

Scientific Contributions to Overcoming Barriers to Sustainable Public Procurement: Systematic and Bibliometric Analysis

Adelquis Stanley Monteiro Santiago ^I
Adriana Kirley Santiago Monteiro ^{II}
Rafael Fernandes de Mesquita ^{III}

Calebe Paiva Gomes de Souza ^{IV}
José Machado Moita Neto ^V

Abstract: This study analyzes the barriers present in sustainable public procurement (SPP) by reviewing scientific publications indexed in the Web of Science database (2013-2022). The methodology employed combines bibliometric techniques and content analysis. The results indicate that most of the research is descriptive and theoretical and focuses on the concept of the SPP, which may limit its practical application. There has also been a predominance of studies on the planning and execution phases of contracts, neglecting the management and supervision of contracts. The study recommends the development of applied research to support public policies and management strategies that overcome the identified barriers, promoting the effective implementation of sustainability in public procurement. By systematizing scientific knowledge on the subject, this research aims to foster the practical application of SPPs, encouraging the participation of different actors and government sectors in the search for socioenvironmental benefits.

Keywords: Tenders; Sustainability; Obstacles; Drivers; SDG 12.

^I Graduate Programme in Development and Environment (PRODEMA) at the Federal University of Piauí (UFPI), Teresina, PI, Brazil

^{II} Graduate Programme in Development and Environment (PRODEMA) at the Federal University of Piauí (UFPI), Teresina, PI, Brazil

^{III} Federal Institute of Piauí (IFPI), Dirceu Campus; Graduate Program in Public Management (PPGP) and Graduate Program in Public Policy (PPGPP) at the Federal University of Piauí (UFPI), Teresina, PI, Brazil

^{IV} Technology Center (CT) at the Federal University of Piauí (UFPI), Teresina, PI, Brazil

^V Graduate Programme in Development and Environment (PRODEMA) at the Federal University of Piauí (UFPI), Teresina, PI, Brazil

São Paulo. Vol. 28, 2025

Original Article

DOI: <http://dx.doi.org/10.1590/1809-4422asoc01271vu28L4OA>



All the contents of this journal, except where otherwise noted, is licensed under a Creative Commons Attribution License.

Introduction

The 2030 Agenda and its Sustainable Development Goals (SDGs) stand out for guiding national and international policies, articulating global efforts toward sustainable development by 2030, even in the face of political challenges (Cia Alves; Fernandes, 2020). This comprehensiveness is reflected in the diversity of areas covered by the SDGs, such as poverty eradication, food security, gender equality, clean energy, access to drinking water and climate action, making the discussion of sustainable development increasingly present in the international community (Barbieri, 2020).

In this context, SDG 12, responsible consumption and production, which aims to ensure the adoption of sustainable standards, stands out. To achieve this goal, Target 12.7 seeks to encourage sustainable public procurement (SPP), integrating the economic, social and environmental dimensions at all stages (IBGE, [n.d.]; ONE PLANET NETWORK, [n.d.]; UN, [n.d.]). SPP, in turn, promotes sustainable development through the efficient use of public resources, generating economic, environmental and social benefits (Clement; Watt; Semple, 2016).

Clement, Watt and Semple (2016) define SPP as the process that ensures that products and services acquired by an entity provide value in relation to the resources invested, considering life cycle costs and benefits for the environment, society and economy (Clare *et al.*, 2023). For this value generation to be effective, a SPP needs to transcend immediate needs and assess the long-term impacts of each purchase, including aspects such as resource efficiency, climate change mitigation, social responsibility and economic resilience.

In practical terms, the SPP uses the state's purchasing power to foster sustainable development, integrating the economic, social and environmental dimensions into procurement decisions (Costa; Mota, 2019), in line with the triple bottom line model (Elkington, 2020). In this way, SPPs transcend simple procurement and are strategically directed toward meeting state goals and promoting more inclusive, equitable and sustainable development (Silva *et al.*, 2018). Despite the potential, Oliveira Silva and Severo Filho (2021) point to an underutilization of these practices, indicating the need for a change in the public administration's stance.

This underutilization becomes even more critical when we consider the state's purchasing power, which represents an average of 40% of GDP in OECD countries (OECD, [n.d.]), can be an important tool for promoting public policies aligned with sustainable development (Zago, 2018). In Brazil, for example, public spending increased from 30.7% of GDP in 2021 to 32.7% in 2022, equivalent to R\$ 3.2 trillion (Brasil, 2024). Therefore, the adoption of CPS in Brazil becomes crucial to boost public policies aligned with sustainable development.

However, the implementation of SPPs faces endogenous and exogenous obstacles related to cultural, procedural, economic, market and political-legal-normative aspects (Cader; Villac, 2022). Several studies have investigated these barriers (Alencastro, Sila and Lopes, 2014; Costa; Motta, 2019; Souza *et al.*, 2022; Oliveira; Santos, 2015; Oliveira Silva; Severo Filho, 2021; Paes *et al.*, 2019; Torres Filho *et al.*, 2020; Vejaratnam;

Mohamad; Chenayah, 2020). However, many have limited themselves to conceptual or theoretical approaches, without moving on to practice.

In this sense, the review by Vejaratnam, Mohamad and Chenayah (2020) on the barriers to the SPP points to the need for additional studies, especially quantitative ones, to delve deeper into the subject. Investigating how research addresses these barriers contributes to understanding the inefficient implementation of SPPs and helps in the development of preventive or corrective strategies.

From this perspective, this study seeks to answer the following guiding question: How do high-impact scientific publications published between 2013 and 2022 address the issue of barriers to sustainable public procurement?

Materials and Methods

This research uses a qualitative methodological approach, combining a systematic review with bibliometric techniques and content analysis. The aim is to analyze the various approaches present in high-impact publications on the barriers faced in carrying out sustainable public procurement, as well as to identify possible research gaps.

This systematic review makes it possible to identify the main contributions in a field of study, especially in scenarios with a large volume of work and potential contradictions, ensuring transparency and replicability through a rigorous protocol (Tranfield; Denyer; Smart, 2003). Bibliometric techniques, in turn, complement present quantitative indicators in the analysis of scientific production, making it possible to assess the performance of researchers and institutions, as well as map the structure and dynamics of the field of study (Zupic; Čater, 2015). This combination of methods allows for an in-depth and transparent analysis of scientific publications relevant to the research.

Systematic review model

The systematic review was conducted following a model adapted from Snyder (2019, p. 336-337), which aims to minimize bias and ensure the validation and replicability of the results. This model structures the research in four interdependent phases, which complement each other and guarantee the robustness of the study. The first phase addresses planning and involves defining the strategy for obtaining data, with a view to forming a portfolio of articles. This stage includes the choice of database, the definition of keywords, the development of a search key and the establishment of inclusion/exclusion filters and exclusion and ranking criteria.

With the planning defined, the second phase, execution, focuses on searching the database and exporting the relevant information. Next, an adherence test is carried out on the articles found in relation to the research problem, applying exclusion criteria to remove articles that do not fit the scope of the study. Finally, the remaining articles are ranked and selected for reading and qualitative analysis. In the third phase, the analysis of the selected articles is deepened by performing a preliminary bibliometric analysis of the final portfolio and a syntopical reading of the articles, which makes it possible to identify and establish correlations between them, deepening the qualitative analysis. The

last phase involves structuring and writing the review; consolidating the research results; and selecting visual elements (graphs, figures, charts and tables) to present the results in a clear, concise and organized way.

The documentation of the review guarantees the depth and rigor of the analysis, the replicability of the results, the usability of the data and a format suitable for practical application. By following this structured model, the systematic review guarantees the quality and reliability of the results, contributing to the advancement of knowledge in the field.

Definition of the data collection strategy

The database selected to search for articles was the Web of Science (WoS) - Main Collection (Clarivate Analytics), recognized for its comprehensiveness and reliability as a source of interdisciplinary studies. WoS offers broad thematic coverage, rigorous quality control of publications and indexed metadata, contributing to an efficient and reliable systematic review (Almeida; Gracio, 2019). The platform uses the Journal Impact Factor (JIF) and Journal Citation Indicator (JCI) indices to assess the quality and influence of scientific journals. In this study, the JIF 2022 was used to rank the articles in the final portfolio, following the protocol of Carvalho *et al.* (2020).

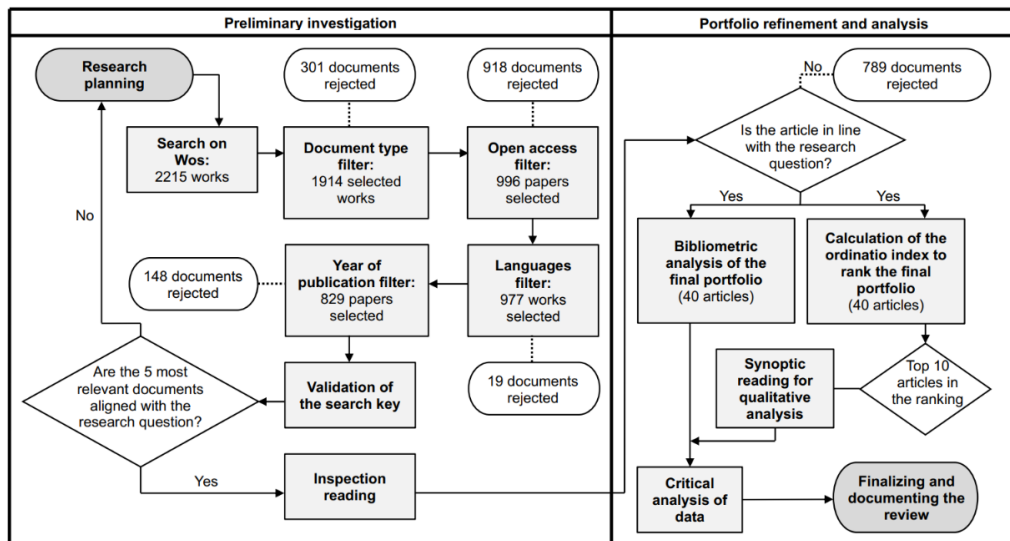
To broaden the search for articles on barriers to sustainable public procurement, keywords were defined in English and strategically combined to create the search key used in the title, abstract and keyword fields of the WoS database. The search key used was TS=((procurement\$ OR purchase\$ OR contract\$ OR hir* OR bid*) AND (government* OR public) AND (sustain* OR green OR circular) AND (obstacle* OR challenge\$ OR barrier* OR risk*)). This key combines terms related to 'contracting' (procurement, purchase, contract, hiring, bid), 'public' (government, public), 'sustainable' (sustainable, green, circular) and 'barriers' (obstacle, challenge, barrier, risk).

After the search key was applied to WoS, inclusion and exclusion criteria were applied to compose the portfolio of articles. Only original articles and review articles, both peer-reviewed, published between 2013 and 2022, in English or Portuguese and available in open access through the CAPES Journal Portal via CAFE, were included. Proceeding papers, books, book chapters and other types of documents were excluded. This selection strategy sought to ensure the inclusion of reliable, accessible and relevant studies for state-of-the-art research.

Construction and analysis of the research portfolio

Figure 1 shows the stages of construction and analysis of the research portfolio, which are detailed below.

Figure 1 - Summary of the research portfolio construction and analysis process



Source: Adapted from Afonso *et al.* (2012, p. 52), Carvalho *et al.* (2020, p. 6) and Pagani, Kovaleski and Resende (2015, p. 2122).

The search in the WoS database was carried out on June 24, 2023, using the search key in the title, abstract and keywords fields, resulting in 2,215 documents. After applying the inclusion and exclusion filters, 829 documents were selected and sorted by the WoS 'relevance' criterion. To validate the search key, an inspectional reading (Adler; Doren, 2010) of the title, abstract and keywords of the 5 most relevant documents was carried out, 3 of which confirmed the relevance of the search to the topic under study.

Following the refinement process, the same inspection reading procedure was applied to the entire set of documents to assess their adherence to the research problem. This stage resulted in the selection of 40 documents to make up the final research portfolio after the exclusion of 789 documents.

The final portfolio was then subjected to bibliometric analysis via Excel 365 software, the R Bibliometrix tool version 4.1.2 and the Biblioshiny web application (Bibliometrix, [n.d.]). Various analyses have been carried out, including analyses of keyword co-occurrence, coauthorship networks and citations, with the aim of identifying research clusters, collaboration networks and trends in the field of study (Aria; Cuccurullo, 2017). Moreover, the ordination index was calculated, as described by Pagani, Kovaleski and Resende (2015, 2018) and Carvalho *et al.* (2020), to assess the importance of publications considering the journal's impact factor (*JIF/JCI*), the number of citations received and

the year of publication, weighted by a constant α (ranging from 1-10), according to the following formula.

The constant α of the ordinatio index influences the relevance of articles according to their age. Higher values of α give greater weight to recent articles, whereas lower values prioritize older articles. In this study, α was set to 5 to balance the portfolio ranking, considering both the timeliness and historical relevance of the publications.

Thus, the selection of articles for the qualitative analysis phase followed the proposal by Pagani, Kovaleski and Resende (2015), which allows researchers to define the metrics for this stage. We chose to select the 10 articles with the highest ordinal indices. Chart 1 shows the articles selected, ordered by the ordinatio index, which ranged from 122.10 (Sönnichsen and Clement, 2020) to 47.10 (Peñate-Valentín, Sánchez-Carreira and Pereira, 2021).

Chart 1 - 10 articles with the highest ordinatio indexes

AUTHORS	ARTICLE TITLE	ORDINATIO INDEX
(Sönnichsen; Clement, 2020)	Review of green and sustainable public procurement: Towards circular public procurement	122,10
(Delmonico <i>et al.</i> , 2018)	Unveiling barriers to sustainable public procurement in emerging economies: Evidence from a leading sustainable supply chain initiative in Latin America	85,20
(Alnuaimi; Singh; Harney, 2021)	Unpacking the role of innovation capability: Exploring the impact of leadership style on green procurement via a natural resource-based perspective	66,30
(Leal Filho <i>et al.</i> , 2019)	Sustainability and procurement practices in higher education institutions: Barriers and drivers	56,10
(Grandia; Kruiyen, 2020)	Assessing the implementation of sustainable public procurement using quantitative text-analysis tools: A large-scale analysis of Belgian public procurement notices	54,10
(Adjei-Bamfo <i>et al.</i> , 2023)	Public procurement for innovation through supplier firms' sustainability lens: A systematic review and research agenda	53,40
(Lindfors; Ammenberg, 2021)	Using national environmental objectives in green public procurement: Method development and application on transport procurement in Sweden	53,10
(Giacomo <i>et al.</i> , 2019)	Does Green Public Procurement lead to Life Cycle Costing (LCC) adoption?	50,10
(Gaitán-Cremaschi <i>et al.</i> , 2022)	Public food procurement from family farming: A food system and social network perspective	47,50
(Peñate-Valentín; Sánchez-Carreira; Pereira, 2021)	The promotion of innovative service business models through public procurement. An analysis of Energy Service Companies in Spain	47,10

Source: the authors based on data collected from WoS, 2023.

The qualitative analysis of the selected articles involved analytical and syntopical reading, as recommended by Adler and Doren (2010b), for a critical analysis. Next, ATLAS.ti software, the Computer-Assisted Qualitative Data Analysis Tool (CAQDAS), was used to carry out categorical content analysis (Sampaio; Lycarião, 2021), with a focus on the types of research and approaches used to analyze the barriers to sustainable procurement. The data were tabulated and normalized to balance the occurrence of the codes in documents of different sizes, thus avoiding potentially misleading interpretations of the absolute frequencies.

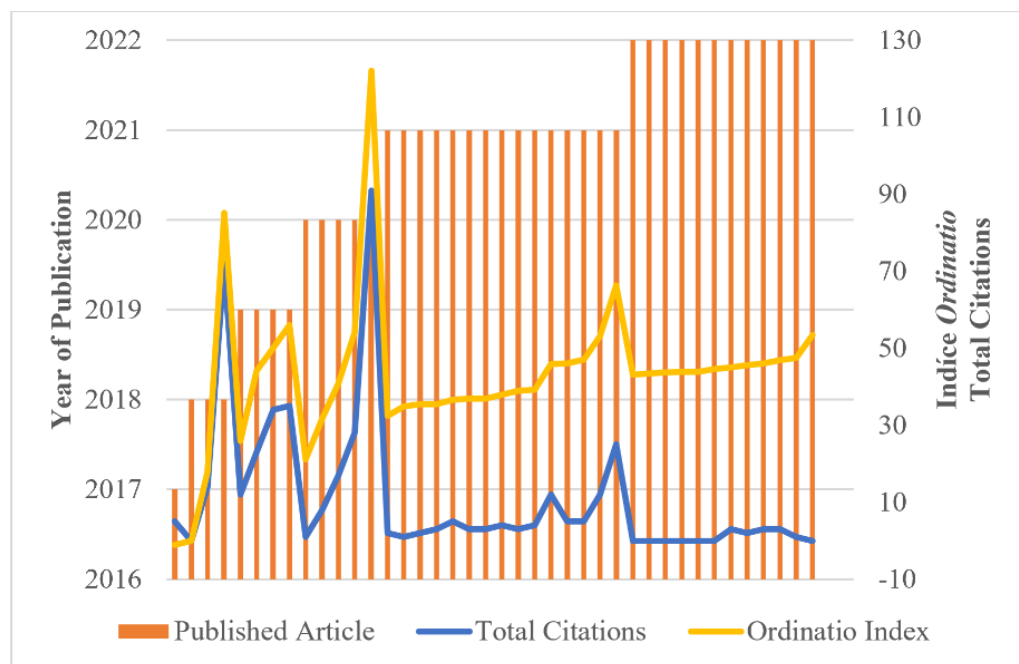
This normalization process adjusts the code counts proportionally, using the document with the highest total number of citations as a reference, which allows for a more accurate and valid comparison of the relevance and frequency of codes between the articles analyzed, regardless of their length. Finally, after the normalized data were validated and the corresponding citations were analyzed, the review was documented and finalized with the appropriate qualitative interpretations.

Results and Discussion

This section presents the results of the analysis of the final portfolio, followed by a discussion of its implications. Despite the initial filter to select articles published between 2013 and 2022, the application of the selection protocol resulted in a portfolio with 40 articles published between 2017 and 2022, written by 143 authors and featuring 152 keywords. There was limited international collaboration between the authors, with 30% international coauthorship.

Annual scientific production on barriers to sustainable public procurement has increased since 2020, from 5 articles in that year to 15 in 2021 and 12 in 2022. This trend may be related to the growing recognition of the importance of sustainability in public procurement, driven by the Sustainable Development Goals (SDGs), especially SDG 12 - responsible consumption and production (Santos; Reis, 2021). The search for procurement practices aligned with SDG 12 has stimulated research interest in the area. Moreover, the growing perception of state purchasing power as an inducer of public policies (Zago, 2018) has led to the adoption of policies and regulations for this purpose, which reinforces the relevance of research in this field.

Analysis of the portfolio revealed that the most relevant articles, according to the criteria adopted, are concentrated in the years 2018 and 2020. This concentration, as shown in Figure 2, which shows the profile of the articles in relation to the year of publication, total citations and ordinatio index, may be associated with the influence of Agenda 2030 in carrying out more comprehensive research on the subject, as highlighted by Santos and Reis (2021).

Figure 2 - Profile of Articles: Year of Publication, Total Citations and Ordination Index

Source: the authors, 2023

The journals *Sustainability* and *Journal of Cleaner Production* stand out as the main publication vehicles on the subject, with 13 and 5 articles in the portfolio, respectively. Although it has fewer publications, the *Journal of Cleaner Production* has a greater impact in terms of citations. This difference is corroborated by the analysis of the articles selected for the qualitative phase: among the 10 articles with the highest ordination index, the *Journal of Cleaner Production* is represented by 3 articles, whereas *Sustainability* has no article in this group. This finding suggests that the *Journal of Cleaner Production* publishes research with greater impact and influence in the field of barriers to sustainable public procurement, despite its lower quantitative output on the subject.

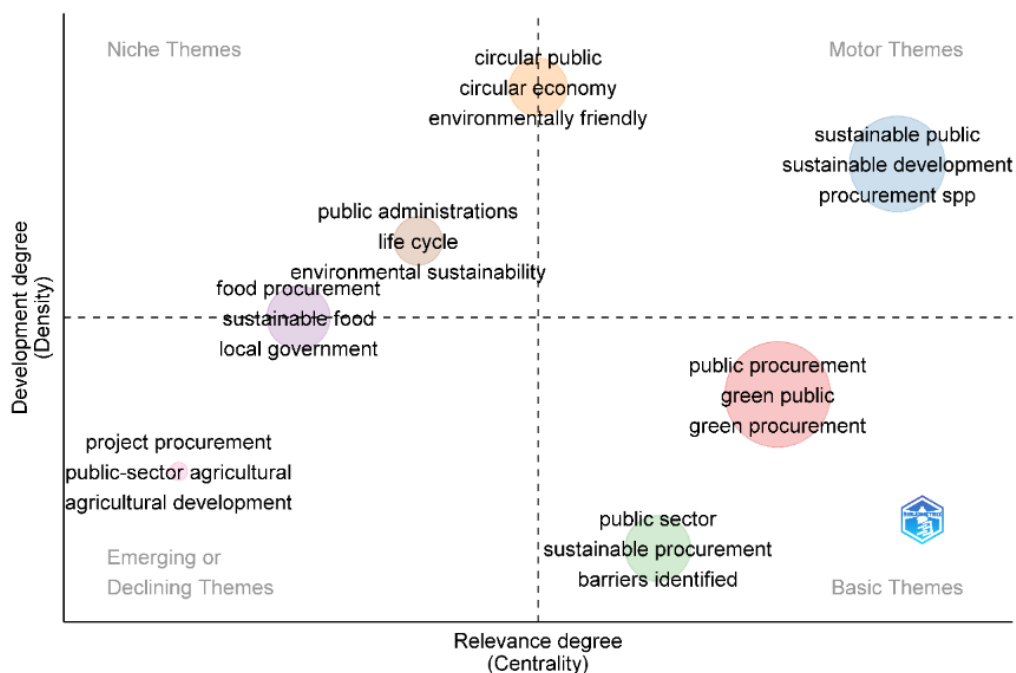
The interdisciplinary nature of the subject is reflected in the distribution of the articles in the portfolio between different subject areas in WoS. The most representative categories are 'Environmental Sciences' (21 publications), 'Green and Sustainable Science and Technology' (19 publications) and 'Environmental Studies' (15 publications). In contrast, categories related to public management, such as 'Management' (5 publications), 'Business' (4 publications) and 'Public Administration' (1 publication), have fewer publications, indicating a possible gap in the thematic classification of works on barriers in sustainable public procurement in the database analyzed. Importantly, this classification gap was not identified in the literature consulted on the subject, including other review articles.

The analysis of the co-occurrence of keywords present in the abstracts of the articles in the portfolio revealed four distinct clusters. The most significant cluster is composed of the terms ‘public procurement’ (12 occurrences), ‘sustainability’ (10 occurrences), ‘sustainable public procurement’ (9 occurrences), ‘green public procurement’ (8 occurrences) and ‘circular economy’ (6 occurrences), indicating a strong association between these concepts. The other keywords, including ‘barrier’, which is directly related to the guiding question of this research, are less relevant in the overall context of the portfolio. Notably, a cluster dedicated to the topic of barriers in sustainable public procurement in the context of family farming highlights the importance of this segment in the debate on sustainable public procurement.

The cocitation network shows the most influential works in the portfolio, especially Witjes (2016), Cheng, Appolloni and D’Amato (2018), Brammer and Walker (2011), Walker and Brammer (2009), Seuring and Muller (2008), Alhola *et al.* (2019), Sonnichsen (2020), Walker *et al.* (2012), Grandia and Kruijen (2015) and Preuss (2009). This analysis shows that the works of Witjes (2016), Cheng, Appolloni and D’Amato (2018), Brammer and Walker (2011), Walker and Brammer (2009) and Seuring and Muller (2008) stand out as the most cited, highlighting their relevance and influence in the field of study. Notably, Sönnichsen and Grandia, authors in the research portfolio itself, occupy first and fifth places, respectively, in the relevance ranking, which demonstrates the importance of their contributions to this research.

The analysis of the thematic map generated from the portfolio abstracts makes it possible to visualize the distribution and evolution of research topics over time (Callon; Courtial; Laville, 1991). The map, shown in Figure 3, reveals a blue cluster, highlighted in the second quadrant, which brings together the themes ‘sustainable public procurement’, ‘sustainable development’ and ‘public sustainability’, classified as drivers. This classification indicates that these themes represent central and influential research areas in the field, characterized by a high volume of publications and citations, informing their relevance and maturity.

Figure 3- Thematic map generated from the portfolio summaries



Source: the authors, 2023.

The green cluster on the thematic map, in turn, reveals that the theme of ‘identified barriers’, although relevant, still needs more in-depth study than the more consolidated themes in the other quadrants. This finding corroborates the conclusions of Grandia and Kruryen (2020), which focus on the environmental dimension of sustainable public procurement and, in the planning phase, relegate contract management and inspection to a secondary role.

In this sense, it is essential to develop research that specifically addresses the barriers faced in implementing sustainable public procurement, as well as the role of contract managers and inspectors in the effectiveness of these practices. It is essential to explore strategies to optimize the effectiveness of sustainable public procurement, considering not only the planning phase but also the implementation of concrete measures during the execution and monitoring of contracts. In addition, the clusters located in the third quadrant, which represent basic themes, suggest the existence of knowledge gaps to be explored in future research.

The categorical content analysis of the 10 articles with the highest ordination index revealed a prevalence of studies of a basic strategic nature, focused on theoretical-conceptual contributions, to the detriment of applied research aimed at solving practical problems. In fact, only two studies (Lindfors *et al.*, 2021; Giacomo *et al.*, 2019) presented

a predominantly applied approach.

This trend was confirmed when the purpose of the studies was analyzed. Most of the studies prioritized the description and categorization of barriers, characterizing a descriptive purpose. A smaller proportion of the articles had an exploratory purpose, seeking to gain a deeper understanding of specific cases, or an explanatory purpose, seeking to identify the factors that influence the occurrence of barriers (Gil, 2017).

The qualitative analysis of the 10 articles selected revealed that the interpretation of certain aspects as barriers or drivers in sustainable public procurement varies among authors, highlighting the complexity of the topic and the influence of the research context and the perspective adopted. While Sönnichsen and Clement (2020) point to the economic aspect as the main barrier, Delmonico *et al.* (2018) highlight the importance of motivational factors and organizational culture. Grandia and Kruiyen (2020) identify a gap in research related to the effective implementation of SPP, focusing on evaluation indicators, whereas Peñate-Valentín, Sánchez-Carreira and Pereira (2021) investigate barriers in communication between buyers and suppliers. Lindfors and Ammenberg (2021) highlight the lack of tools to standardize criteria in tenders, and Adjei-Bamfo *et al.* (2023) explore the challenges faced by small and medium-sized enterprises.

In an attempt to organize these various perspectives, the identified barriers were classified as external or internal (Chart 2) on the basis of their origin, whether they were factors related to the body itself or factors external to it. The external category was subdivided into the following dimensions: economic, legal-normative, market, political, regulatory and technological. The internal category covers the following dimensions: capacity building and training, motivation and culture, and organization.

The economic barrier, characterized by the perception that sustainability increases costs, was frequently cited (Grandia; Kruiyen, 2020), although this perception does not always reflect long-term benefits. The legal-normative barrier related to the lack of clear legislation or the existence of rules that hinder sustainable contracting was also present (Leal Filho *et al.*, 2019).

The market barrier, characterized by the unavailability of sustainable products or services, and the technological barrier, related to the lack of technologies for sustainable production, point to supply challenges (Adjei-Bamfo *et al.*, 2023). The political barrier arises when there is a lack of clear direction on the subject (Peñate-Valentín; Sánchez-Carreira; Pereira, 2021), whereas the regulatory barrier manifests itself in the fear of legal implications, leading to risk aversion (Giacomo *et al.*, 2019).

The barriers to capacity building and training (Lindfors; Ammenberg, 2021), motivation and culture (Delmonico *et al.*, 2018) and organization (Leal Filho *et al.*, 2019) highlight the importance of internal aspects for the success of sustainable public procurement. The lack of qualified professionals, unfavorable organizational culture and inadequate structure represent obstacles to overcome.

Chart 2 - Categorization of barriers/drivers

ARTICLES	Nature of the barriers (b) and/or Drivers (d) addressed in the portfolio																		TOTALS
	External												Internal						
	Economic		Legal-normative		Market		Politics		Regulatory		Technology		Capacity building and training		Motivation and culture		Organizational		
(Adjei-Bamfo <i>et al.</i> , 2023) / Gr=20	4	0	0	0	31	16	4	8	0	0	4	4	0	8	4	4	4	8	98
(Alnuaimi; Singh; Harney, 2021) / Gr=19	0	0	0	0	0	0	5	5	0	0	0	0	10	0	5	21	10	41	98
(Giacomo <i>et al.</i> , 2019) / Gr=28	3	0	5	0	18	0	8	0	10	0	5	0	15	5	15	5	3	5	98
(Delmonico <i>et al.</i> , 2018) / Gr=12	21	0	0	0	7	0	14	0	0	0	0	0	7	0	28	7	14	0	98
(Gaitán-Cremaschi <i>et al.</i> , 2022) / Gr=37	4	2	6	9	13	9	8	9	1	0	1	2	4	3	2	2	9	13	98
(Grandia; Kruyen, 2020) / Gr=16	39	20	0	0	0	0	0	0	0	0	0	0	20	0	20	0	0	0	98
(Leal Filho <i>et al.</i> , 2019) / Gr=33	7	2	12	2	5	0	5	0	7	0	0	0	7	0	14	5	26	7	98
(Lindfors; Ammenberg, 2021) / Gr=7	0	0	0	0	0	0	0	0	0	0	0	0	24	24	24	24	0	0	98
(Peñate-Valentín; Sánchez-Carreira; Pereira, 2021) / Gr=23	14	3	3	3	14	3	14	3	6	0	3	0	6	6	3	3	12	3	98
(Sönnichsen; Clement, 2020) / Gr=57	6	0	5	3	2	3	7	8	3	0	2	2	11	10	5	8	15	8	98
TOTALS	98	27	31	17	91	31	65	33	27	0	15	8	105	56	121	79	92	85	980

Source: the authors, 2023.

The analysis of the categorization of the barriers and drivers identified in the portfolio reveals an interesting duality: with the exception of the 'Regulatory' subcategory, which was classified only as a barrier, all the other subcategories were perceived as both obstacles and facilitating elements, depending on the context and perspective adopted. This duality suggests that a barrier can be transformed into a driver on the basis of the coping strategy used, just as a driver can become a barrier if it is neglected.

A clear example of this duality is the economic barrier. While Sönnichsen and Clement (2020) associate this with the perception of high costs for sustainable products and services, Grandia and Kruiyen (2020) show that the inclusion of price criteria in calls for tenders can reverse this perception and increase sustainability. Leal Filho *et al.* (2019) corroborate this perspective by stating that many barriers are, in practice, neglected drivers.

The data in Chart 2 indicate a greater emphasis on internal barriers, related to 'Capacity Building and Training', 'Motivation and Culture' and 'Organizational', and external barriers, linked to the 'Economic' and 'Market' dimensions. On the other hand, the most prominent drivers are external drivers, related to the 'political' dimension, and internal drivers, covering 'capacity building and training', 'motivation and culture' and 'organizational'. This convergence highlights the importance of the human element as a crucial factor in the success of sustainable public procurement.

In this context, leadership emerges as a key driver. Alnuaimi, Singh and Harney (2021) show that transformational and transactional leadership styles have a positive effect on innovation capacity and, consequently, the sustainability of hiring.

In the Brazilian scenario, Delmonico *et al.* (2018), Leal Filho *et al.* (2019) and Gaitán-Cremaschi *et al.* (2022) offer relevant contributions on the subject. Delmonico *et al.* (2018) investigated the barriers to implementing the Environmental Agenda in Public Administration (A3P), whereas Leal Filho *et al.* (2019) analyzed the challenges faced by Brazilian universities. Gaitán-Cremaschi *et al.* (2022) address barriers in public food procurement, highlighting the National School Feeding Program (PNAE).

Although the literature acknowledges the existence of barriers in all phases of public procurement, from planning to waste management, the portfolio analyzed concentrates on the planning phase, with less focus on contract management and inspection and waste management. This gap reinforces the need for future research that explores the other stages of sustainable public procurement life cycle.

Conclusion

This research aimed to analyze how high-impact scientific literature addresses the barriers faced in implementing sustainable public procurement. To this end, publications indexed in the Web of Science database from 2013-2022 were examined.

The results indicate a growing interest in the field of sustainable public procurement following the publication of the 2030 Agenda, which reflects the search for strategies to achieve global sustainable development goals. However, the bibliometric analysis revealed that publications focused on the barriers to such procurement are still scarce, indicating

that this research niche, although relevant, is at an early stage of development.

The content analysis revealed that the majority of research adopts a basic, descriptive approach, prioritizing the theoretical understanding of sustainable public procurement. However, there is a significant gap in the practical application of this knowledge, which highlights the need to connect theory to the reality of public procurement.

Motivational and cultural barriers, as well as those related to capacity building and training, were identified as the most frequent and impactful, highlighting the importance of considering the human and cultural dimensions in the search for more sustainable hiring practices.

It reported that the majority of research has focused on the planning and contracting phases, neglecting the management and inspection stages. It is essential that the implementation and monitoring of sustainable measures be incorporated throughout the life cycle of contracts.

This study contributes to the advancement of knowledge by identifying gaps in the literature and reinforcing the need for further research into sustainable public procurement. The practical implications of this work go beyond similar studies, as it provides insights for public policy makers and managers, encouraging the adoption of measures that increase sustainability in public procurement.

It is important to recognize the limitations of this research. The restriction to the Web of Science database, despite its breadth, may have excluded relevant studies from other sources. The lack of specific studies on the Brazilian context limits the direct applicability of the results to the country's reality. In addition, the article selection methodology may have meant that relevant publications were excluded, which highlights the need for future research with a broader or substitutive relation to any of the stages already developed approach.

As a suggestion for future work, we recommend the development of empirical research that explores practical strategies for overcoming the identified barriers, especially in the Brazilian context, where the regulatory framework for public procurement has undergone significant transformations. The new Bidding Law (Law 14.133/2021), for example, has considerably expanded the provisions on sustainability in public procurement, constituting a fertile field for investigations into its effective implementation. Mapping organizational adaptations and successful strategies can provide relevant input for both the academic literature and the improvement of public administration.

In summary, this study provides a comprehensive overview of research into barriers to sustainable public procurement, outlining areas that require greater attention. It is hoped that the results will encourage further studies and actions to promote sustainability in public procurement, generating positive impacts for society and the environment.

References

- ADJEI-BAMFO, P. *et al.* Public procurement for innovation through supplier firms' sustainability lens: A systematic review and research agenda. **Business Strategy and the Environment**, v. 32, n. 1, p. 387-407, 2022. Available at: <https://doi.org/10.1002/bse.3137>. Accessed on July 11, 2024.
- ADLER, M. J.; DOREN, C. VAN. **How to read books: the classic guide to intelligent reading**. São Paulo: É Realizações, 2010.
- AFONSO, M. H. F. *et al.* How to build knowledge about the research topic? Application of the ProKnow-c process in the search for literature on sustainable development evaluation. **Revista de Gestão Social e Ambiental**, v. 5, n. 2, 27 feb. 2012. Available at: <https://doi.org/10.24857/rgsa.v5i2.424>. Accessed on: July 11, 2024.
- ALENCASTRO, M. A. C.; SILVA, E. V. da; LOPES, A. M. D. Sustainable contracting in the Brazilian public administration: the experience of the Federal Executive Branch. **Rev. Adm. Pública-Rio de Janeiro**, v. 48, n. 1, p. 207-242, 2014. Disponível em: <https://doi.org/10.1590/S0034-76122014000100009>. Accessed on: July 11, 2024.
- ALMEIDA, C. C.; GRACIO, M. C. C. Brazilian scientific production on the "Impact Factor" indicator: a study in the SciELO, Scopus and Web of Science databases. **Encontros Bibli: electronic journal of library and information science**, v. 24, n. 54, p. 62-77, 4 Jan. 2019. Disponível em: <https://doi.org/10.5007/1518-2924.2019v24n54p62>. Accessed on: July 11, 2024.
- ALNUAIMI, B. K.; SINGH, S. K.; HARNEY, B. Unpacking the role of innovation capability: Exploring the impact of leadership style on green procurement via a natural resource-based perspective. **Journal of Business Research**, v. 134, p. 78-88, 2021. Available at: <https://doi.org/10.1016/j.jbusres.2021.05.026>. Accessed on: July 11, 2024.
- ARIA, M.; CUCCURULLO, C. bibliometrix: An R-tool for comprehensive science mapping analysis. **Journal of Informetrics**, v. 11, n. 4, p. 959-975, 1 nov. 2017. Available at: <https://doi.org/10.1016/j.joi.2017.08.007>. Accessed on: July 11, 2024.
- BARBIERI, J. C. **Sustainable development: from its origins to the 2030 Agenda**. Petrópolis: Vozes, 2020.
- BIBLIOMETRIX**. Available at: <https://www.bibliometrix.org/home/>. Accessed on: June 28, 2023.
- BRAZIL. Ministry of Finance. National Treasury. **COFOG: expenditure by central government function**. Expenditure by Central Government Function. 2024. Available at: https://www.tesouro-transparente.gov.br/publicacoes/cofog-despesas-por-funcao-do-governo-central/2022/114?ano_selecionado=2022. Accessed on: July 11, 2024.
- CADER, R.; VILLAC, T. **Governance and sustainability: a necessary link**. Belo Horizonte: Fórum, 2022.
- CALLON, M.; COURTIAL, J. P.; LAVILLE, F. Co-word analysis as a tool for describing the network of interactions between basic and technological research: the case of polymer chemistry. **Scientometrics**, v. 22, n. 1, p. 155-205, 1991. Available at: <https://doi.org/10.1007/BF02019280>. Accessed on: July 11, 2024.

CARVALHO, G. D. G. de *et al.* Bibliometrics and systematic reviews: A comparison between the Proknow-C and the Methodi *Ordinatio*. **Journal of Informetrics**, v. 14, n. 3, Aug. 1, 2020. Available at: <https://doi.org/10.1016/j.joi.2020.101043>. Accessed on: July 11, 2024.

CIA ALVES, E. E.; FERNANDES, I. F. de A. L. Sustainable Development Goals: a transformation in the scientific debate on development? **Meridiano 47 - Journal of Global Studies**, v. 21, July 20, 2020. Available at: <https://orcid.org/0000-0002-4236-4393>. Accessed on: July 11, 2024.

CLARE, C. V. *et al.* **National Guide to Sustainable Contracting**. 6. ed. Brasília: Advocacia-Geral da União, 2023.

CLEMENT, S.; WATT, J.; SEMPLE, A. **The Procura+ Manual**. 3. ed. Freiburg: ICLEI, 2016.

COSTA, B. B. F. da.; MOTTA, A. L. T. S. da. Key factors hindering sustainable procurement in the Brazilian Public sector: A Delphi study. **International Journal of Sustainable Development and Planning**, v. 14, n. 2, p. 152-171, 2019. Available at: <https://doi.org/10.2495/SDP-V14-N2-152-171>. Accessed on: July 11, 2024.

COSTA, B. B. F. da.; MOTTA, A. L. T. S. da. The role of public administration in promoting sustainable consumption and production. **Revista Tecnologia e Sociedade**, v. 16, n. 40, p. 1-19, 2020. Available at: <https://revistas.utfpr.edu.br/rts/article/view/9727>. Accessed on: July 11, 2024.

DELMONICO, D. *et al.* Unveiling barriers to sustainable public procurement in emerging economies: Evidence from a leading sustainable supply chain initiative in Latin America. **Resources, Conservation and Recycling**, v. 134, p. 70-79, July 1, 2018. Available at: <https://doi.org/10.1016/j.resconrec.2018.02.033>. Accessed on: July 11, 2024.

ELKINGTON, John. **Sustainability: cannibals with a knife and fork**. M. Books, 2020.

GAITÁN-CREMASCHI, D. *et al.* Public food procurement from family farming: A food system and social network perspective. **Food Policy**, v. 111, p. 1-16, Aug. 1, 2022. Available at: <https://doi.org/10.1016/j.foodpol.2022.102325>. Accessed on: July 11, 2024.

GIACOMO, M. R. de *et al.* Does Green Public Procurement lead to Life Cycle Costing (LCC) adoption? **Journal of Purchasing and Supply Management**, v. 25, n. 3, p. 1-10, 1 jun. 2019. Available at: <https://doi.org/10.1016/j.pursup.2018.05.001>. Accessed on: July 11, 2024.

GIL, A. C. **Como elaborar projetos de pesquisa**. 6. ed. São Paulo: Atlas, 2017.

GRANDIA, J.; KRUYEN, P. M. Assessing the implementation of sustainable public procurement using quantitative text-analysis tools: A large-scale analysis of Belgian public procurement notices. **Journal of Purchasing and Supply Management**, v. 26, n. 4, p. 1-9, 1 Oct. 2020. Available at: <https://doi.org/10.1016/j.pursup.2020.100627>. Accessed on: July 11, 2024.

BRAZILIAN INSTITUTE OF GEOGRAPHY AND STATISTICS [IBGE]. **Indicators of the Sustainable Development Goals - Brazil**. Available at: <https://odsbrasil.gov.br/objetivo/objetivo?n=12>. Accessed on: July 11, 2024.

LEAL FILHO, W. *et al.* Sustainability and procurement practices in higher education institutions: Barriers and drivers. **Journal of Cleaner Production**, v. 231, p. 1267-1280, Sep. 10, 2019. Available at: <https://doi.org/10.1016/j.jclepro.2019.05.202>. Accessed on: July 11, 2024.

LINDFORS, A.; AMMENBERG, J. Using national environmental objectives in green public procurement: Method development and application on transport procurement in Sweden. **Journal of Cleaner Production**, v. 280, p. 1-12, 20 Jan. 2021. Available at: <https://doi.org/10.1016/j.jclepro.2020.124821>. Accessed on: July 11, 2024.

OLIVEIRA SILVA, J. I. A.; SEVERO FILHO, J. Sustainable bidding in higher education institutions: a case study of the Federal University of Campina Grande. **Revista de Direito Economico e Socioambiental**, v. 12, n. 1, p. 153-195, 1 jan. 2021. Available at: <https://dialnet.unirioja.es/servlet/articulo?codigo=8147542>. Accessed on: July 11, 2024.

OLIVEIRA, B. C. S. C. M. De.; SANTOS, L. M. L. dos. Public procurement as a policy for sustainable development. **Revista de Administracao Publica**, v. 49, n. 1, p. 189-205, 2015. Available at: <https://doi.org/10.1590/0034-76121833>. Accessed on: July 11, 2024.

ONE PLANET NETWORK. **12.7 Public Procurement | SDG 12 Hub**. Available at: <https://www.oneplanetnetwork.org/sdg-12-hub>. Accessed on: July 11, 2024.

UNITED NATIONS ORGANIZATION [UN]. **SDG - 12.7 target and indicator on Sustainable Public Procurement implementation | UNEP - UN Environment Programme**. Available at: <https://www.unep.org/explore-topics/resource-efficiency/what-we-do/sustainable-public-procurement/sdg-127-target-and>. Accessed on: July 11, 2024.

ORGANIZATION FOR ECONOMIC COOPERATION AND DEVELOPMENT [OECD]. **General government expenditure | Overview of General Government: Latin America and the Caribbean 2020 | OECD iLibrary**. Available at: <https://www.oecd-ilibrary.org/sites/49b8ce16-pt/index.html?itemId=/content/component/49b8ce16-pt>. Accessed on: July 11, 2024.

PAES, C. O. *et al.* Practices, benefits and obstacles in sustainable public procurement: a systematic literature review. **Revista de Gestão Social e Ambiental**, São Paulo (SP), v. 13, n. 2, p. 21-39, 2020. Available at: <https://rgsa.emnuvens.com.br/rgsa/article/view/1798>. Accessed on: July 11, 2024.

PAGANI, R. N.; KOVALESKI, J. L.; DE RESENDE, L. M. *Methodi Ordinatio*: a proposed methodology to select and rank relevant scientific papers encompassing the impact factor, number of citation, and year of publication. **Scientometrics**, v. 105, n. 3, p. 2109-2135, Dec. 1, 2015. Available at: <https://doi.org/10.1007/s11192-015-1744-x>. Accessed on: July 11, 2024.

PAGANI, R. N.; KOVALESKI, J. L.; RESENDE, L. M. M. Advances in the composition of *Methodi Ordinatio* for systematic literature review. **Ciência da Informação**, [S.l.], v. 46, n. 2, 2018. Available at: <https://revista.ibict.br/ciinf/article/view/1886>. Accessed on: July 11, 2024.

PEÑATE-VALENTÍN, M. C.; SÁNCHEZ-CARREIRA, M. del C.; PEREIRA, Á. The promotion of innovative service business models through public procurement. An analysis of Energy Service Companies in Spain. **Sustainable Production and Consumption**, v. 27, p. 1857-1868, 2021. Available at: <https://doi.org/10.1016/j.spc.2021.04.028>. Accessed on: July 11, 2024.

SAMPAIO, R. C.; LYCARIÃO, D. **Categorical content analysis: application manual**. Brasília: ENAP, 2021.

SANTOS, A. L. T. dos; REIS, A. da C. Theoretical Trends in Risk Management in Sustainable Public Procurement: A Bibliometric Analysis Based on the Scopus and Web of Science Databa-

ses. **Revista de Gestão Social e Ambiental**, São Paulo (SP), v. 15, p. e02733, 2021. Available at: <https://rgsa.emnuvens.com.br/rgsa/article/view/2733>. Accessed on: July 11, 2024.

SILVA, R. C. da *et al.* Sustainable public procurement: the Federal Public Institution's shared system. **Revista de Gestão**, v. 25, n. 1, p. 9-24, 2018. Available at: <https://www.emerald.com/insight/content/doi/10.1108/REGE-11-2017-001/full/html>. Accessed on: July 11, 2024.

SNYDER, H. Literature review as a research methodology: An overview and guidelines. **Journal of Business Research**, v. 104, p. 333-339, 1 nov. 2019. Available at: <https://doi.org/10.1016/j.jbusres.2019.07.039>. Accessed on: July 11, 2024.

SÖNNICHSEN, S. D.; CLEMENT, J. Review of green and sustainable public procurement: Towards circular public procurement. **Journal of Cleaner Production**, v. 245, p. 1-18, Feb. 1, 2020. Available at: <https://doi.org/10.1016/j.jclepro.2019.118901>. Accessed on: July 11, 2024.

SOUZA, L. da R. *et al.* Sustainable bidding: limits, possibilities and advances. **Revista Catalana de Dret Ambiental**, v. 13, n. 1, 2022. Available at: <https://doi.org/10.17345/rcda3302>. Accessed on: July 11, 2024.

TORRES FILHO, D. M. *et al.* Barriers Identified in Sustainable Public Procurement: an analysis of a public organization. **Amazônia, Organizações e Sustentabilidade**, v. 9, n. 2, p. 120, 31 dec. 2020. Available at: <http://dx.doi.org/10.17648/aos.v9i2.1648>. Accessed on: July 11, 2024.

TRANFIELD, D.; DENYER, D.; SMART, P. Towards a Methodology for Developing Evidence-Informed Management Knowledge by Means of Systematic Review. **British Journal of Management**, v. 14, n. 3, p. 207-222, 2003. Available at: <https://doi.org/10.1111/1467-8551.00375>. Accessed on: July 11, 2024.

VEJARATNAM, N.; MOHAMAD, Z. F.; CHENAYAH, S. A systematic review of barriers impeding the implementation of government green procurement. **Journal of Public Procurement**, v. 20, n. 4, p. 451-471, 2020. Available at: <https://doi.org/10.1108/JOPP-02-2020-0013>. Accessed on: July 11, 2024.

ZAGO, M. F. **State purchasing power as a public policy instrument**. Brasília: National School of Public Administration, 2018.

ZUPIC, I.; ČATER, T. Bibliometric Methods in Management and Organization. **Organizational Research Methods**, v. 18, n. 3, p. 429-472, 15 jul. 2015. Available at: <https://doi.org/10.1177/1094428114562629>. Accessed on: July 11, 2024.

Adelquis Stanley Monteiro Santiago

✉ adelquismonteiro@hotmail.com

ORCID: <https://orcid.org/0000-0003-0063-0750>

Responsible Editor
Pedro Roberto Jacobi

Associate Editor
Rylanneive Teixeira

Adriana Kirley Santiago Monteiro

✉ adrianakirley@gmail.com

ORCID: <https://orcid.org/0009-0004-2696-3056>

Submitted on: 11/01/2025

Accepted on: 09/04/2025

2025;28:e90127

Rafael Fernandes de Mesquita

✉ rafael.fernandes@ifpi.edu.br

ORCID: <https://orcid.org/0000-0002-4953-4885>

Calebe Paiva Gomes de Souza

✉ calebepaiva@ufpi.edu.br

ORCID: <https://orcid.org/0000-0002-0664-7898>

José Machado Moita Neto

✉ jmoita@ufpi.edu.br

ORCID: <https://orcid.org/0000-0003-3268-1907>

Data Availability Statement:

The research data are available within the body of the document.

Contribuições Científicas para Superar Barreiras Enfrentadas nas Contratações Públicas Sustentáveis: Análise Sistemática e Bibliométrica

Adelquis Stanley Monteiro Santiago
Adriana Kirley Santiago Monteiro
Rafael Fernandes de Mesquita

Calebe Paiva Gomes de Souza
José Machado Moita Neto

Resumo: Este estudo analisa as barreiras presentes nas Contratações Públicas Sustentáveis (CPS) através da revisão de publicações científicas indexadas na base Web of Science (2013-2022). A metodologia empregada combina técnicas bibliométricas e análise de conteúdo. Os resultados indicam que a maioria das pesquisas possui caráter descritivo e teórico, com foco no conceito de CPS, o que pode limitar sua aplicação prática. Constatou-se também a predominância de estudos nas fases de planejamento e realização das contratações, negligenciando a gestão e fiscalização dos contratos. O estudo recomenda o desenvolvimento de pesquisas aplicadas para subsidiar políticas públicas e estratégias de gestão que superem as barreiras identificadas, promovendo a implementação efetiva da sustentabilidade nas contratações públicas. Ao sistematizar o conhecimento científico sobre o tema, a pesquisa busca fomentar a aplicação prática das CPS, incentivando a participação de diferentes atores e setores governamentais na busca por benefícios socioambientais.

São Paulo. Vol. 28, 2025

Artigo Original

Palavras-chave: Licitações; Sustentabilidade; Obstáculos; Impulsionadores; ODS 12.

Contribuciones Científicas para Superar los Obstáculos a la Contratación Pública Sostenible: un Análisis Sistemático Y Bibliométrico

Adelquis Stanley Monteiro Santiago
Adriana Kirley Santiago Monteiro
Rafael Fernandes de Mesquita

Calebe Paiva Gomes de Souza
José Machado Moita Neto

Resumen: Este estudio analiza las barreras presentes en la Compra Pública Sostenible (CPS) mediante la revisión de publicaciones científicas indexadas en la base de datos Web of Science (2013-2022). La metodología empleada combina técnicas bibliométricos y análisis de contenido. Los resultados indican que la mayoría de las investigaciones son descriptivas y teóricas, centradas en el concepto de CPS, lo que puede limitar su aplicación práctica. También predominan los estudios sobre las fases de planificación y contratación, descuidando la gestión y la inspección de los contratos. El estudio recomienda el desarrollo de investigación aplicada para subvencionar políticas públicas y estrategias de gestión que superen las barreras identificadas, promoviendo la implantación efectiva de la sostenibilidad en la contratación pública. Al sistematizar el conocimiento científico sobre el tema, la investigación busca incentivar la aplicación práctica de las CPS, estimulando la participación de diferentes actores y sectores gubernamentales en la búsqueda de beneficios socioambientales.

São Paulo. Vol. 28, 2025

Artículo Original

Palabras-clave: Licitaciones; Sostenibilidad; Obstáculos; Impulsores; ODS 12.