

SUSTAINABLE CITIES: A CRITICAL REVIEW OF GLOBAL SCIENTIFIC PRODUCTION AND ITS EPISTEMIC ASYMMETRIES

Recibido 09/08/2025
Aceptado 28/10/2025

CIUDADES SOSTENIBLES: REVISIÓN CRÍTICA DE LA PRODUCCIÓN CIENTÍFICA GLOBAL Y SUS ASIMETRÍAS EPISTÉMICAS

CIDADES SUSTENTÁVEIS: REVISÃO CRÍTICA DA PRODUÇÃO CIENTÍFICA GLOBAL E DE SUAS ASSIMETRIAS EPISTÊMICAS

Francisco Javier Serrano-Bosquet

Doctor en Filosofía
Profesor Asociado, Escuela de Humanidades y Educación
Tecnológico de Monterrey, Monterrey, México
<https://orcid.org/0000-0003-3929-4141>
fjavierserrano@tec.mx

Daniel Martínez-Martínez

Maestría en Diseño
Director de área Ambiente Construido, Escuela de Arquitectura, arte y diseño
Tecnológico de Monterrey, Monterrey, México
<https://orcid.org/0009-0001-7623-3172>
dmartinez@tec.mx



ABSTRACT

This article presents a critical review of scientific literature on sustainable cities published between 2015 and 2025 in the Scopus and Web of Science databases. Based on a corpus of 5,155 articles, a mixed-method approach—combining bibliometric, thematic, and relational analysis—is applied to examine dominant topics, collaboration patterns, epistemological gaps, and emerging concepts. The results reveal a research field highly concentrated in the Global North, marked by a prevalence of technical-strategic approaches and low levels of effective international collaboration. At the same time, innovative lines of research are identified, opening the way for a more critical, pluralized, and situated agenda on urban sustainability.

Keywords

sustainable cities, urban planning, scientific publications, documentary analysis, cultural inequality

RESUMEN

Este artículo presenta una revisión crítica de la literatura científica sobre ciudades sostenibles del mundo, publicada entre 2015 y 2025, en las bases de datos Scopus y Web of Science. A partir de un corpus de 5.155 artículos, se aplica un enfoque mixto de análisis bibliométrico, temático y relacional para examinar ejes predominantes, dinámicas de colaboración, vacíos epistemológicos y nociones emergentes. Los resultados muestran una producción altamente concentrada en el Norte Global, con predominio de enfoques técnico-estratégicos y baja internacionalización efectiva. Al mismo tiempo, se identifican líneas de investigación innovadoras que abren posibilidades para una agenda más crítica, plural y situada en torno a la sostenibilidad urbana.

Palabras clave

ciudades sostenibles, planificación urbana, publicación científica, análisis documental, desigualdad cultural

RESUMO

Este artigo apresenta uma revisão crítica da literatura científica sobre cidades sustentáveis do mundo publicada entre 2015 e 2025 nas bases de dados Scopus e Web of Science. A partir de um corpus de 5.155 artigos, aplica-se uma abordagem mista de análise bibliométrica, temática e relacional para examinar eixos predominantes, dinâmicas de colaboração, lacunas epistemológicas e noções emergentes. Os resultados mostram uma produção altamente concentrada no Norte Global, com predominância de abordagens técnico-estratégicas e baixa internacionalização efetiva. Ao mesmo tempo, são identificadas linhas de investigação inovadoras que abrem possibilidades para uma agenda mais crítica, plural e situada em torno da sustentabilidade urbana.

Palavras-chave

ciudades sustentáveis, planejamento urbano, publicação científica, análise documental, desigualdade cultural

INTRODUCTION

Accelerated urbanization - which already concentrates 56% of the world's population and will reach 68% by 2050 (UN-Habitat, 2022) — has intensified the social, environmental, and economic challenges associated with urban life. In this context, cities have become key players in global sustainability strategies (World Commission on Environment and Development, 1987; Bettencourt & West, 2010; Bai, 2016), and the notion of “sustainable city” is a central concept, both for public policy and for scientific production. This interest has given rise to a growing and diverse academic literature, characterized by multiple approaches, heterogeneous indicators, and disparate scales. Such diversity, although valuable, makes it difficult to articulate a clear vision of the field. Hence, there is a need for systematic reviews that enable mapping of the accumulated knowledge, identifying thematic clusters, and highlighting critical gaps.

This article responds to this need through a structured review of the scientific literature published between 2015 and 2025 in Scopus and Web of Science. Based on a database consisting of 5,155 articles worldwide, the evolution of the field, the main thematic lines, collaboration patterns, the most active institutions, and sources of financing are analyzed to contribute to a more critical, plural, and situated understanding of sustainable cities as an object of knowledge. In line with recent bibliometric evaluations focused on SDG 11, which map the thematic expansion and international networks in urban sustainability

(Almulhim et al., 2024), these findings are contrasted with the observable asymmetries in the production and circulation of knowledge.

However, the field is not only growing in volume: it is also configured in validation and recognition circuits that are not neutral. The concentration of capacities, financing, and publishing channels in a few nodes — mainly from the Global North and emerging powers (whose details are analyzed in the results section)— conditions agendas, methods, and visibility, while experiences located in the Global South — mainly from Latin America, Africa, and South Asia— enter with less centrality or under externally defined frameworks. This work positions itself against these tensions by mapping the 2015-2025 production, identifying its lines, networks, and institutions, and, at the same time, problematizing the mechanisms that can reproduce epistemic asymmetries, in dialogue with the previous literature (Parnell & Oldfield, 2014; Pieterse, 2011; Anguelovski et al., 2018; Almulhim et al., 2024; Ottinger, 2024).

METHODOLOGY

GENERAL STRATEGY FOR OBTAINING RELEVANT DATA

Although the methodology implemented has as its starting point and initial inspiration the Scoping Review model proposed by Arksey and O'Malley (2005), it is improved in light of the main

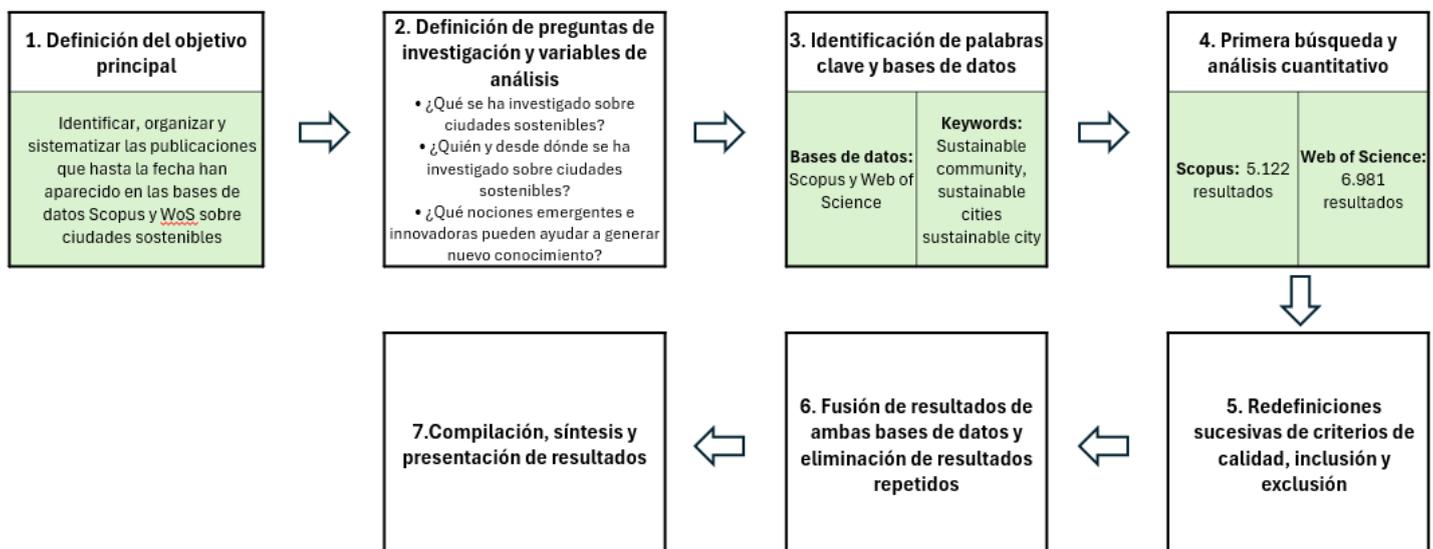


Figure 1. Strategy applied for the search, compilation, and synthesis of data. Source: Prepared by the authors.

recommendations made by Levac et al. (2010) and the incorporation of methodological innovations based on previous experiences and own research, such as those developed in Serrano-Bosquet et al. (2023). Although there is an attempt to include basic notions of the PRISMA-P 2020 (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) research protocol, taken from Estarli et al. (2016) and Vázquez et al. (2022), it was considered more appropriate — at least for the case at hand — not to categorically distinguish research, planning, and action into two stages, as different authors do under this model (Vázquez et al., 2022). On the contrary, a model was designed in which both types of operations are happening and logically and organically providing feedback in 7 steps (Figure 1): (1) define the main objective of the research; (2) define the research questions and analysis variables; (3) select the main keywords and the most appropriate databases; (4) conduct a first systematic search; (5) perform a first preliminary quantitative analysis of the scientific literature, redefining the quality, eligibility and exclusion quality; (6) merge the results of both databases, after eliminating the repetitions; and (7) conduct the compilation, synthesis, and presentation of the results. The strategy used is shown in detail in Figure 1.

RESEARCH QUESTIONS AND ANALYSIS VARIABLES

To guide the bibliometric and thematic analyses of sustainable cities, a set of research questions was defined to structure the study. The questions finally proposed not only address the predominant thematic content and methodological approaches, but also incorporate key dimensions, such as the evolution over time of scientific production, the disciplines involved, and the publication channels. Their formulation seeks to offer a comprehensive view of the field, identify emerging patterns, and detect knowledge gaps that can guide future research:

- What research has been conducted on sustainable cities?
- Who and from where has research on sustainable cities been conducted?
- Which emerging and innovative notions can help generate new knowledge?

To answer these questions, a mixed strategy of thematic, bibliometric, and relational analysis was applied. In the first case, the question is addressed through the thematic analysis of the contents, the research lines, emerging categories, and methodological orientations are considered as variables. The second question is explored through analysis of institutional affiliations, the authors'

geographical location, collaboration networks, and sources of funding. Finally, emerging notions were traced that point to an epistemological and conceptual renewal of the field, one that addresses proposals that go beyond the dominant technical-strategic approaches.

Each of these levels is articulated throughout the article, allowing the development of an integrated, comprehensive, and critical vision of the current state of scientific production on sustainable cities.

SELECTION OF THE MOST APPROPRIATE DATABASES AND THE MAIN KEYWORDS

The electronic bibliographic databases, Scopus and Web of Science (WoS), were chosen because they are recognized as the most comprehensive and for the quality and impact of the research they contain (Ball, 2021). After this choice, the next step was to identify the most appropriate keywords for our research and the search criteria. After testing with the following terms in English: "Sustainable community", "sustainable cities", "sustainable city", "ecocity", and "green city", the final descriptors with which we worked were:

Table 1. Descriptors for the database search. Source: Prepared by the authors.

Database	Descriptor
Scopus	KEY ("Sustainable community") OR KEY ("sustainable cities") OR KEY ("sustainable city")
Web of Science	"Sustainable community" (Topic) or "sustainable cities" (Topic) or "sustainable city" (Topic)

FIRST SYSTEMATIC SEARCH AND REDEFINITION OF QUALITY, ELIGIBILITY, AND EXCLUSION CRITERIA

A first systematic search identified 5122 titles in Scopus and 6981 in WoS. After an initial analysis of the obtained references, it was considered appropriate to refine the quality, eligibility, and exclusion criteria. At first, the search was limited to research articles, book chapters, conference chapters, and books. Subsequently, the search was restricted to works published between 2015 and 2025. Given the number of references obtained and what was observed in other research, the study focused on those articles for which the full title, abstract, and keywords were available. Finally, the results from the two databases were merged, and duplicate results were removed. These steps and the number of results that were obtained in each case are summarized in Table 2.

Table 2. Data inclusion and exclusion criteria. Source: Prepared by the authors.

Moment	Selection criteria	# of results	
		Scopus	Web of Science
1	Keywords	5,122	6,981
2	Types of documents	4,812	6,607
3	2015-2025	4,012	5,476
4	Only articles	2,468	4,315
5	Publications with title, abstract, and keywords	2,410	4,212
6	Merging of databases and removal of repeated results (1,419)	5,155	

METHODOLOGICAL CLARIFICATIONS AND TRANSPARENCY.

The bibliographic search did not apply language restrictions: All the records retrieved by the queries defined in Scopus and Web of Science within the 2015-2025 period were included. The fine-tuning and normalization of the corpus - duplication, revision of fields, and standardization of names of countries, institutions, and keywords - were performed in Microsoft Excel 365.

For the thematic analysis and the identification of conceptual clusters based on titles, abstracts, and keywords, generative AI assistance was used (ChatGPT, OpenAI; consultation: September 2025), limited to support tasks: Textual synthesis, preliminary semantic grouping, and proposal of thematic labels. All the final analytical decisions - definition of lines, validation of categories, and interpretation - were made by the authors, by contrasting the proposed groupings with the articles' original content and with the specialized literature.

To mitigate biases and favor reproducibility: (i) An encoding protocol was applied with explicit criteria to assign categories; (ii) a manual verification was performed on stratified random samples of the corpus; and (iii) a record of relevant prompts and outputs of the AI tool was kept, along with intermediate versions of co-occurrence matrices and tally charts. The visualizations (annual series, geographical distribution, concentration by journals/institutions, and co-occurrence heatmaps) were prepared from these matrices in Excel and with the authors' design tools.

To prepare the map of collaborations (Figure 6), based on the 2015-2025 Scopus and Web of Science corpora, co-authorship links between countries were quantified. To promote readability, only links with ≥ 2 co-publications were included. The paths are represented

as great circle arcs in a Robinson projection (WGS84), with re-entry when cross-checking the international meridian of date change ($\pm 180^\circ$), on a Natural Earth 1:110m background (continents in light gray; oceans in white). The intensity of collaboration is encoded by a high-contrast palette: purple (2), navy blue (3), orange (4-6), teal (7-9), and red (≥ 10). The ends of the lines were in the national capitals as cartographic anchor points; the positions of the nodes are referential and do not correspond to the co-authors' actual cities of affiliation. The results were exported in PNG (300 dpi) and SVG.

Ethical note. Generative artificial intelligence was used solely for instrumental writing and editing purposes. This tool was not used to generate data and did not replace the expert criterion. To avoid inaccuracies, all the content was checked against the primary sources. The final responsibility for the methodology, the analysis, and the conclusions lies entirely with the authors.

COMPILATION, SYNTHESIS, AND PRESENTATION OF RESULTS

This generated a total of 5,155 documents that were organized in a bibliographic database using Excel software with the following fields: a) Database, b) author(s), c) title of the work, d) year, e) journal, f) affiliation of the authors, g) abstract, h) keywords, and i) funding organizations.

RESULTS AND DISCUSSION

MAIN THEMES IDENTIFIED

The database analyzed shows a sustained growth in research on sustainable cities, with a significant uptick since 2019 (Figure 2), in parallel with the strengthening of the 2030 Agenda and SDG 11 - Sustainable Cities

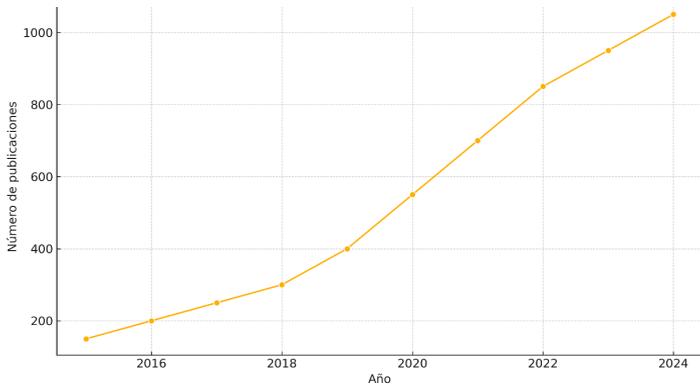


Figure 2. Publications per year. Source: Prepared by the authors.

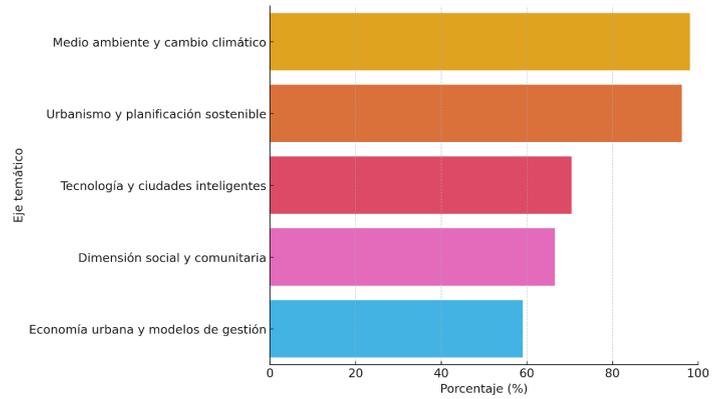


Figure 3. Presence of each thematic line in the scientific literature. Source: Prepared by the authors.

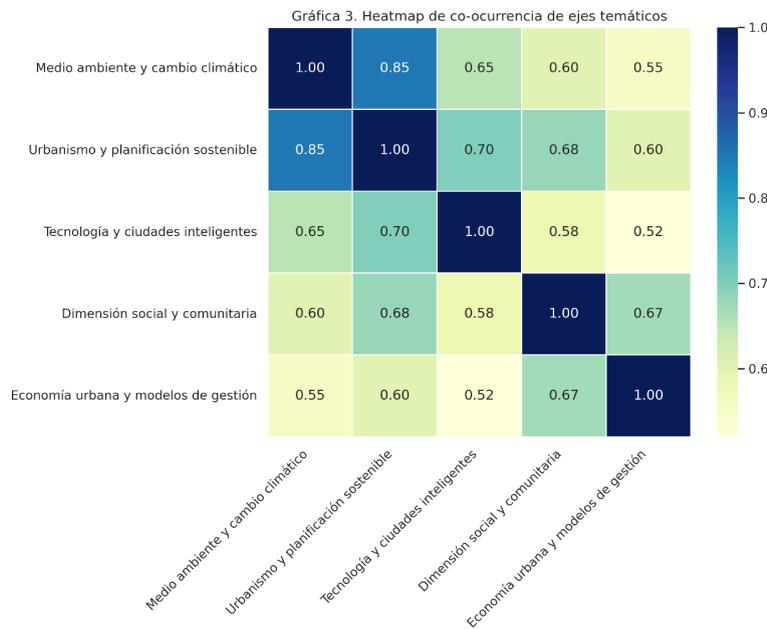


Figure 4. Heatmap of co-occurrence of thematic lines. Source: Prepared by the authors.

and Communities (United Nations, 2019), as well as the increase in financing and institutional prioritization of the topic.

The semantic analysis, reinforced with co-occurrence techniques, allowed identifying five central thematic lines (Figure 3):

- Environment and climate change (98.08%): Work focused on mitigation, adaptation, green infrastructure, air quality, and energy efficiency.
- Urbanism and sustainable planning (96.16%): Studies on urban morphology, density, public space, transport, and land use.
- Technology and smart cities (70.46%): Big Data, sensors, modeling, GIS, and digital governance as key tools.

- Social and community dimension (66.52%): Participation, spatial justice, inclusion, and community resilience.
- Urban economy and management models (59.07%): Circular economy, governance, institutional innovation, and financing

The data show a thematic bias towards the environmental and urbanistic. This trend expresses a technical-strategic rationality focused on ecological conservation and spatial optimization, anticipated by Jenks and Jones (2010) and exposed, though criticized today, by authors such as Clark (2020) and Ziosi et al. (2022), Birkeland (2008), Birkeland (2020), Silva et al. (2024), and Sharifi et al. (2024). In contrast, social and economic approaches appear less developed, which reveals an epistemological imbalance. Although recent

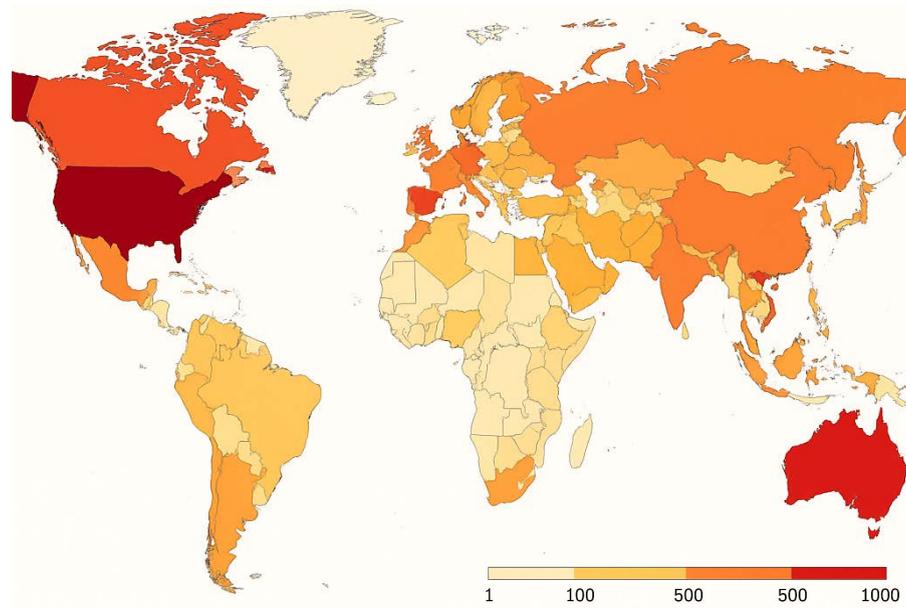


Figure 5. Geographical distribution of publications. Source: Prepared by the authors.

advances have been observed in social and governance issues, asymmetries persist that invite us to review the frameworks that structure urban sustainability critically.

A key aspect is the thematic intersection. Most of the lines appear combined with the others, reflecting a holistic and interdisciplinary approach to the complexity of contemporary urban challenges. These connections, as evidenced by the co-occurrence heatmap, allow visualization of conceptual clusters that structure the field (Figure 4).

As noted by Purwandari et al. (2025) and Wei et al. (2025), this type of analysis not only maps knowledge structures but also guides future agendas. Such intersections can be understood as manifestations of a complex rationality, typical of systems thinking.

From the theoretical level, normative (such as the SDGs), technical-environmental (resilience, impact), systemic (multi-level governance), and social (right to the city, environmental justice) frameworks are identified. Although empirical and quantitative approaches predominate, critical approaches that question technocratic hegemony and disciplinary fragmentation also emerge.

Methodological diversity is growing, from exploratory studies and urban cases to predictive modeling. Tools such as GIS, Big Data, AI, and participatory methods reflect a field in transition towards more explanatory and propositional approaches.

Interdisciplinarity, although widely declared, faces epistemological and operational tensions. Fragmentation between disciplines, disarticulation between scales

(local-global), and obstacles to translating knowledge into action persist. Among the most recurrent limitations are the overrepresentation of technological approaches, the limited development of qualitative and participatory studies, and the low attention to dimensions such as culture, health, or education. These limitations are accentuated by the geographical concentration of scientific production in the Global North, as well as by the limited ethical problematization of urban digitalization processes and the limits of predictive models.

Faced with this growing technical sophistication, it is crucial to prevent instrumental rationality from being imposed as an exclusive paradigm. Urban sustainability requires articulating technological efficiency, environmental governance, and social welfare, as suggested by emerging integrative frameworks (Javidroozi et al., 2023). Likewise, urban redesign must incorporate nature as a structuring axis, beyond its ecological value, in a logic of profound territorial transformation (Harms et al., 2024).

Consolidating a real transdisciplinarity implies more than combining disciplines: it requires integrating diverse knowledge, incorporating subaltern voices, and constructing context-sensitive epistemic frameworks.

SCIENTIFIC PRODUCTION ACTORS AND STRUCTURES ON SUSTAINABLE CITIES: GEOGRAPHIES, DISCIPLINES AND COLLABORATIONS

The analysis of the literature allows the identification of the actors, networks, and institutions that shape

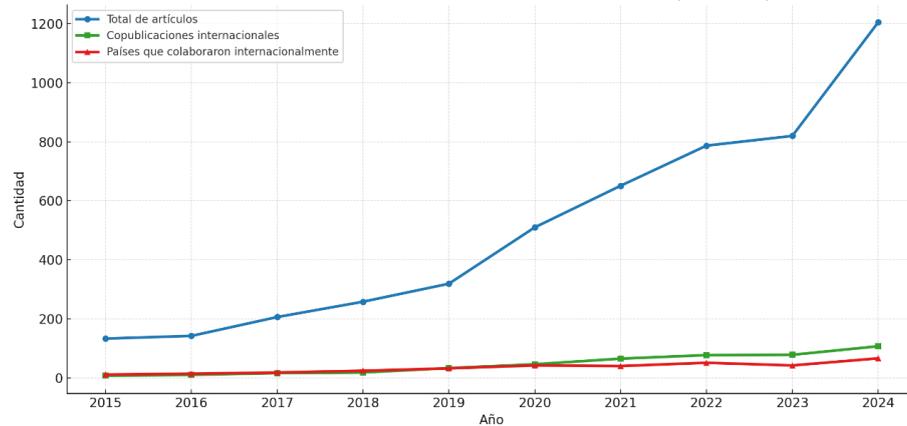


Figure 6. Evolution of international collaboration. Source: Prepared by the authors.

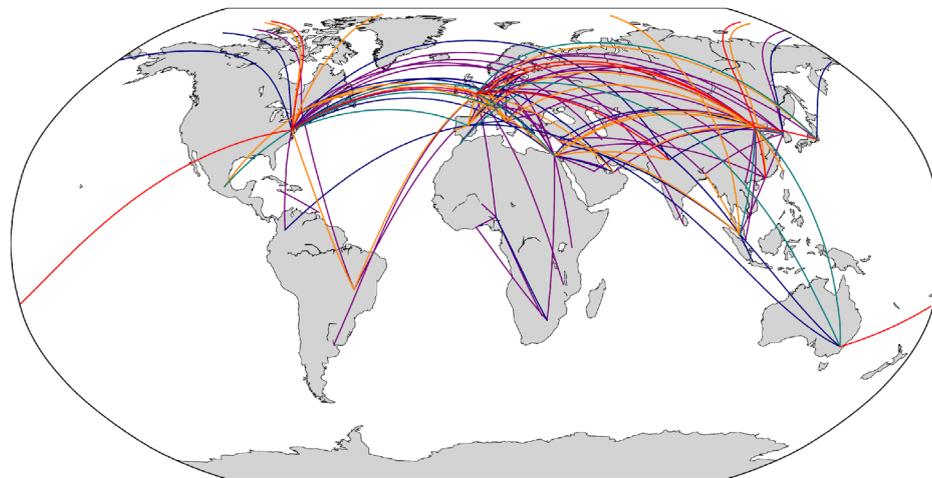


Figure 7. International collaboration network (countries). Source: Prepared by the authors.

scientific production on urban sustainability. This includes authorship patterns, more active regions and research centers, evolution of collaboration networks, and funding structures and editorial validation.

Geographical location of scientific production

Scientific production on sustainable cities is concentrated — as mentioned above - in countries of the Global North (China, the United States, the United Kingdom, Germany, India, Spain, and Australia), which not only lead in volume, but also act as central nodes of the global epistemic network (Figure 5).

This concentration reflects both institutional capacities and structural inequalities of the international science and technology system. However, the participation of 141 countries and more than 5,000 institutions shows a global expansion of scientific interest. In this sense,

the gradually increasing presence of countries from the Global South - Brazil, Mexico, Colombia, South Africa, Iran, or Malaysia - confirms this expansion, although usually from peripheral positions.

These dynamics invite us to ask ourselves about the geography of knowledge: Which cities are studied? Who studies them and from what perspectives? Key questions to rethink the networks and agendas of sustainable urban knowledge.

The evolution of international collaboration

During the period studied, international scientific collaboration on sustainable cities has remained low and stable. Less than 10% of the articles are international co-publications, suggesting that national or institutional frameworks still dominate production. Although an average of 30 countries participate per year, there are no indications of a significant opening towards a fully global network (Figure 6).

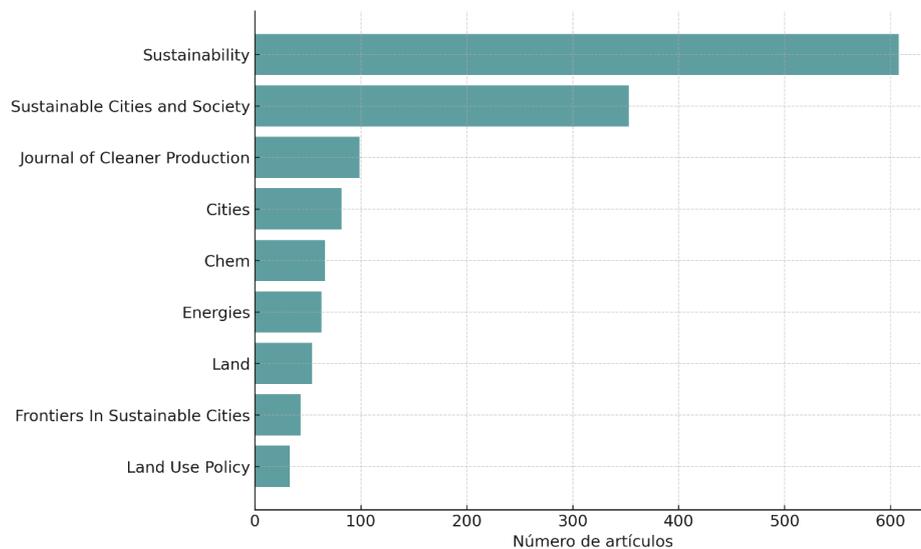


Figure 8. Most relevant journals or sources. Source: Prepared by the authors.

International collaboration network

The scientific collaboration network, shown in Figure 7, reveals that only 8% of the possible bilateral combinations between countries have been activated. Although 102 countries participate, the network is still dominated by nodes from the Global North, mainly Western Europe, North America, and East Asia. At the same time, regions such as sub-Saharan Africa, South Asia, and Latin America have lower density and usually occupy peripheral positions.

Figure 7 shows a network with high centrality in universities and research centers in Western Europe and North America, whose interregional collaborations sustain the most intense links. Latin America and Southeast Asia participate through specific corridors - often mediated by Northern partners - while Africa and South Asia exhibit islands of activity and less intra-regional interconnection. Overall, the graph suggests a polycentric hierarchy, with a clearly differentiated nucleus relative to the periphery.

These regularities respond not only to accumulated scientific capacities and accessibility to publishing funds and platforms, but also to idiomatic affinities and evaluation criteria that tend to reward specific agendas and methodologies. Therefore, in addition to promoting interregional collaboration, it is advisable to favor mechanisms for co-producing knowledge and recognition criteria that value local and comparative perspectives, thereby reducing biases toward centrism and cognitive dependence.

Most relevant journals or sources

The countries with the highest volume of publications also concentrate the field's main editorial channels and

sources of financing, which evidence and reinforce its centralized structure, with little representation from regions such as Africa and Latin America.

The ten most common journals, including Sustainability, Cities, Sustainable Cities and Society, and the Journal of Cleaner Production, consolidate an agenda focused on environmental sustainability, urbanism, and interdisciplinary approaches. This concentration strengthens specific editorial languages and criteria, but it can marginalize critical or situational perspectives that do not fit these agendas (Figure 8).

Although open access predominates, this model also imposes economic challenges, especially for researchers without institutional support. In addition, the limited presence of journals from the Global South restricts epistemic diversity. However, new regional publications are emerging that expand circulation and recognize urban experiences from other latitudes.

It should be noted that many of the most influential journals are registered in countries of the Global North — such as the United Kingdom, the Netherlands, or Switzerland — and are published by large commercial publishers (Elsevier, MDPI, Springer Nature, or Taylor & Francis). This editorial concentration contributes to shaping the logics of access, indexing, and prestige that shape scientific practices on urban sustainability.

Institutions with the highest scientific production

The institutional analysis reveals that a small group of universities concentrates scientific production on sustainable cities. Among the 15 most productive are the Chinese Academy of Sciences, the University of California System, the University of London, the

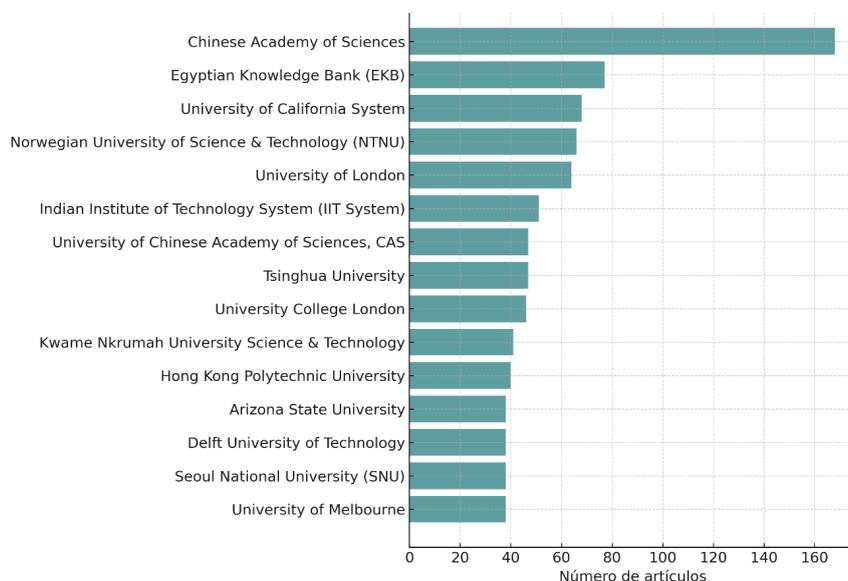


Figure 9. Institutions with the most publications. Source: Prepared by the authors.

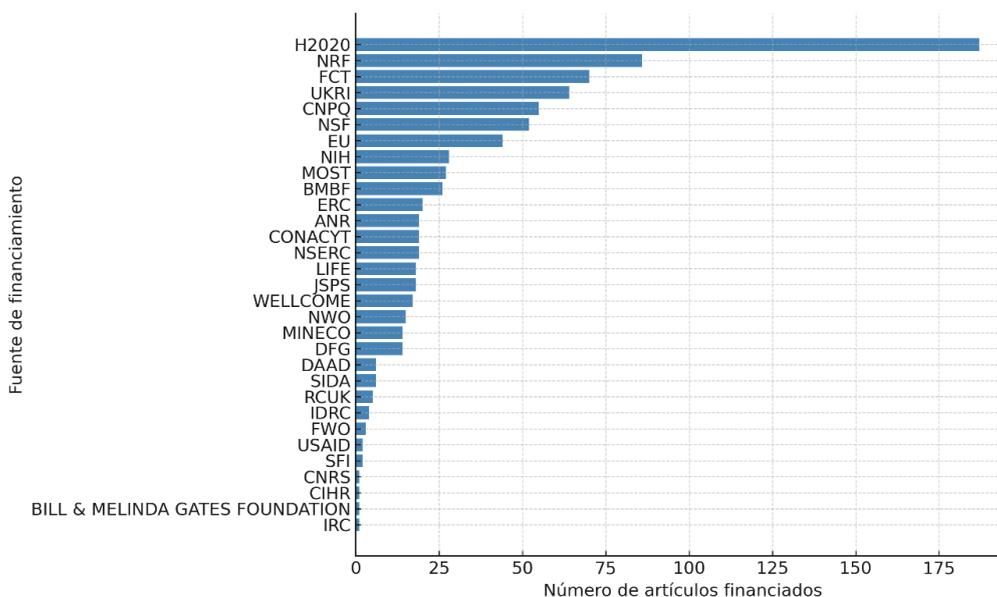


Figure 10. Primary sources of financing. Source: Prepared by the authors.

Norwegian University of Science and Technology, and the University of Melbourne (Figure 9).

These institutions, mainly from the Global North, reflect an uneven distribution of resources and academic visibility. However, there are also actors from the Global South, such as the Kwame Nkrumah University of Science & Technology (Ghana) or the Egyptian Knowledge Bank, which suggests a progressive — although still incipient — geographical diversification. This institutional composition reinforces the need for public policies supported by context-sensitive urban science (Manrique et al., 2024) that promote equity in knowledge production, strengthen local capacities,

and recognize knowledge within the global debate on urban sustainability.

Main sources of financing

The analysis of the sources of financing allows an understanding of both the viability of the projects and the political orientations shaping the production of knowledge in urban sustainability. National agencies, such as the National Natural Science Foundation of China (NSFC), the National Science Foundation (USA), and the Horizon 2020 program of the European Union, stand out. These institutions not only contribute resources but also define thematic frameworks and

evaluation criteria that influence the global agenda (Figure 10).

Likewise, multilateral organizations such as the World Bank, UN-Habitat, and UNDP have co-financed urban projects — especially in the Global South -aligned with strategic objectives such as climate resilience, territorial equity, or poverty reduction. This combination of sources reflects a knowledge governance marked by international priorities and the unequal distribution of research resources.

Taken together, these patterns suggest that it is not enough to describe volumes and flows: it is necessary to interrogate how knowledge is validated and who achieves recognition. Beyond the metrics of volume, co-authorship, or co-occurrence, the results can be read in the light of epistemic injustice: Mechanisms by which certain actors, territories, or research traditions see the credibility and recognition of their knowledge undermined in urban and environmental circuits. This framework helps to explain the underrepresentation of regions of the Global South in strategic positions of collaboration and citation, as well as the concentration of agendas and validation flows in specific nodes of the North. Consequently, a critical reading of “sustainable cities” requires complementing bibliometric indicators with the examination of recognition practices, citation circuits, and hierarchies of legitimacy in the production and circulation of knowledge (Ottinger, 2024).

EMERGING CLASSIFICATIONS AND NOTIONS WITH INNOVATIVE POTENTIAL

Based on the analysis of the scientific production carried out, it was also possible to identify emerging categories, key notions, and areas with potential for conceptual innovation that are worth specifically pointing out:

Emerging thematic categories

The semantic analysis made it possible to identify research lines that are still marginal in quantitative terms, but with a high capacity for expansion and conceptual innovation:

- Urban culture and heritage: Linking sustainability with cultural identity, creativity, responsible tourism, and education. It aligns with UNESCO (2013), which defines culture as an essential and energizing component of sustainable development.
- Urban health and well-being: The relationship between sustainability and physical and mental health, particularly regarding equitable access to green infrastructure and basic services.
- Spatial justice and the right to the city: A critical

approach that questions processes of exclusion, gentrification, and vertical governance.

- Social innovation and citizen participation: Emphasis on the active role of communities in the transformation of urban space.

These emerging lines suggest a shift from technical-functional approaches towards more integrative frameworks, sensitive to context and open to critical perspectives, thereby consolidating, in the words of Almulhim et al. (2024), a global agenda around sustainable urban development.

Transversal concepts with heuristic power

Alongside the most common keywords, concepts that articulate the field discursively and serve as hubs of theoretical innovation were identified. These include:

- Urban resilience
- Collaborative governance
- Urban metabolism
- Green-blue infrastructure
- Territorial perspective

These terms function as interdisciplinary bridges and as conceptual operators capable of renewing the analysis of sustainable urban systems.

Thematic gaps and epistemological blinds

Despite the thematic breadth of the field, there are still unexplored areas that represent opportunities to move towards a more critical and inclusive sustainability. These include:

- Educational dimension: Little attention to the learning processes, urban literacy, and citizenship training.
- Informal economies and urban poverty: Barely addressed, despite their relevance in multiple contexts.
- Intersectionality: Limited incorporation of gender, age, or ethnic diversity perspectives.

Rather than technical omissions, these gaps reflect epistemological blind spots that reproduce biases in the very definition of the urban and the sustainable.

Potential for conceptual innovation

From the epistemological point of view, a potential for epistemological renewal is recognized in the convergence of three trends:

- The emergence of transdisciplinary approaches.
- The incorporation of narratives from the Global South.

- The problematization of sustainability as a field in dispute, beyond technocratic solutions.

These currents, albeit still incipient, question the neutrality of the technique, make the political dimension of sustainability visible, and advocate for more inclusive, critical, and contextualized forms of urbanism. Concepts such as urban justice, community resilience, co-production of knowledge, or regenerative cities are beginning to shift traditional frameworks towards more integrated, plural, and participatory perspectives. Authors such as Birkeland (2008), Birkeland (2020), Ziosi et al. (2022), or Clark (2020) propose, as already partly anticipated, to break with the dominant technical-strategic rationality, which opens the way to models that integrate environmental justice, epistemic diversity, and eco-social regeneration as central lines of sustainable urban transformation.

CONCLUSIONS

This systematic review has allowed for a critical mapping of the scientific field of sustainable cities over the last decade. Based on a combined thematic, bibliometric, and relational approach, the main research lines, institutional actors, geographies of knowledge, and emerging notions shaping the academic debate on urban sustainability have been identified.

The findings confirm a significant expansion of the field, both in volume of publications and in institutional and thematic diversity. However, this expansion has not been accompanied by a profound structural transformation. Scientific production continues to be dominated by institutions from the Global North, concentrated in asymmetric collaboration networks and supported by funding sources that reinforce technocratic and instrumental logics. In thematic terms, a rationality focused on environmental conservation and urban efficiency predominates, which tends to marginalize social, cultural, political, and educational dimensions key to a truly inclusive sustainability.

Despite these limitations, the review has also identified emerging research lines with high transformative potential. Concepts such as urban justice, community health, social innovation, cultural heritage, or eco-social regeneration are beginning to articulate new interpretative frameworks that question technical neutrality and open the way to more transdisciplinary, critical, and contextualized perspectives. These notions not only expand the field of study but also open possibilities to imagine other urban futures that are more just, resilient, and plural.

In this sense, this work is not limited to offering a systematization of the available knowledge; it also proposes analytical tools to identify gaps, interrogate dominant agendas, and strengthen new research orientations. The mapping carried out — in thematic, institutional, and geographical terms — can be helpful for researchers, academic groups, collaborative networks, and scientific policymakers who wish to contribute to a more diverse and situated urban collective intelligence.

As a starting point, this review invites rethinking the modes of production and circulation of knowledge about urban sustainability. What perspectives are absent? Which cities are not investigated? Which knowledge could enrich the debate if it were acknowledged? Faced with the complexity of contemporary urban challenges, it becomes urgent to move towards a more open, inclusive, and co-responsible science, capable of sustaining the transition to truly sustainable cities in every way.

CONTRIBUTION OF AUTHORS CRedit

Conceptualization, F.J.S.B., D.M.M.; Data Curation, F.J.S.B., D.M.M.; Formal analysis, F.J.S.B., D.M.M.; Research, F.J.S.B., D.M.M.; Methodology, F.J.S.B., D.M.M.; Project Management, F.J.S.B., D.M.M.; Resources, F.J.S.B., D.M.M.; Software, F.J.S.B., D.M.M.; Supervision, F.J.S.B., D.M.M.; Validation, F.J.S.B., D.M.M.; Visualization, F.J.S.B., D.M.M.; Writing – original draft, F.J.S.B., D.M.M.; Writing – revision and editing, F.J.S.B., D.M.M.

ACKNOWLEDGMENTS

The authors would like to thank Tecnológico de Monterrey for the institutional support and access to the bibliographic resources necessary for the realization of this study. This research did not receive any specific funding.

REFERENCIAS BIBLIOGRÁFICAS

Almulhim, A. I., Sharifi, A., Aina, Y. A., Ahmad, S., Mora, L., Filho, W. L., & Abubakar, I. R. (2024). Charting sustainable urban development through a systematic review of SDG11 research. *Nature Cities*, 1, 677–685. <https://doi.org/10.1038/s44284-024-00117-6>

Anguelovski, I., Connolly, J. J. T., Garcia-Lamarca, M., Cole, H., & Pearsall, H. (2018). New scholarly pathways on green gentrification: What does the urban 'green turn' mean and where is it going?, *Progress in Human Geography*, 43(6),

1061–1086, <https://doi.org/10.1177%2F0309132518803799>

Arksey, H. y O'Malley, L. (2005) Scoping studies: towards a methodological framework, *International Journal of Social Research Methodology*, 8(1), 19–32, <https://doi.org/10.1080/1364557032000119616>

Bai X. (2016). Eight energy and material flow characteristics of urban ecosystems. *Ambio*, 45(7), 819–830. <https://doi.org/10.1007/s13280-016-0785-6>

Ball, Rafael. (2021). *Handbook Bibliometrics*, De Gruyter Saur. <https://doi.org/10.1515/9783110646610>

Bettencourt, L. M. A., & West, G. B. (2010). A unified theory of urban living. *Nature*, 467, 912–913. <https://doi.org/10.1038/467912a>

Birkeland, J. (2008). *Positive development: From vicious circles to virtuous cycles through built environment design*. Earthscan. Routledge. <https://doi.org/10.4324/9781849772235>

Birkeland, J. (2020). *Net-positive design and sustainable urban development*. Routledge.

Clark, J. (2020). *Uneven innovation: The work of smart cities*. Columbia University Press.

Estarli, M., Aguilar Barrera, E.S., Martínez-Rodríguez, R., Baladia, E., Duran Agüero, S., Camacho, S., Buhning, K., Herrero-López, A., Gil-González, D.M. (2016). Ítems de referencia para publicar Protocolos de Revisiones Sistemáticas y Metaanálisis: Declaración PRISMA-P 2015. *Revista Española de Nutrición Humana y Dietética* 20, 148–160. <https://doi.org/10.14306/renhyd.20.2.223>

Harms, P., Hofer, M., & Artmann, M. (2024). Planning cities with nature for sustainability transformations: A systematic review. *Urban Transformations*, 6(9). <https://doi.org/10.1186/s42854-024-00066-2>

Javidroozi, V., Carter, C., Grace, M., & Shah, H. (2023). Smart, sustainable, green cities: A state-of-the-art review. *Sustainability*, 15(6), 5353. <https://doi.org/10.3390/su15065353>

Jenks, M., & Jones, C. (Eds.). (2010). *Dimensions of the Sustainable City*. Springer.

Levac, D., Colquhoun, H. y O'Brien, K., (2010). Scoping studies: advancing the methodology, *Implementation Science* 5 69, <https://doi.org/10.1186/1748-5908-5-69>.

Manrique Rueda, G., Poirier Stephens, Z., Therrien, M.-C., Kestens, Y., Arnaud, J., & Pascal, N. (2024). City/science intersections: A scoping review of science for policy in urban contexts. *Cities*, 152, 105132. <https://doi.org/10.1016/j.cities.2024.105132>

Ottinger, G. (2024). Careful knowing as an aspect of environmental justice. *Environmental Politics*, 33(2), 199–218. <https://doi.org/10.1080/09644016.2023.2185971>

Parnell, S., & Oldfield, S. (Eds.). (2014). *The Routledge Handbook on Cities of the Global South*. Routledge.

Pieterse, E. (2011). Grasping the unknowable: Coming to grips with African urbanisms. *Social Dynamics*, 37(1), 5–23. <https://doi.org/10.1080/02533952.2011.569994>

Purwandari, C. A., Purwanto, E., Dewi, C. S., & Salsabil, S. H. (2025). Sustainable Cities and Communities: Bibliometric Analysis of Research Trends and Scholarly Networks. *International Journal of Business, Law, and Education*, 6(1), 1013 - 1029. <https://doi.org/10.56442/ijble.v6i1.1154>

Serrano-Bosquet, F. J., Carreño Correa, L. M., & Giorgi, E. (2023). Review: Technological resources for vulnerable communities. *Technology in Society*, 75, 102354. <https://doi.org/10.1016/j.techsoc.2023.102354>

Sharifi, A., Allam, Z., Bibri, S. E., & Khavarian-Garmsir, A. R. (2024). Smart cities and sustainable development goals (SDGs): A systematic literature review of co-benefits and trade-offs. *Cities*, 146, 104659. <https://doi.org/10.1016/j.cities.2023.104659>

Silva, R. H., Zwarteven, M., Stead, D., & Bacchin, T. K. (2024). Bringing Ecological Urbanism and Urban Political Ecology to transformative visions of water sensitivity in cities. *Cities*, 145, 104685. <https://doi.org/10.1016/j.cities.2023.104685>

UNESCO. (17 de mayo de 2013). The Hangzhou Declaration: Placing culture at the heart of sustainable development policies. UNESCO Digital Library. <https://unesdoc.unesco.org/ark:/48223/pf0000221158>

UN-Habitat (2022), *World Cities Report 2022: Envisaging the Future of Cities*, Nairobi.

United Nations Department of Economic and Social Affairs. (2019). Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable. Department of Economic and Social Affairs. <https://sdgs.un.org/goals/goal11>

Vázquez Parra, J. C., Cruz-Sandoval, M., y Carlos Arroyo, M. (2022). Social Entrepreneurship and Complex Thinking: A Bibliometric Study. *Sustainability*, 14 (20), 13187. <https://doi.org/10.3390/su142013187>

WCED, World Commission on Environment and Development, (1987). *Our Common Future*. Oxford University Press.

Wei, Y., Wei, X., Ye, Z. y Fan, J. (2025). A bibliometric analysis of food security and urbanization: insights and implications. *Frontiers in Sustainable Cities*. 7:1459493. <https://doi.org/10.3389/frsc.2025.1459493>

Ziosi, M., Hewitt, B., Juneja, P., Taddeo, M., & Floridi, L. (2022). Smart cities: Reviewing the debate about their ethical implications. *AI & Society*, 39, 1185–1200. <https://doi.org/10.1007/s00146-022-01558-0>

