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Developing a Sustainable Procurement Performance Index based on ISO 20400 Standard: A Structural Equation Modelling Approach

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ABSTRACT

Objective: The environmental and social concerns have increased the interest toward sustainable practices. Within this context, organizations aim to make responsible purchasing decisions for a sustainable procurement (SP). However, there is a pressuring need for a measurement index that testify the efficiency of the adopted strategies. To fill this gap, this paper aims to develop an assessment tool of the sustainable procurement performance (SPP) based on the ISO 20400 standard seven main subjects.

Methods: Structural equation modeling (SEM) is employed to characterize the different causal relationships among the sustainable procurement's components. The SEM resolution is performed by the partial least squares (PLS) approach.

Results: The proposed model measures the effectiveness of the procurement process. It stresses the role of stockholder's engagement and commitment in ensuring the adoption of sustainable practices.

Conclusion: This study provides valuables insights for managers and scholars in term of assessing practices sustainability and contributing to the theoretical discourse. Future research may validate the proposed index in various industries.

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1. Introduction

A rising awareness of environmental and social concerns has sparked the interest of organizations and social communities (Echefaj et al., 2024). In this sitting, the importance of organizations' activities, actions and relationships has become prominent, particularly the role of procurement function. As a result, SP has emerged as a crucial approach to align organizations' decisions and operations with the triple bottom line of sustainability (TBM) (Lau et al., 2023). In addition to the economic viability, SP seeks to reduce the environmental impacts and promote the social performance (Waris et al., 2019). This requires the engagement of the pair service receiver (customer) and provider (undertaker) to adopt practices that prioritize sustainability and enhance supply chain performance (Kabra et al., 2023; Walker et al., 2008).

SP is gaining growing importance in scholarly discussions as researchers acknowledge the role of procurement to address the environmental and social issues in the global SC (Aroonsrimorakot and Laiphrakpam, 2024). Additionally, the increasing public awareness regarding environmental threats and social disparities has prompted organizations to enhance their responsibility (Echefaj et al., 2023). Procurement specialists have reshaped their sourcing process to acquire products and services that meet the economic and environmental goals (Sarkis et al., 2017; Pagell and Shevchenko, 2014; Kaye et al., 2012). To do so, Boruchowitch et al., (2022) indicate that the procurement procedure requires being compliant with a set of rules and stakeholders' perspectives. Sustainability measurement researches stress the role of stakeholders in the design, the implementation and the employment of assessment tools (Mura et al., 2018).

The international Organization for Standardization (ISO) released the standard ISO 20400 in 2017 (ISO 20400, 2017). It introduces the main directions and guidelines for SP practices, in order to promote the sustainability of SC management. The guidance builds a framework and defines an approach for the procurement of goods and services that contribute to sustainable development, considering the consequences to the environment, society, ethics and economy.

Even with the considerable attention this topic has received, organizations struggle to assess the sustainability of their operations. Evaluating without standard metrics leads to inconsistent results and hinders the company's progress as they cannot compare the effectiveness of their operations. Literature suggests that there is a need to develop more balanced, comprehensive and applicable assessment tools (Madanchi et al., 2019; Moldavska and Welo., 2015). Within this context, this paper aims to develop an SPP Index based on the seven main questions described in the standard ISO 20400. A SEM using PLS approach is employed to construct a performance index according to the evaluation of seven core dimensions: Organizational Governance index (OG), Human Rights index (HR), Labor Practices index (LP), the Environment index (E), Fair Operating Practices index (FOP), Consumer Issues index (CI), and Community Involvement and Development index (CID).

The main contributions of this paper are:

- Developing an index to assess the economic, social and environmental performance of the procurement process using the ISO 20400 standard.
- Proposing a methodology based on a statistical approach to develop the assessment tool.

The remainder of this paper is as follows. Section 2 presents the theoretical background associated with SP, stakeholders' theory, ISO20400 standard and SEM. Section 3 presents the SP performance index model. Section 4 discusses the model and provides the theoretical and practical implications. Section 5 summarizes the paper and proposes directions for future research.

2. Theoretical background

2.1 Sustainable Procurement

Sustainability is a straightforward design to state: "responding to the requirements of the present-day no strings attached the ability of next generation to respond to their own requirements" (Sustainable Development Knowledge Platform or WCED). SP refers to contracting, purchasing, and SC management best practices in the framework of sustainability (Walker et al., 2013).

Procurement is progressively becoming a crucial role and an important part in companies (Islam et al., 2018). As a process, it is ideally positioned to play a pivotal role in achieving sustainability objectives (Wang et al., 2021). Although the SP is not a novel concept, the actions are still in their infancy. However, it has been getting an increasing amount of attention and review, at both the national and international levels.

From an operational point of view, the review of the literature on SP has its origins in the sustainable SC management, which historically geared towards reprocessing and retraining, reducing costs and minimizing waste (Carter and Dresner, (2021); Min and Galle., 1997). In its theoretical and philosophic foundations, SP is a section of a wider management and governance operation, nationally and internationally, endeavoring to formalize and standardize practices, procedures and perceptions, which at the same time pressure cognizance of society's environmental liabilities (Walker and Phillips, (2008); Williams-Elegbe, 2016). Walker and Brammer (2012) stated that SP needs to be conceptually formed and accepted within a three-dimensional structure: social, environmental and economic; whereas with regard to specified points: individuals, organizational/institutional, purchaser-supplier dyad, supply chain/network and macro social (marketplace, society, stakeholders, NGOs).

SP and SC management best practices have been constantly correlating with several strategic advantages in particular positive environmental results, favorable social quality changes, reinforced public insights, expenses decrease, improved business competition and enhanced organizational realization (Prier et al., (2016); Brammer and Walker, (2011); Deininger and Byerlee (2011); Sonnino (2009); Porter and Kramer, (2006); Fiksel et al., (2004); Roberts (2003). A significant advantage frequently associated with the environmental-aware purchase is that the aspects of legitimation, regulatory frameworks and organizational arrangements are more likely viewed as legitimate if the organization is perceived as socially responsible (Preuss, 2009). Yet, although performance advantages are frequently brought up in unplanned conversations, there is indeed very limited experimental proof in this context (Zhu et al., 2005). Consequently, it must be shed to light that SP literature often suffers from an excessively optimistic alignment in presenting SP as nearly ensured 'win-win'. The reality of SP is often less developed than the depiction found in the literature. Table 1 provides an overview of the recent works related to the SP.

2.2 Stakeholder Theory

Stakeholders are defined as those who possess a controlling interest in the company or institution, including personnel and staff, managing directors and leaders, customers and providers, and possessors and societies (Williamson, 1984). In addition, within this framework, there should be a clear distinction between those who cooperate with the company/institution (personnel/staff, consumers, providers etc.) and those who share the risks (the proprietors).

The Stakeholder theory (Freeman et al., 2010) is a governing theory that highlights the relationships between proprietors (business partners), identified as the shareholders, and the controlling actors known as the managing directors (Williamson, 1984). Nevertheless, the determinants of the acts/operations are driven by the stakeholders and their interests, rather than solely by these two parties, as seen in other models like Agency theory. It has been noticed that the main motive leading the evolution of sustainability requires the stakeholder actions and efforts (Islam and Kokubu, 2018).

Table1. The recent works related to SP

Reference	Focus	Main findings
Van tam, 2025	Investigate the critical success factors for a SP in the construction sector	A strong importance of the government commitment. The public sector prioritizes the integration of sustainable technologies The private sector stresses the role of education and training
Arsalan et Can, 2025	Examine the effect of procurement policies in the context of sustainability	The differentiation strategies improve performance The long –term planning is crucial for sustainable performance
Fathy, 2025	Analyse the links between economic, environmental and social performance to assess procurement alternatives	Economic viability and an improved social and environmental performance lead to informed decision making
Omwange, 2025	Investigate the impact of SP on the state of corporations	supplier sustainability evaluation, sustainable contract management, and sustainable information technology infrastructure have a positive impact on organizational performance
Celestin and Kumar, 2024	Explore the state of SP in the Southern African Development Community mining industry	10% reduction in available mineral reserves, 20% increase in pollution incidents, and 15% rise in labor grievances. Weak regulatory enforcement and a lack of transparency The importance of strategic partnerships
Opoku-Mensah et al., 2024	Examines the challenges of SP through a qualitative lens, focusing on Principal-Agent and Stakeholder theories.	5 main challenges of SP: economic, political, bureaucratic, legal, and technical challenges. Conflicting interests among certain stakeholders and dysfunctional principal-agent relationships hinder the adoption of SP practices.
Aroonsrimorakot and Laiphrakpam (2024)	Discuss the definitions and importance of SP, development and process of ISO 20400 standard and the challenges and recommendations.	ISO 20400 is crucial as it offers guidelines for incorporating sustainability issues into procurement process. The challenges: costs, insufficient management support, the complexities of sustainability labels, marks and certifications.
Adebayo et al., (2024)	examines the interplay of compliance (Guided by regulations such as ISO20400), ethics (e.g., transparency), and cost-effectiveness in SP.	A balance of the three elements builds trust among stakeholders, improves brand reputation, and ensures long-term operational efficiency.
Lau et al., (2023)	Develop an index for reporting SP practices using recognised ethical norms and standard	Notable differences in disclosure, with fewer than 20% of the examined companies reporting 80% or more of the 33 indicators that make up the disclosure index. Companies are more likely to disclose information related to governance and environmental aspects, while they tend to provide less information on economic and social dimensions.
Agyekum et al., 2023	Explore the barriers to stakeholders' engagement in SP.	Three clusters of barriers: organisational structures and knowledge driven factors (1), attitudinal and stakeholder fatigue (2) and relational and information sharing processes (3).
This study	Develop an assessment tool of the SPP based on the ISO 20400 standard's seven main subjects.	Sustainability factors are interconnected. The results stress the role of stakeholder in promoting sustainable practices

2.3 ISO 20400 SP

The international standard ISO 20400 is the latest global norm on SP. Sustainability is known as an appropriate subject in relation to the daily actions of entire businesses/institutions. Furthermore, throughout their operational lifespan, companies/institutions are employing their procurement procedures for the delivery of goods and/or services such as facilities management (FM) services. Therefore, they may need to collaborate with external suppliers that have an extensive influence on their efficiency/performance. Implementing SP ensures that both the consumer and suppliers have ethical behavior and adhere to fair operating practices and responsible actions. This incorporates compliance with regulations, institutional management, social and environmental effects, fostering a positive work environment, managing risks, etc. The approach can lead to numerous advantages in several sectors, as presented in the ISO 20400 (ISO 20400, 2017):

- Prohibition from economic/financial risk and reputation and its damage;
- Respect for the legislation during the entire supply chain;
- Enhancement of workplace wellness;
- increased productivity of employees;
- Growth in economic value added (EVA);
- Enhancement in communication effectiveness among consumer/s and supplier/s;
- Strengthen of clarity in information managerial practices;
- Facilitate, support and encouragement of innovation;
- etc.

Certainly, the SP practices enable companies/institutions to strengthen their decision-making, through aligning the necessities of the companies/institutions with sustainability concerns (e.g. the requirements of the organization and the environment, goods sustainability, economic features, etc.). Consequently, by giving guidance and main directions regarding the incorporation of sustainability into procurement procedures, the new standard ISO 20400 helps companies/institutions in designing and applying sustainability practices and strategies in the global SC. The process of services procurement, proposed by the standard ISO 20400, clearly signifies an innovation for the existing procurement practices of organizations, comprising companies/institutions that need outsourcing FM services. The standard ISO 20400 presents an outline and a review of the SP, defining the principles and standards, main subjects/topics, and determining factors. The ISO 20400 indicates that the SP relies on several elements, which are (ISO 20400, 2017):

- Responsibility;
- Clarity and translucence;
- Ethics-related and ethical conduct;
- All the chances and equitable opportunity;
- Respecting stakeholder benefits and values;
- Compliance with the legislation and international norm and standard relating behaviour;
- Respecting human rights (HR);
- Creative solutions;
- Concentrate on requirements;
- Integration;
- Costs analysis;
- Continuous improvement.

To assist institutions/companies implementing SP, ISO 20400 identifies seven key topics and outlines 37 corporate social responsibility (CSR) aspects, each of which is associated with a topic. It provides the procurement managers with several actionable recommendations to promote SP practices related to every aspect of CSR (Table 2).

Table 2. ISO 20400 sustainability concerns and available procurement actions

Main subjects	Sustainability concerns	Numbers of actions for SP
OG	Decision-making procedures and frameworks	5
HR	Due diligence	12
	HR risk cases	
	Avoiding complicity	
	Resolve complaints	
	Discrimination and vulnerable cohorts	
	Civil and political rights	
	Economic, social and cultural rights	
	Essential rules and rights at work	
LP	Employment relations	5
	Employment environment and social insurance and security	
	Social concertation	5
	Occupational health and safety	
	Training and development of human resources	
E	Pollution prevention at the workplace	10
	Sustainable resource use	
	Mitigation and resilience of climate change	
	Environmental protection, biodiversity and habitat restoration	
FOP	Combat corruption	11
	Responsible political involvement	
	Equal competitive conditions	
	Boosting social responsibility in the value chains	
	Respecting rights of ownership	
CI	Unbiased marketing, real and fair data, and unbiased contractual practices	7
	Protecting health and safety of customers	
	Consumer durable	
	Customer service, support, complaining and settlement of disputes	
	Customer data protection and privacy	
	Admission to indispensable services	
	Promoting education and awareness	
CID	Community participation	16
	Education and culture	
	Employment generation and professional development	
	Technology development and access	
	Wealth and earnings creation	
	Health	
	Socially responsible investing	

2.4 STRUCTURAL EQUATION MODELING (SEM)

SEM is a statistical method and a standard scheme for fitting and testing hypotheses about relationships amongst noted (manifest) and latent variables. It mixes characteristics of factor analysis and multiple regressions for examining the pair of the measurement and the structural features of theoretical models (Deininger and Byerlee, 2011). This approach is strictly interpreted by two groups of linear equations. The first set is named the inner model and the second set is the outer model. The inner model identifies the connections among latent variables (LVs), whereas the outer model specifies the connections among LVs and their related manifest variables (MVs). The term SEM is used to mention to both the structural and measurement model (Figure 1).

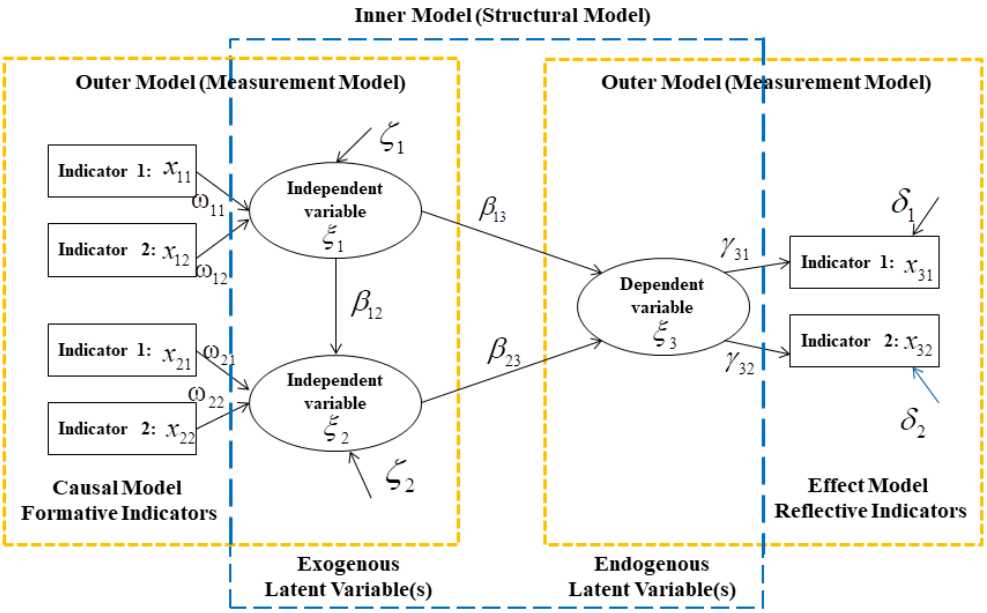

Figure 1. The structural equation model

The differentiation between reflective and formative measures can be realized by making a comparison of their respective measurement models. Figure 1 represents the formative measurement model, where ξ_1 describes the structure of interest whereas x_{11} and x_{12} are formative measures of the structure. The coefficients w_{11} and w_{12} designate the weights of the effects of x_{11} and x_{12} on ξ_1, and the residual term ζ_1 is occupied to denote features of ξ_1 not described by x_{11} and x_{12}. Sporadically, ξ_1 is eliminated from formative measurement models, in which situation the LV ξ_1 is an accurate weighted linear complex of its measurements.

Figure 1 reveals that x_{11} and x_{12} easily correlate, such that the relations amongst formative measures are absorbed by their mutual relationships, not by the paths connecting the measurements to the structure.

Reflective measures are addressed as results of structures. A reflective measurement model is given in Figure 1, in which ξ_3 presents a LV signifying the structure of interest while x_{31} and x_{32} are reflective measures of the structure. The $\delta_{31}$and δ_{32} are uniqueness related with the reflective measures and join item particularity with random measurement error, whereas the loadings γ_{31} and γ_{32} represent the magnitude of the effects of ξ_3 on x_{31} and x_{32}.

Structural model reveals the diverse causative relationships among LVs over structural factors β_{13}, β_{12} and β_{23}; (β_{12}signifies the relation between ξ_1 and ξ_3).

Formative and reflective measurement models may as well be differentiated based on the equations implicit by every model. A formative measurement model matches to the next equation:

$$\xi_1 = \sum_{i=1}^{2} w_{1i} x_{1i} + \zeta_1 \quad (1)$$

Where x_{1i} is a formative measure, ξ_1 is its related structure, w_{1i} is the effect of x_{1i} on ξ_1, and ζ_1 is the residual (i varies from 1 to 2 for the model in Figure 1), which is occupied as that part of ξ_1 not described by the x_{1i} .

In contrast, a reflective measurement model is provided by the next equation

$$x_{3i} = \gamma_{31} \xi_3 + \delta_{3i} \quad (2)$$

Where x_{3i} is a reflective measure, ξ_3 is the structure of interest, γ_{31} is the effect of ξ_3 onx_{3i}, and δ_{3i} is the uniqueness of the measure.

Inner model is well-defined by linear equations relating the LVs among them. For endogenous LV ξ_3, we have:

$$\xi_3 = \sum_{i}^{2} \beta_{3i} \xi_i + \zeta_3 \quad (3)$$

3. SP PERFORMANCE INDEX (S2PI) MODEL

Under all these considerations, the purpose of this study is to propose a S2PI as a comprehensive assessment tool that stakeholders can employ to evaluate an organization's commitments to the seven key CSR topics. The approach applies SEM to examine the planned causal relationships between these seven main subjects and the S2PI model.

The details of our proposed model are described along as follows:

- Every main subject is a LV interrelated with the different LVs
- Every main subject, but unnecessarily every field of action (issue), has a particular degree of significance
- Every LV is elucidated by a group of MVs (measurement items) that are assessed by a questionnaire designed (procurement actions) for a demonstrative sample of stakeholders.
- Based on ISO 20400 guidelines, even though all the main subjects (LVs) are interconnected and matching, the OG has the distinctive feature of being jointly a main subject on which an organization have to work and a manner of growing the organization's capability to perform in a socially responsible method with respect to the other main subjects. As a consequence, the S2PI model based on a SEM approach can be described by Figure 2.

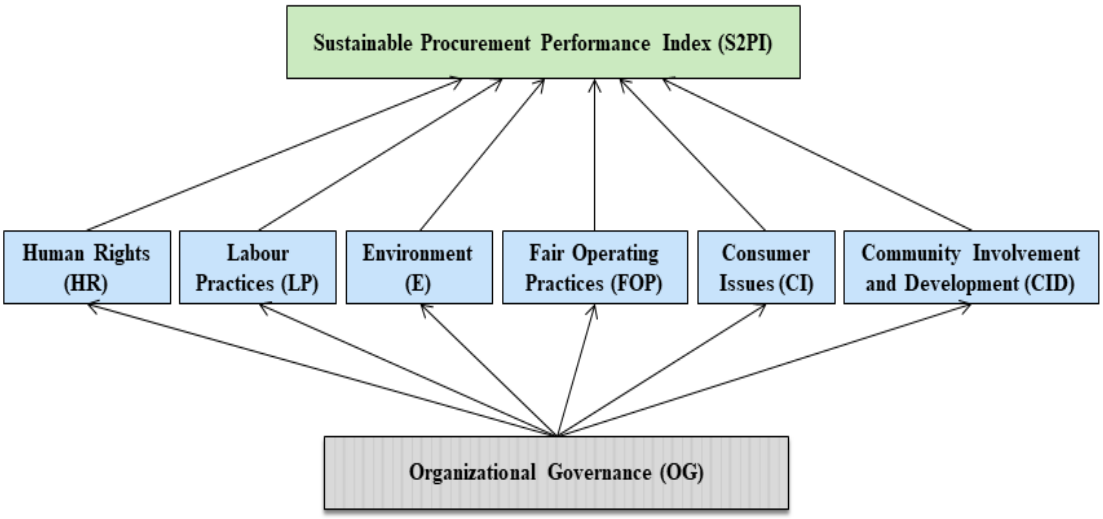

Figure 2. Causality model describing causes of S2PI

3.1 Methodology

As illustrated in Figure 3, all MVs are important to assess SP performance index (S2PI) and they are an elementary input of the SEM model. In addition, they are deemed as indices and measures of the LVs. Accurately, the MVs are the outcomes designated by the interviewees as part of the questionnaire conducted. Furthermore, we consider the following regular statistical hypotheses according to SEM:

- All MVs are independent
- Sampling interviewees is random and illustrative
- The minimum sample size desired is given among 40 and 120.
- Having linear associations or relations (Multiple linear Regression MLR)
- referring to statistical methods and models (multivariate Normality distribution)
- No flatten as well as no asymmetric
- A suitable measurement interval is specified (the scoring scale: between 0 and 10) for all the respondents' scores.

As stated before, we have conducted a survey investigation proposed to a random sample interviewees selected by the organization as representative stakeholders.

Each LV is associated with a range of questions to assess the degree of significance about the main subject. Figure 3 shows the proposed methodology.

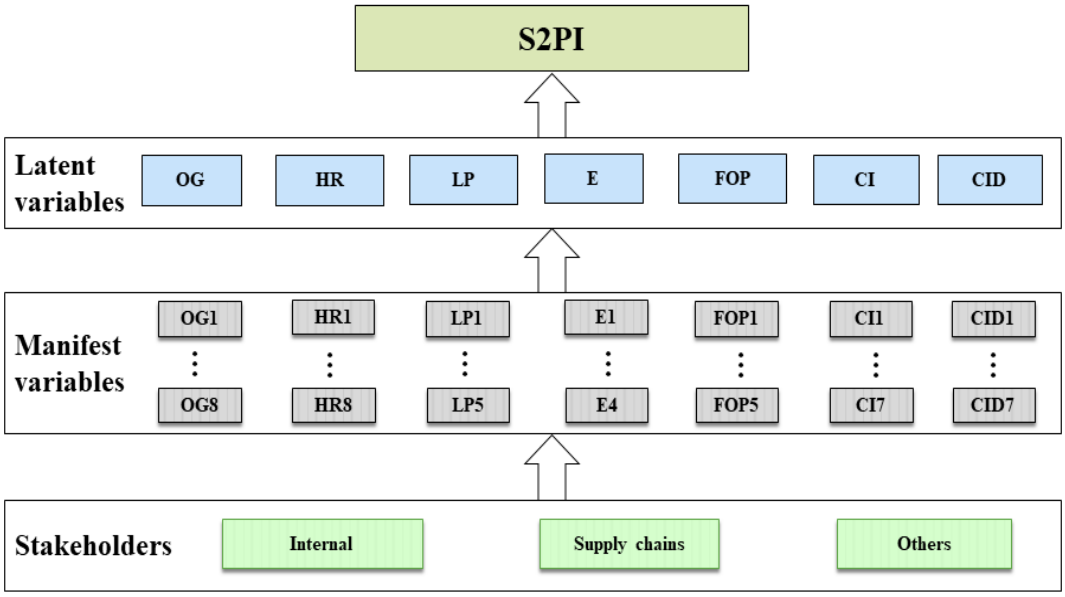

Figure 3. Research protocol

3.2 The PLS Path Model Equations: Inner Model

PLS-SEM is a well-known technique for approximating path models with LVs and their relations. In the structural model, also named the inner model, the LVs are associated based on substantive theory. It is important to note that LVs are separated into two classes, exogenous and endogenous. The first class, exogenous LVs, do not have any predecessor in the structural model, whereas all other LVs are considered endogenous. The structural model for the

S2PI model is illustrated in Figure 4. It is noticeable that OG represents the only exogenous LV in the S2PI model. Additionally, the graph can be defined by an adjacency matrix D as demonstrated in Table 2. It is still possible to structure the adjacency matrix D by way of a triangular matrix. We note that if the entry $d_{ij} = 1$ the LV_i is a predecessor of LV_j (Table 3).

Table 3. Adjacency matrix D for S2PI

	OG	**HR**	**LP**	**E**	**FOP**	**CI**	**CID**	**S2PI**
OG	1	1	1	1	1	1	1	0
HR	0	0	0	0	0	0	0	1
LP	0	0	0	0	0	0	0	1
E	0	0	0	0	0	0	0	1
FOP	0	0	0	0	0	0	0	1
CI	0	0	0	0	0	0	0	1
CID	0	0	0	0	0	0	0	1
S2PI	0	0	0	0	0	0	0	0

For every endogenous LV in the model, it may be written as follows (see Table 4). With $cor\left(\zeta_i, \xi_j\right) = 0, \forall\, i \neq j$

Table 4. Inner Model Equations

LVs	**Inner Model Equations**
OG ξ_1	-
HR ξ_2	$\xi_2 = \beta_{21}\xi_1 + \zeta_2$
LP ξ_3	$\xi_3 = \beta_{31}\xi_1 + \zeta_3$
E ξ_4	$\xi_4 = \beta_{41}\xi_1 + \zeta_4$
FOP ξ_5	$\xi_5 = \beta_{51}\xi_1 + \zeta_5$
CI ξ_6	$\xi_6 = \beta_{61}\xi_1 + \zeta_6$
CID ξ_7	$\xi_7 = \beta_{71}\xi_1 + \zeta_7$
S2PI ξ_8	$\xi_8 = \sum_{1=2}^{7} \beta_{8i}\xi_i + \zeta_8$

3.3 The PLS Path Model Equations: Outer Model

The measurement model characterizes the relationships amongst the MVs and the equivalent LV. For every MV in the model may be written as shown in Table 5.

Table 5. Outer Model Equations

Manifest Variables	Number of Indicators (i)	Outer Model Equations
OGi x_{1i}	8	$\xi_1 = \sum_{i=1}^{8} w_{1i}\, x_{1i} + \zeta_1$
HRi x_{2i}	8	$\xi_2 = \sum_{i=1}^{8} w_{2i}\, x_{2i} + \zeta_2$
LPi x_{3i}	5	$\xi_3 = \sum_{i=1}^{5} w_{3i}\, x_{3i} + \zeta_3$
Ei x_{4i}	4	$\xi_4 = \sum_{i=1}^{4} w_{4i}\, x_{4i} + \zeta_4$
FOPi x_{5i}	5	$\xi_5 = \sum_{i=1}^{5} w_{5i}\, x_{5i} + \zeta_5$
CIi x_{6i}	7	$\xi_6 = \sum_{i=1}^{7} w_{6i}\, x_{6i} + \zeta_6$
CIDi x_{7i}	7	$\xi_7 = \sum_{i=1}^{7} w_{7i}\, x_{7i} + \zeta_7$
S2PIi x_{8i}	4	$\xi_8 = \sum_{i=1}^{4} w_{8i}\, x_{8i} + \zeta_8$

The formative measurement model is appropriate for our S2PI model. Considering each main subject/topic, in accordance with the ISO 20400, is declined in several relevant concerns which constitute formative indicators. The graph, in Figure 4, shows the nomological net of the proposed S2PI. The LVs are presented in ellipses whereas the MVs are exhibited in boxes.

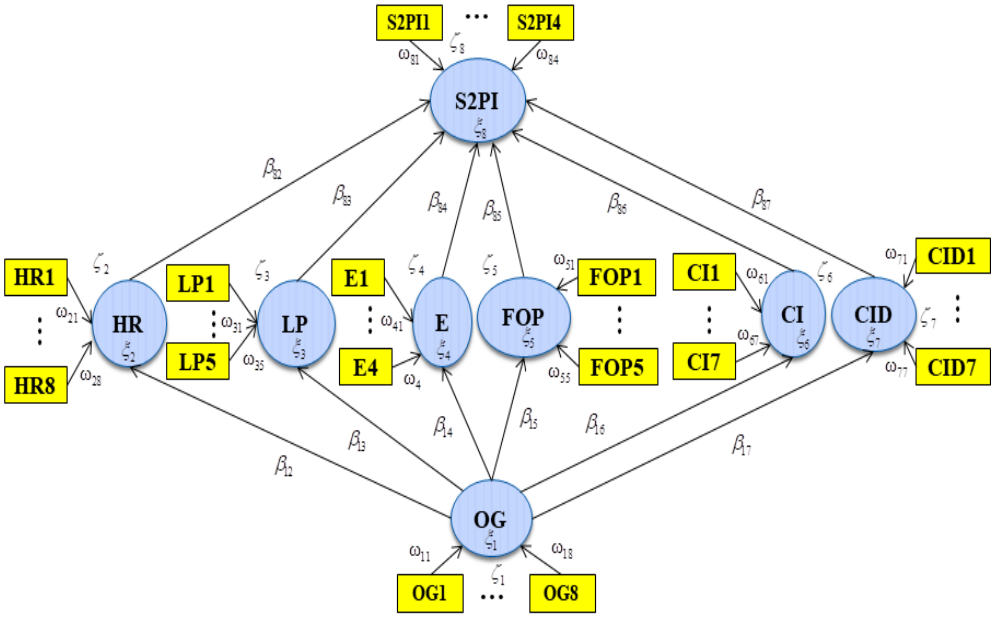

Figure 4. PLS Path Model Equations of S2PI

3.4 PLS-SEM Method

Model approximation in PLS-SEM uses of a three-phase process associated with the least squares (LS) methods (Mateos-Aparicio, 2011). Figure 5 shows the PLS-SEM algorithm as given by (Lohmöller, 1989).

Begin	
Phase 0	Initialization
Phase 1	Inner Estimation & Outer Estimation
Phase 2	Compute: factor scores
Phase 3	Convergence
Last phase	Result

Figure 5. PLS-SEM algorithm

3.5 The S2PI Formulation

The general form of S2PI is as follows:

$$S2PI = \frac{E\,[\xi_8]-Min\,[\xi_8]}{Max\,[\xi_8]-Min[\xi_8]} \times 100 \quad (4)$$

Where ξ_8 is the latent variable for SP performance index (S2PI) and $E\,[.]$, $Max\,[.]$, and $Min\,[.]$ denote the expected, the maximum, and the minimum value of the variable, respectively. The minimum and the maximum values are determined by those of the corresponding manifest variables.

$$Min\,[\xi_8] = \sum_{i=1}^{4} w_{8i}\, Min\,[x_{8i}] \quad (5)$$

$$Max[\xi_8] = \sum_{i=1}^{4} w_{8i}\, Max[x_{8i}] \quad (6)$$

In S2PI, there are four indicators for SPP that range from 0 to 10. The calculation is then simplified to:

$$S2PI = \frac{\sum_{i=1}^{4} W_{8i}\overline{x_{8i}} - \sum_{i=1}^{4} w_{8i}}{10\sum_{i=1}^{n} w_{8i}} \quad (7)$$

Where w_{8i} are the unstandardized weights.

4. Discussion

This study has developed an S2PI based on ISO20400 recommendations to measure the efficiency of sustainable initiatives from the stakeholder's lens. The compliance with regulatory standards such as ISO20400 ensures that companies/institutions adhere to sustainability frameworks and models (Lau et al., 2023), which enhance trust among stakeholders. Ethical practices not only impact SC partners but also promote competitiveness and efficiency (Baah et al., 2024). The index is developed based on a clear statistical approach that enables integrating the seven main components introduced by ISO 20400.

The developed index provides a quantitative score that measure the effectiveness of the procurement process and allows to make informed decisions through comparing the various available options. The results stress the role of

stakeholder's engagement and commitment in ensuring the adoption of sustainable practices and collaborating with suppliers with higher sustainability metrics.

The present study contributes to theory through promoting the discourse of sustainability in the context of SC management. It provides a structured approach to measure the effectiveness of the sustainable practices associated with procurement. Moreover, the S2PI highlights the links between LV and ML related to the SP, fostering the understanding of their interactions. This work is a basis that prompts further studies, theoretical exploration, and refinement to adjust or to create other assessment tools. The use of the stakeholder theory emphasizes the importance of their engagement in sustainability.

In practice, the S2PI offers practical guidance and an evaluation tool for organizations to measure the efficiency of their practices and identify strengths and weaknesses. Further, they can use the index as a benchmark against the industry standard to foster continuous improvement of sustainability initiatives. This clear metric can help managers to make informed decisions that meet their strategies. Also, organizations may use the index to demonstrate their implication and commitment to sustainability and enhance transparency and accountability. Lastly, using the S2PI ensures the compliance of organizations' strategies and operations with significant policies and regulations of sustainability.

5. Conclusion

This paper develops an index to evaluate the economic, environmental and social performance of the procurement strategies and operations based on ISO 20400 standards. To that end, the existing studies on sustainable procurement and the ISO reference were reviewed and presented. Following, The SEM approach was applied to examine the planned causal relationships between these seven main subjects and the S2PI model. According to the concept, rules and thoughts of this norm, we presented and detailed an S2PI model allowing an organization to assess its SP operations and activities through the lens of stakeholders.

The proposed index provides a structured framework that promotes the theoretical understanding of the SP and equips organizations with a practical tool to assess the achievement of sustainability objectives. It serves as a valuable resource to promote procurement effectiveness. Further, the framework represents a foundation for scholars and policymakers to foster sustainability discourse.

Like every study, this paper has some limitations that create valuable opportunities for future research:

- Implementing the proposed index in a real-world case study to test its effectiveness based on empirical evidence. This can be performed through employing a Python package (PyPLS-PM), which is devoted to PLS-PM.
- Conducting longitudinal studies to analyze the impacts of SP practices in the long-term, using the S2PI framework.
- Performing a comparative analysis of the S2PI with other sustainability indicators to identify improvement areas.
- Studying the ability of the proposed index to be integrated in other sustainability frameworks.

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