018). With rising demands for transparency and responsible behavior, procurement and supply management have taken on a significant role in advancing sustainability goals (Quintana-García *et al.*, 2020; Walker *et al.*, 2012).

Despite these ambitions, numerous publicized incidents, such as labour exploitation, environmental harm or weak oversight in global supply chains, have exposed a significant gap between companies' sustainability commitments and their actual practices (Koberg & Longoni, 2018; Fayezi *et al.*, 2018). Well-known companies have faced reputational damage for sustainability issues linked to their suppliers, especially in lower tiers of the supply chain where visibility and control are limited (Koberg & Longoni, 2018; Wilhelm & Villena, 2021). These incidents highlight not only the complexity of global supply networks but also the urgent need for systematic approaches to implement sustainability throughout the procurement process.

While various frameworks and standards offer guidance, they often provide a narrow, predominantly environmental

perspective. Moreover, they fall short in addressing the full spectrum of sustainability challenges (Meehan & Bryde, 2010). As a result, companies as well as academic researchers are increasingly relying on maturity models and assessment grids to assess and advance sustainability in procurement.

This paper seeks to critically analyze existing sustainability maturity grids within procurement. The literature review explores their structure and thematic focus in order to evaluate how effectively they reflect the complexities of sustainable procurement in practice.

A. Relevance of Sustainable Procurement

Sustainable procurement has become essential for companies aiming to comply with the increasing demand from regulatory authorities, stakeholders, and society for more responsible and sustainable sourcing decisions (Truant *et al.*, 2023; Wang *et al.*, 2024). The increasing importance of sustainability is also observable in academic research. Studies show that the majority of global leaders recognize it as a key to business performance (Yun *et al.*, 2018; Laosirihongthong *et al.*, 2019). Sustainable procurement fundamentally aims to incorporate environmental care, social responsibility and economic factors into all purchasing and supply activities (Koberg & Longoni, 2018). This includes not only reducing carbon footprints but also ensuring labour rights, ethical governance, and long-term value creation (Quintana-García *et al.*, 2020; Koberg & Longoni, 2018).

Perspectives on sustainability vary across countries, industries, and organizations, which can lead to misunderstandings and unequal power dynamics within supply chains. In many cases, large companies enforce their own sustainability standards on less influential suppliers (Walker *et al.*, 2012). At the same time suppliers or manufacturers, from countries with weak regulations, often lack the motivation or pressure to adopt sustainable practices on their own (Wilhelm & Villena, 2021). Because procurement has the ability to influence supplier behavior and shape sourcing as well as production decisions, it plays a key role in spreading sustainability throughout the entire supply chain (Meehan & Bryde, 2010). To meet rising expectations, it is important to understand how sustainable procurement affects not only legal compliance but also a company's financial results, environmental impact, and public reputation (Truant *et al.*, 2023; Brandenburg *et al.*, 2013).

This growing complexity and impact underline the need to critically evaluate existing approaches for assessing sustainability in procurement.

B. Objective of the Review

The aim of this research is to gain a deeper understanding of how sustainability can be integrated into the procurement process. This paper serves as the first step in a two-part study. In this initial phase, the focus lies on analyzing existing maturity grids through a literature review in order to identify improvement opportunities. Based on these findings, a sustainability maturity grid will be developed in a second paper. To achieve the goal of the first paper following objectives will be pursued.

To conduct a literature review on sustainable procurement focusing on the analysis of existing models and practices: For the first objective a literature review will be performed focusing on existing models and practices of the sustainable procurement process. The aim of this analysis is to evaluate the different approaches and get a clear picture of the current status.

To identify gaps in current sustainability models and explore opportunities for the development of a more effective sustainability maturity model for procurement: A further goal of this paper is to identify gaps and opportunities for improvement in current models. This paper will analyze which aspects of sustainability may be not fully incorporated in existing models. On this basis, possibilities for the development of a more effective and comprehensive sustainability maturity model for procurement will be identified.

Hence, the main research question of this paper is: "How can a Sustainability Maturity Grid be designed to effectively integrate environmental, social, governance and economic responsibility into procurement processes?" While this paper does not provide the final maturity grid design, it identifies critical requirements and lays the groundwork for its development in future research.

This review contributes to sustainable procurement literature in three ways. First, it provides a procurement-oriented synthesis of sustainability maturity grids and systematically maps their coverage of TBL/ESG dimensions using a unified coding logic. Second, it identifies recurring structural limitations across existing grids, especially regarding KPI operationalization, differentiation of sustainability dimensions, and limited procurement-stage coverage. Third, it derives concise design requirements that form the conceptual foundation for the procurement-specific sustainability maturity grid developed in the subsequent paper.

C. Structure of the Paper

To achieve the objectives, the present paper is divided into five main sections. Beginning with the introduction to the topic and showing the relevance of sustainable procurement, the second section explains the methodology. Hereby, the literature search strategy will be presented. With the outcomes of the literature research a theoretical foundation will be provided in section three. Current key drivers of sustainable procurement will be presented as well as current trends and practices. Furthermore, barriers to the implementation of maturity grids will be examined, highlighting the challenges companies face when attempting to integrate them into their procurement processes.

After outlining the theoretical background existing maturity grids will be identified by the mentioned analysis approach and coding framework. The results will be

discussed and critically analyzed. Finally, a conclusion will be drawn based on the findings.

This structure provides a clear outline to guide the reader through key aspects of the research and its findings.

II. METHODOLOGY

The methodology of this paper is based on a narrative review of literature which is complemented by a coding framework. The purpose of this research method is to collect and synthesize existing literature (Baumeister & Leary, 1997). It provides an overview of theories and current trends as well as barriers in the field of sustainability in procurement. Furthermore, existing maturity grids in this field will be examined. The analysis approach of the existing maturity grids will be explained in Section IV.A

A. Literature Search Strategy

In order to provide an overview of existing literature, a combination of web-based search engines such as Google Scholar and established databases including Wiley Online Library, ScienceDirect and Emerald Insight have been used. The literature search was conducted primarily in English, which may have resulted in the exclusion of relevant studies published in other languages.

Following search terms (Table I) were used to identify relevant literature in the search engines and databases mentioned above:

TABLE I. SEARCH TERMS

No.	Terms
Search term 1	(Sustainable) AND (Purchasing)
Search term 2	(Sustainable OR Green) AND (Procurement)
Search term 3	(Sustainable OR Green) AND (Supply) AND (Management OR Chain)
Search term 4	(SSCM)
Search term 5	(ESG) AND (Procurement OR Purchasing)
Search term 6	(Sustainable OR Green) AND (Purchasing OR Procurement) AND (Maturity) AND (Model OR Grid)
Search term 7	(SSCM) AND (Maturity) AND (Model OR Grid)
Search term 8	(Sustainable OR Green) AND (Supply) AND (Chain OR Management) AND (Maturity) AND (Model OR Grid)

To ensure the quality of this paper the literature has been peer-reviewed based on the German VHB Jourqual 3-Rating. The primary intention of this rating is to classify academic journals based on their scientific quality. The VHB-rating categorizes journals into five categories: "A+", "A", "B", "C" and "D". For this paper only the categories "A+" to "C" have been taken into consideration (VHB, n.d.).

III. THEORETICAL FOUNDATION

To critically assess sustainability maturity grids, it is necessary to understand the broader theoretical context in which sustainable procurement operates. This section introduces key drivers related to the procurement process. It further identifies current trends and demonstrates barriers to implementation. These theoretical insights provide the foundation for interpreting and comparing existing maturity grids in later sections of this paper.

A. Procurement Process

The procurement process is a core component of supply chains and involves far more than just the procurement of materials. It is a complex, multi-stage process that requires strategic decisions within the entire supply chain (Kim *et al.*, 2005). The complexity of the process is demonstrated by the interaction of various stages such as supplier, manufacturer, and logistics (Kim *et al.*, 2005; Fleuren *et al.*, 2024; Waqar *et al.*, 2025). While the supplier's main focus is the adequate distribution of demand, the manufacturer's focus is the efficient production of products (Fleuren *et al.*, 2024; Kim *et al.*, 2005). The logistics forms the last step and ensures that products reach their destination on time (Fan *et al.*, 2023). Each of these phases brings its own challenges and adequate coordination is crucial for efficient and resilient procurement.

B. Sustainable Procurement

Sustainable procurement defines the integration of sustainability principles into the purchasing process mentioned above. It ensures that objectives such as environmental and social goals are considered throughout the entire procurement process (Wilhelm & Villena, 2021). It is important to highlight that with sustainable procurement companies do not only need to pay attention to their own sustainable practices but also need to ensure that their suppliers or other stakeholders integrated in the procurement process need to comply with the sustainable standards (Koberg & Longoni, 2018). Compared to the past, the focus is shifting towards sustainability instead of focusing only on economic aspects (Brandenburg *et al.*, 2013).

C. Key Drivers of Sustainable Procurement

According to Lee and Klassen (2008) a driver is defined as a factor that motivates companies to adopt sustainable practices in their procurement processes. The following section illustrates two key drivers that have emerged over the years in relation to sustainable procurement.

1) Triple bottom line

John Elkington introduced the concept of the Triple Bottom Line (TBL). With TBL, Elkington provided the foundation for measuring the company's success not only based on financial factors. It takes environmental as well as social impact into consideration (Wang *et al.*, 2024). TBL has become the central guiding principle for sustainable development and encourages companies to align their strategy in the following three dimensions (Meehan & Bryde, 2010):

Environmental: The first dimension of TBL is the environmental impact of a company. It shifts the focus to the protection of natural resources through conscious resource utilization, recycling, waste, and CO₂-reduction (Yun *et al.*, 2018). The stakeholders' expectation to implement environmentally friendly practices has been increasing over time (Quintana-García *et al.*, 2020).

Social: The second dimension measures a company's contribution to society including working conditions, equal opportunities as well as human rights (Yun *et al.*, 2018). Therefore, companies that take social sustainability into account are committed to fair working conditions, health, and safety measures for their employees (Shou *et al.*, 2019).

Economic: The last dimension of the TBL measures the company's financial performance such as profit and sales

growth (Shou *et al.*, 2019), operational efficiency or shareholder value (Yun *et al.*, 2018). Whereas the economic dimension also benefits from cost savings due to improved social and environmental standards, e.g., reduced packaging or lower health and safety costs resulting from improved working conditions (Carter & Easton, 2011).

Companies are integrating environmental and social aspects into their business models to drive sustainable development. However, effective sustainability practices need to extend beyond organizational level and involve the whole procurement process (Meehan & Bryde, 2010). Therefore, sustainable procurement plays a key role in this transformation since it needs to implement sustainable principles in each stage of the process (Meehan & Bryde, 2010) in order to meet the expected standards (Quintana-García *et al.*, 2020) to stay competitive (Wang *et al.*, 2024).

In academic research, many studies refer to the framework by Carter and Rogers (2008). It is a theoretical basis for sustainable supply chain and extends the TBL approach by strategic and operational factors such as risk management, strategy, organizational culture, and transparency which are crucial for the successful implementation (Carter & Rogers, 2008).

Although environmental aspects are often the primary focus of sustainability, it is important to highlight that economic and social dimensions require equal attention to create a genuinely sustainable business model (Meehan & Bryde, 2010).

2) Environmental, social and governance

In 2004 the United Nations (UN) introduced ESG, an acronym for Environmental, Social and Governance (United Nations Department of Public Information, 2004). ESG provides a practical framework for companies to report and transparently communicate their non-financial performance in the areas of environment, social responsibility, and corporate governance. The UN aims to encourage companies to pursue a more sustainable business strategy and to demonstrate more accountability to their stakeholders (Truant *et al.*, 2023). Despite the fact that ESG was introduced in 2004 the origin lies in the UN Global Compact, which was launched in 2000, initiating to encourage companies to implement universal principles of corporate sustainability (United Nations Department of Public Information, 2004). Since its introduction by the UN in 2004, "ESG has become the most widely accepted measure of firms' sustainability and governance" (Truant *et al.*, 2023, p. 1).

TBL and ESG both consider the dimensions Environmental and Social, but ESG does not consider the financial aspect. Instead, it includes the dimension Governance (Das, 2023). The following section will explain the three dimensions of ESG:

Environmental: This dimension deals with the company's efforts of protecting the environment such as adequate usage of resources or managing waste. Good environmental performance does not only reduce the company's environmental footprint but also promotes its reputation (Liu & Song, 2025).

Social: The second dimension refers to the company's contribution to society. The company offers benefits for employees or donates to charities. The named activities help

to build trust among stakeholders and improve the image (Liu & Song, 2025).

Governance: Liu and Song (2025) divide the governance dimension into two sectors. On one hand the external governance reviews the company's performance in market competition and legal environment while on the other hand the internal governance tries to reduce agency issues (Liu & Song, 2025).

The influence of ESG is also visible in sustainable procurement since companies increasingly need to take responsibility for their supply chains. According to Das (2023) studies show that companies with higher ESG rating achieve lower capital costs and a better company valuation. As a result, ESG is becoming a crucial factor in the procurement process and is crucial for companies with a sustainable procurement strategy. The European Union (EU) Directive 2022/2464 (CSRD) underlines the growing importance of ESG. Beginning in January 2024 large European companies are forced to report regularly on social and environmental impact to increase transparency and prevent greenwashing (Truant *et al.*, 2023). This increases the pressure to integrate sustainable and ethical practices into business strategy.

D. Current Trends and Practices in Sustainable Procurement

Sustainable procurement is constantly developing. It is characterized by various trends driven by external and internal factors. One key trend regarding ESG is the transparency in the supply chain (Truant *et al.*, 2023). Large companies are under pressure to publish their ESG data and integrate sustainable practices into their procurement strategies. This is being reinforced by regulatory requirements in various regions, especially the EU (Trahan & Jantz, 2023). The increasing number of regulatory requirements can be seen as another trend. Governments and international institutions are introducing stricter laws to improve corporate sustainability practices. As stated earlier, the EU takes a leading role by developing initiatives such as the ESG benchmark label. This initiative aims to improve transparency and prevent greenwashing. In the Asia-Pacific region ESG regulations are currently evolving rapidly in contrast to other regions (Trahan & Jantz, 2023).

Another trend is the increasing collaboration within the supply chain to promote environmental and social sustainability (Jo & Kwon, 2021). According to Jo and Kwon (2021) close cooperation with stakeholders, such as suppliers, is essential for the joint exchange of knowledge and technologies to improve sustainability standards in the procurement process.

Companies started to adopt frameworks, such as maturity grids, in order to improve the monitoring of their current practices especially focusing on sustainability (Wang *et al.*, 2024). Maturity grids are multi-level models that help companies to assess the current maturity level of sustainability and identify areas for improvement (Sari *et al.*, 2020). Additionally, certificates such as ISO 14001 or Eco Management and Audit Scheme (EMAS) serve as recognized standards for sustainable practices (Quintana-García *et al.*, 2020).

While sustainable procurement continues to evolve, regulatory frameworks and standardized sustainability

models are becoming essential drivers for integrating sustainability into procurement strategies.

E. Barriers to Implementation of a Maturity Grid

As outlined earlier, a key trend to improve corporate sustainability is the usage of maturity grids. While maturity grids provide helpful guidance, their implementation faces several barriers and challenges.

The first internal barrier is the motivation of employees. Without their active commitment sustainability often remains a formal requirement without being deeply integrated in the company's process. In addition, often a lack of the necessary collaboration between internal and external stakeholders is the reason that values and data are not being shared efficiently (Meehan & Bryde, 2010). Therefore, the commitment of employees as well as the collaboration between companies are crucial for the successful implementation and assurance of sustainability (Jo & Kwon, 2021).

On the other hand, if employees maintain a strong collaboration with external stakeholders the issue of greenwashing might arise. According to Walker *et al.* (2012) people tend to give a more positive impression of their company in order to be "perceived in a socially acceptable way with regard to sustainability" (Walker *et al.*, 2012, p. 202). This can hinder real progress in sustainable procurement.

The lack of transparency in the supply chain is another major issue. The required transparency that comes with ESG depends on many factors such as the quality of the data, corporate culture, and monitoring processes (Truant *et al.*, 2023). Concerning this, information asymmetry could be a result of the lack of control of individual actors in the procurement process (Das, 2023). Regulatory differences between regions also complicate the implementation of sustainable procurement and information access. Compared to the European Union other regions have less mandatory and well-developed requirements (Trahan & Jantz, 2023). Especially in emerging markets there is a lack of national regulations to hold suppliers to their responsibilities. As a result, many companies do not take independent responsibility for their supply chains. This is problematic in multi-tier supply chains where buyers have no information or direct influence on suppliers in lower tiers of the supply chain (Wilhelm & Villena, 2021).

Another barrier is the uneven adoption of sustainable procurement practices across sectors. While some sectors have already implemented sustainability practices, others are behind. Moreover, complexity and cultural change are other key barriers that prevent companies from fully integrating sustainable procurement (Wang *et al.*, 2024).

The most important and common barrier is the lack of resources, especially the financial resources. Sustainable practices often require high investment costs. Small and medium-sized companies prefer to use the financial capital for operational needs instead of sustainable practices. To improve sustainable knowledge, it requires training employees, which leads to additional costs (Jaramillo *et al.*, 2018).

To overcome these barriers, companies need to consider sustainable procurement as an integral part of their corporate strategy.

IV. RESULT AND DISCUSSION

While drivers and trends are factors that motivate sustainable procurement, enablers can be used to fulfil the goal and implement sustainability into the procurement process (Lee & Klassen, 2008). As previously stated, one of the trends is frameworks such as maturity grids which can be used as enablers to track the current level of sustainability and to improve it. In this section existing maturity grids will be critically analyzed.

A. Analysis Approach and Coding Framework

To systematically analyze existing maturity grids, a coding framework is constructed that takes the dimensions of TBL and ESG into account. This framework serves as the basis for evaluating the extent to which each model incorporates relevant sustainability aspects.

The identification of relevant maturity grids was conducted using the structured literature search approach outlined in Section II.A. The selected journals were peer reviewed based on the VHB Jourqual 3-Rating. Furthermore, the maturity grids were analyzed if they address economic,

environmental, social and governance aspects or any other combination.

The identified maturity grids will be documented in a table that contains basic information such as author, published journal and levels of maturity. Another table presents the coding framework, which systematically categorizes the relevant dimensions.

In addition, a radar chart is created to visually illustrate the sustainability dimensions covered by the maturity grids. This dual representation, tabular and visual, aims to support a more structured and insightful analysis as well as discussion of strengths and gaps in sustainability maturity grids. Furthermore, each maturity grid is examined in detail to provide a comprehensive understanding of its structure and key dimensions.

B. Overview of Maturity Grids

Table II shows the identified maturity grids after the peer reviewing based on the VHB Jourqual 3-Rating. 64% of the maturity grids use a 5-Level-Grid. The other maturity grids use either a 3-, 4- or 6-Level-Grid.

TABLE II. OVERVIEW MATURITY GRIDS

Author	Journal	Levels
Sari <i>et al.</i> (2020)	International Journal of Productivity and Performance Management	3
De Almeida Santos <i>et al.</i> (2020)	Sustainability	5
Reefke & Sundaram (2018)	Decision Support Systems	6
Allais <i>et al.</i> (2016)	Journal of Cleaner Production	5
Baumgartner & Ebner (2010)	Sustainable Development	4
Veleva & Ellenbecker (2001)	Journal of Cleaner Production	5
Liu <i>et al.</i> (2018)	Sustainability	5
Bvuchete <i>et al.</i> (2021)	Sustainability	5
Xavier <i>et al.</i> (2020)	Sustainability	5
Okongwu <i>et al.</i> (2013)	International Journal of Productivity and Performance Management	5
Amini & Bienstock (2014)	Sustainability	4

C. Results

Table III provides an overview of the categorization by the dimensions Economic, Environmental, Social and Governance of each identified maturity grid. This table presents the coding framework that forms the basis for the systematic analysis. The maturity grid by Reefke and

Sundaram (2018) does not distinguish between the mentioned dimensions but sees sustainability as one factor and does not provide specific aspects which can be categorized. Therefore, the following statistics exclude the maturity grid by Reefke and Sundaram (2018).

TABLE III. MATURITY GRIDS CATEGORIZED BY DIMENSIONS

Author	Economic	Environmental	Social	Governance
Sari <i>et al.</i> (2020)	√	√	√	√
De Almeida Santos <i>et al.</i> (2020)	√	√	√	
Reefke & Sundaram (2018)				
Allais <i>et al.</i> (2016)		√	√	√
Baumgartner & Ebner (2010)	√	√	√	
Veleva & Ellenbecker (2001)	√	√	√	
Liu <i>et al.</i> (2018)	√	√	√	
Bvuchete <i>et al.</i> (2021)			√	
Xavier <i>et al.</i> (2020)		√	√	
Okongwu <i>et al.</i> (2013)	√	√	√	√
Amini & Bienstock (2014)	√	√	√	√

Based on Table III, it can be observed that every identified maturity grid includes the dimension Social while only 40% address Governance. The second most used dimension is Environmental. 90% of the maturity grids are taking this dimension into consideration. With 20% less compared to the Environmental dimension 70% of the maturity grids include the Economic dimension. Fig. 1 illustrates the distribution to highlight the fact that Social

and Environmental are the most frequently included dimensions.

Overall, the maturity grids provided by Sari *et al.* (2020), Okongwu *et al.* (2013) and Amini and Bienstock (2014) cover all four dimensions. The maturity grids presented by De Almeida Santos *et al.* (2020), Baumgartner and Ebner (2010), Veleva and Ellenbecker (2001) and Liu *et al.* (2018) address all dimensions of the TBL. Allais *et al.* (2016) cover all dimensions of ESG. In contrast, the maturity grid

by Xavier *et al.* (2020) includes only the Environmental and Social dimensions while the maturity grid by Bvuchete *et al.* (2021) focuses solely on the social dimension. Based on this overview, the following section will examine each grid in more detail.



Fig. 1. Distribution of economic, environmental, social and governance.

Sari *et al.* (2020) divide the maturity grid into three dimensions corporate sustainability driver, corporate sustainability action, and corporate sustainability performance. In the last dimension, the factors of TBL are being used as Key Performance Indicators (KPI). Hereby, the economic, social, and environmental benefits are being measured as one criterion and are not listed separately. Governance, on the other hand, will be evaluated separately in the dimension corporate sustainability driver. Sari *et al.* (2020) determine relevant indicators for each dimension and therefore some indicators of the second-dimension corporate sustainability action also involve economic and social criteria such as energy consumptions or donations to the community.

De Almeida Santos *et al.* (2020) provide a 5-Level Maturity Grid. Each level includes the factors of TBL. In addition to the environmental, social, and economic aspects De Almeida Santos *et al.* (2020) evaluate the cross-cutting aspects of sustainability.

Reefke and Sundaram (2018) use sustainability as a maturity measure. Unlike the other maturity grids this maturity grid focuses on the systematic integration of sustainability as one aggregated dimension into supply chain processes.

Allais *et al.* (2016) primarily focus on governance within the maturity grid. While governance remains the central aspect, social and environmental factors are also incorporated into the framework as sub-aspects. The maturity grid has four dimensions with social and environmental aspects being considered separately but in relation to governance.

Baumgartner and Ebner (2010) present three separate maturity grids. Each addressing economic, social, and environmental aspects. Particular attention should be given to the economic maturity grid as it has a separate dimension for purchasing. The purchasing dimension includes assessment based on social and environmental aspects. While the economic maturity grid integrates social and

environmental aspects, the other two grids independently define sustainability within their dimension in a more detailed way.

Veleva and Ellenbecker (2001) include all dimensions of the TBL. While Environmental, Economic and Social are a separate dimension the dimension Energy and material use could be associated with Environmental and the dimension Workers with the Social dimension. It is remarkable that the maturity grid determines the level measuring specific KPI such as the ecotoxicity metric or the worker's health in comparison to other companies within the same industry.

Compared to Baumgartner and Ebner (2010), Liu *et al.* (2018) have a separate dimension for the procurement as well. While Baumgartner and Ebner (2010) consider sustainability aspects in the purchasing dimension, Liu *et al.* (2018) focus on the procurement process not considering sustainability. Sustainability is measured in another dimension called Corporate Social Responsibility (CSR). The CSR dimension is divided into subcategories which address environmental, social, and economic aspects.

Bvuchete *et al.* (2021) provide the only maturity grid that addresses one relevant dimension. Within the Human resources dimension social aspects in the supply chain can be evaluated. The maturity grid offers an overview of the supply chain showing in which stages, from manufacturing to the end receiver, these aspects are relevant.

Xavier *et al.* (2020) outline a maturity grid that primarily focuses on eco-innovation. Nevertheless, the maturity grid includes environmental and social aspects. It aims to encourage partners and other stakeholders to promote especially raising the ethical, social as well as environmental awareness.

Okongwu *et al.* (2013) present a maturity grid which addresses all four dimensions. The maturity level of the Economic dimension is being determined by given KPIs such as the percentage of the company's net profit compared to the turnover. Similarly, the Governance level is measured using KPIs based on ISO standards. However, the other dimensions do not have specific KPIs which can be counted or calculated but are more describing. Okongwu *et al.* (2013) also provide an improved version for the dimension Governance and Social.

Like the maturity grid by Sari *et al.* (2020), Amini & Bienstock (2014) provide a maturity grid that considers the aspects of the TBL as an aggregated dimension with Governance viewed separately. However, Amini & Bienstock (2014) assess the levels differently. The first maturity level contains only economic sustainability, the second adds ecological-environmental sustainability to it and the two highest levels integrate all three aspects of the TBL.

Building on the findings outlined in this section, the following discussion will analyze the key findings and identify potential areas for further research.

D. Discussion

The discussion critically examines the findings by analyzing the existing maturity grids. This section aims to identify key gaps and areas for improvement offering insights into how the procurement process can be better evaluated.

A particularly key component to determine the level of maturity are measurable KPIs. Measurable KPIs are more beneficial than descriptive terms because they provide

concrete data-driven values that make it easier to determine the adequate maturity level (Veleva & Ellenbecker, 2001). Unlike subjective classifications, which often lack consistency and comparability, precise defined KPIs enable companies to track progress over time and to identify specific areas for improvement. An illustrative example are the grids by Veleva and Ellenbecker (2001) and Okongwu *et al.* (2013). Both maturity grids use defined KPIs such as percentage of suppliers receiving safety training or ecotoxicity metric, allowing companies to objectively track their sustainability performance. In contrast, the remaining grids use descriptive terms such as “undefined” to “extreme strong” (Liu *et al.*, 2018). These subjective terms lack precision and make the KPIs less comparable. As a result, it becomes difficult to objectively evaluate a company’s sustainability performance, especially with increasing regulatory pressures. Without clear and measurable data, companies may also find it challenging to meet the regulatory requirements. Moreover, the determination of the adequate maturity level depends on the subjective perception of the evaluator. Companies may have room to interpret their sustainability performance more favorably than it is. This subjectivity creates an opportunity for greenwashing as organizations might strategically position themselves at a higher maturity level. Hence, a key advantage is the usage of defined KPIs to avoid greenwashing and set measurable goals, such as percentual reduction or increase, to improve sustainability performance.

Furthermore, the clear separation of the sustainability dimensions is another crucial factor for accurate evaluation. The maturity grid by De Almeida Santos *et al.* (2020) does not separate each dimension per level but aggregates Environmental, Social and Economic together as one dimension. Likewise, other grids such as those by Sari *et al.* (2020) and Amini & Bienstock (2014), which consider all four dimensions, tend to aggregate the economic, environmental, and social aspects into one dimension while evaluating the governance aspect separately as another dimension. However, treating sustainability as a unified category without distinguishing between the individual dimensions can lead to misleading evaluation of the maturity level. This approach makes it difficult to rigorously evaluate each dimension independently since some dimensions can be outweighed by the other dimensions. For example, a company might achieve outstanding performance in Economic but shows low Environmental awareness. Hence, the adequate determination of the maturity level becomes challenging as it is difficult to prioritize the dimensions when their maturity levels differ. This unequal distribution of maturity levels across the aggregated sustainability dimension results in an inaccurate evaluation, which fails to reflect the true strengths and weaknesses of a company’s sustainability performance. Companies may falsely appear to be more sustainable than they are, which could result in poor decision-making. Nevertheless, a few maturity grids such as the grid by Baumgartner and Ebner (2010) distinguish between the dimensions and provide sub-criteria to evaluate the various aspects within in the dimension itself.

Considering the literature search strategy mentioned in the second section, it can be concluded that none of the maturity grids consider the entire procurement process as well as every sustainability dimension. Instead, they tend to address sustainability in procurement only at a higher level

or address one dimension (Bvuchete *et al.*, 2021). This represents a significant research gap as there is a lack of effectively measuring the sustainability performance of individual procurement activities. A key limitation of the existing maturity grids is their inability to capture the complexity of the procurement process as mentioned in the third section. The maturity grids provide a superficial overview of the sustainable procurement process and do not consider the different procurement stages. For instance, a supplier could achieve less satisfying sustainable performance while the manufacturer provides outstanding performance. These nuances are overlooked by the existing grids, which have difficulty providing an accurate evaluation of each stage within the procurement process. Especially, with the increasing regulatory requirements and transparency it is necessary to evaluate the stages of the procurement process separately (Trahan & Jantz, 2023). Improved transparency throughout the procurement process would enable companies to make more informed decisions when selecting suppliers and sourcing sustainably. Furthermore, companies could identify which stage of the procurement process needs to be improved.

While the existing maturity grids each have their strengths, they also show significant limitations when it comes to evaluating the sustainability performance of the procurement process in detail. Some grids offer clear and well-defined KPIs, which can be useful for tracking process, while others provide a more generalized subjective approach. The absence of a clear distinction between the procurement stages and covering all sustainability dimensions makes it challenging to accurately evaluate a company’s sustainability maturity.

Overall, KPI-based maturity grids provide a more objective classification of sustainability performance compared to predominantly descriptive models. In addition, grids that separate sustainability dimensions allow a more precise assessment than aggregated approaches. However, most existing grids do not explicitly reflect procurement stages, limiting their practical applicability within procurement processes.

In light of these findings, an effective sustainability maturity grid for procurement should clearly differentiate sustainability dimensions, include measurable KPIs, and explicitly integrate procurement stages.

V. CONCLUSION

The concluding section synthesizes the main insights gained from the literature review on sustainability maturity grids within the procurement process. It summarizes the key findings that highlight current gaps in existing grids. Furthermore, it discusses how these findings can inform future research directions. By clearly outlining the areas for improvement, this section provides a foundation for advancing maturity grid frameworks to better support companies in achieving sustainable procurement goals.

A. Summary of Key Findings

This literature review has identified areas for improvement in current sustainability maturity grids. There is a clear need for more measurable KPIs. The lack of a precise and well-defined KPI hinders the adequate classification between the maturity levels.

Furthermore, another improvement point is the clear distinction between the dimensions. Like the first key

finding, a clear separation between the dimensions is more beneficial to adequately classify the maturity level. Rather than aggregating diverse aspects into a single category, a clear separation enables a more detailed maturity assessment. In this regard, companies have the opportunity to identify areas for improvement more quickly as well as in greater detail and the ability to develop a more targeted and effective improvement strategy.

Since the purpose of this paper was to analyze existing sustainability maturity grids in the procurement process, it is evident that most maturity grids do not cover the entire procurement process. While many frameworks address procurement only at a superficial level, they often neglect the integration of all relevant stages.

In summary, the key findings emphasize the need for more precise KPIs, clearer separation of sustainability dimensions as well as a more comprehensive approach to the procurement process. By addressing these gaps, maturity grids would allow organizations to easily identify areas for improvement and make more informed decisions, thereby supporting the prioritization of actions and promoting more effective and targeted sustainability strategies. It would enable companies to achieve greater transparency, comparability, and precision in assessing their procurement strategies. Companies would benefit from more strategic decision-making, allowing them to proactively address sustainability challenges while continuously improving their procurement process.

While this paper does not yet present a finalized maturity grid, it provides essential insights that will guide the development of a sustainability maturity grid.

B. Implication for Future Research

Future research should focus on developing a more detailed maturity grid that addresses the various stages of procurement while ensuring all four dimensions of sustainability. Current maturity grids provide a superficial overview but as procurement processes become increasingly complex, especially with the rise of global supply chains, there is a need for more detailed maturity grids.

Additionally, integrating both qualitative and quantitative KPIs would result in a more accurate analysis of sustainable procurement. By integrating clear KPIs with a detailed breakdown of the procurement stages, researchers could develop maturity grids that align with the complexity of the procurement process. This approach would allow for more targeted improvements in sustainability performance. Furthermore, it would enable more effective decision-making.

Finally, as global sustainability regulations increase, researchers should focus on developing adaptive maturity grids that evolve with regulatory changes. Flexible grids will help companies to stay ahead of governance demands and continuously improve sustainability performance.

By addressing these research gaps, future maturity grids will enable companies to gain a deeper understanding of their procurement processes, especially with the focus on sustainability.

The follow-up paper will build on these findings by developing a procurement-specific sustainability maturity grid with clearly separated sustainability dimensions and defined KPIs. The grid will also consider key procurement stages to enable a more structured and practice-oriented assessment.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

AUTHOR CONTRIBUTIONS

TG conceptualized the study, conducted the empirical research, collected and analyzed the data, and drafted the initial version of the manuscript. WW supervised the research project, contributed to the refinement of the research design and methodology, supported the interpretation of results, and substantially revised, edited, and optimized the manuscript for publication. Both authors contributed to the development of the argumentation, approved the last version of the manuscript, and agreed to be accountable for all aspects of the work. All authors had approved the final version.

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