ISSN: 2359-1048
Novembro 2023

SUSTAINABLE CITIES THROUGH THE LENS OF SUSTAINABLE DEVELOPMENT GOALS: SCOPE REVIEW

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Introdução
In 2015, the United Nations General Assembly, aiming to ensure a more sustainable future for all nations, established the 17 Sustainable Development Goals. In this project, the United Nations' 2030 Agenda recognizes the pivotal role of cities as centers of economic, social, and cultural life that can simultaneously address multiple sustainability objectives. However, despite widespread recognition of the need to develop integrated approaches for implementing the Sustainable Development Goals (SDGs) in cities, limited progress has been achieved thus far.
Problema de Pesquisa e Objetivo
This article aims to analyze the intersection between the literature on the Sustainable Development Goals (SDGs) and sustainable cities to contribute to developing an integrated approach to the SDGs in urban areas.
Fundamentação Teórica
As cornerstones of sustainable development (WCED, 1987; Castells, 2000), cities balance growth and environmental preservation (Hiremath et al., 2013). The rise of smart sustainable cities highlights environmental and social priorities in urban planning (Bibri & Krogstie, 2017; Ahad et al., 2020). Influenced by the UN's SDGs (del Río Castro et al., 2021), cities address global challenges from poverty to environmental policies (Griggs et al., 2014). As pivotal players, cities must embrace agile governance and innovation to achieve 65% of SDGs (Alliance, 2015; Akuraju et al., 2022).
Metodologia
We conducted a literature scope review, utilizing bibliographic research to identify, map topics, summarize research findings, and extract inferences from the existing literature on the state of research activity
Análise dos Resultados
Our research highlights a rising academic focus on sustainable cities and their ties to the UN's Sustainable Development Goals (SDGs). Key themes include urban development, governance, and social inequality, especially around SDG 11 (sustainable cities). We emphasize the need for smart governance in achieving SDGs and recognize the link between sustainable cities and social inequality. The importance of precise indicators and refined research methods is also underscored.
Conclusão
The study reveals a growing academic interest in sustainable cities but also recognizes the need for deeper collaboration across various fields and a more holistic approach to address all interconnected SDGs. Thus, besides providing an overview of the literature on the subject and identifying areas of research requiring further attention, it also suggests ongoing efforts by policymakers and academics to promote sustainability at local and global levels, aligned with the objectives of the UN's 2030 Agenda.
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Palavras Chave
Sustainable Cities, Sustainable Development Goals, Scope Review

Agradecimento a orgão de fomento
Os autores desejam expressar seu agradecimento à Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES) pelo apoio na realização desta pesquisa.

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1 INTRODUCTION

Policymakers, researchers, and urban residents are increasingly concerned about the future of cities, particularly in mapping demographic, economic, social, and environmental disparities and political pathways that will lead to more sustainable development outcomes. This concern arises from a growing recognition within the multilateral system of the pivotal role urban areas play in ensuring sustainable futures across a range of critical issues, including climate change, inclusive economic growth, poverty eradication, housing, infrastructure, essential services, productive employment, food security, and public health. Analyzing a range of urban futures provides an investigative insight into how cities can prepare for an ever-changing world (UN-Habitat, 2022). In this regard, the concept of smart and sustainable cities has emerged in recent years and is rapidly gaining global momentum and attention as a promising response to the challenge of urban sustainability (Bibri & Krogstie, 2017).

Cities play a crucial role in the fight against climate change, increasingly seeking ways to preserve natural and economic resources (Ahvenniemi et al., 2017). The United Nations (UN) believes COVID-19 offers an opportunity to look back, rectify past mistakes, and transform cities globally into more resilient, inclusive, green, and economically sustainable entities. The vision for the future of cities should be guided by the norms of the New Urban Agenda and the 2030 Agenda for Sustainable Development (UN-Habitat, 2022).

New smart technologies are seen as a critical factor in reducing greenhouse gas emissions and improving the energy efficiency of cities. However, these technologies need to be intelligent, lean, integrated, cost-effective, and resource-efficient, impacting not only environmental sustainability goals but also citizens' well-being and financial sustainability (Ahvenniemi et al., 2017). Sustainability assessment should be an integral part of city development, integrating sustainability and smart city frameworks to consider both visions in performance measurement systems (Ahvenniemi et al., 2017). For this reason, international and European standardization bodies are adopting the terminology "smart sustainable cities" (Cen-Cenelec-Etsi, 2015; Itu, 2016).

In 2015, the United Nations General Assembly established the UN 2030 Agenda, a global plan with 17 Sustainable Development Goals (SDGs) to achieve by 2030, to create a better world for all peoples and nations. Thus, the development of intelligent technologies is paving the way for a more sustainable path, as cities are critical in this race against time to achieve these goals by 2030. The 17 SDGs of the UN Agenda 2030 have challenged the capacity of many cities worldwide. Many of the remaining Sustainable Development Goals (SDGs) find their critical mass and the necessary scale to drive their realization in cities, where smart technologies and platforms encounter fertile ground for full deployment and exploration. Therefore, cities represent a kind of laboratory to develop, experiment, and test the efficiency and effectiveness of intelligent solutions for achieving sustainable development goals (Blasi et al., 2022).

Although the SDGs are still seen as a set of largely independent objectives to be achieved rather than a holistic system of goals to be achieved through urban development (Blasi et al., 2022), the United Nations 2030 Agenda recognizes the fundamental role of cities as centers of economic, social, and cultural life that can simultaneously address multiple sustainability goals and offer faster and practical responses to related challenges (Kaika, 2017). The best way for cities to better confront changing conditions and restructuring is by adopting a holistic and integrated approach to city development, capable of focusing resources on long-

term strategies and promoting aspects of social, economic, and environmental sustainability (Alberti & Senese, 2020; Florida, 2017; Griggs et al., 2014).

Even within the SDGs, Goal 11 of the 2030 Agenda aims to create sustainable living conditions in cities and communities (Akuraju et al., 2019), recognizing the importance of addressing the link between urbanization and sustainable development. Therefore, to advance action on the SDGs, it is crucial to understand the interaction between the SDGs, both negative trade-offs and positive co-benefits (Collste et al., 2017; Nilsson et al., 2018). Furthermore, the SDGs have a global dimension, and the implementation of their actions depends on the level of priority given in local systems and how sustainability issues compete with these systems' core problems (Collste et al., 2017). SDGs encompass the idea that all goals are important, and action must also be critical at the city level (UN-Habitat, 2018; Weymouth & Hartz-Karp, 2018).

Despite widespread recognition of the need to develop integrated approaches for implementing the SDGs in cities, little progress has been made thus far (Nilsson et al., 2018; Weitz et al.,2018; Weymouth & Hartz-Karp, 2018). Therefore, this article aims to analyze the intersection between the literature on Sustainable Development Goals (SDGs) and sustainable cities to contribute to the development of an integrated approach to the SDGs in cities.

Thus, this bibliometric study aims to provide an overview of the literature on the interconnection between sustainable cities and the SDGs to understand trade-offs and co-benefits better. Our findings are based on a scoping review, which falls between narrative and systematic, involving the identification of the breadth or scope of the literature on the subject (Munn et al., 2018) and serves various purposes, including mapping topics, assessing the need for a comprehensive systematic review of the topic, summarizing research findings, and drawing inferences from the existing literature on the "state of research activity" (Arksey & O'Malley, 2005).

Our results deepen our understanding of the convergence between the literature on sustainable cities and SDGs by analyzing 39 articles listed in Scopus. Thus, the results of this article are of interest to academics and policymakers. The theoretical contribution lies in surveying studies on how the literature on sustainable cities and SDGs are interconnecting, assisting scholars wishing to continue contributing to developing more sustainable cities. As a policy-oriented contribution, this study offers new possibilities to identify research areas requiring further investment and development. The social contribution focuses on the benefits brought to the development of cities, including demographic, economic, social, environmental, and political paths that lead to more sustainable development outcomes, which contributes to SDG goal 11 - Sustainable cities and communities.

The article is structured as follows. Section 2 presents the theoretical framework for cities and SDGs. Section 3 details our methodology. In Section 4, we present and discuss the main results of our analysis. Finally, the concluding remarks are in Section 5.

2 THEORETICAL BACKGROUND

According to the original definition of sustainable development (WCED, 1987), a city is considered sustainable if its production conditions do not degrade over time the conditions for its reproduction (Castells, 2000). Furthermore, more recent approaches characterize sustainable urban development as the pursuit of a balance between urban growth and environmental preservation to ensure equity in terms of income, employment, housing, essential services, social infrastructure, and transportation within urban areas (Hiremath et al., 2013).

Thus, as a holistic approach to urban development and as an academic pursuit, the concept of smart sustainable cities has gained prominence and is rapidly gaining momentum (Bibri & Krogstie, 2017). It has become an increasingly important concept not only in urban

research and planning but also in policy and urban governance, drawing global attention as a robust framework for sustainable urban strategic development.

Unlike in the past, environmental and social issues are now explicitly addressed as equally relevant goals of the digital transformation of cities (Ahad et al., 2020; Bouzguenda et al., 2019). This trend has also been driven by the United Nations' Sustainable Development Goals (SDGs) of the 2030 Agenda, which emerged in 2015, becoming an unprecedented global compass for addressing existing sustainability challenges (del Río Castro et al., 2021).

The SDGs succeeded the Millennium Development Goals (MDGs), set by the United Nations in the 2000s as reference targets for the international community during the 2015-2030 period. These new goals were immediately seen as an ambitious challenge because they cover a much broader range of issues than the previous ones, aiming to be universal - that is, applicable to all countries, not just developing ones - and serving as a reference for a complex transition toward sustainable development (Le Blanc, 2015; Jones et al., 2016). The structure of the United Nations' Sustainable Development Goals (SDGs) of the 2030 Agenda aims to achieve a better and more prosperous future for Earth and its inhabitants. The set of 17 comprehensive goals, with their subsequent 169 targets, represents an ambitious, transformative action plan that addresses critical challenges relevant to the environmental, social, and economic aspects of modern societies, where sustainability has a holistic meaning: it refers to environmental policies but also to responsible production and consumption, reduction of inequalities, decent work, poverty and hunger eradication, and quality education for all (Griggs et al., 2014).

Historically, there have been discussions about the relationship between development and sustainability, as well as between development and urbanization, and questions about the extent of the relationship between urbanization and sustainability (Akuraju et al., 2022). However, United Nations member states are expected to adopt the SDGs' framework as a guide to steer their development and investment plans, tracking progress in achieving the targets over the designated 15-year period (Aly et al., 2022). It is because, within the SDGs, the urban context, and particularly municipalities and cities, are not only implementing agencies but also key actors, without which at least 65% of the SDGs agenda may not be fully achieved (Alliance, 2015). Moreover, about one-third of the 232 SDGs indicators can be measured locally, making it a vital unit for action and monitoring progress toward sustainable development (UN-Habitat, 2018).

Therefore, cities are called upon to implement policy interventions that do not translate into a pre-established set of strategies with expected outcomes but rather into a continuous and exploratory process aimed at finding innovative solutions, developing a culture of open and agile governance that facilitates learning, adaptation, creativity, innovation, and co-creation, and supports innovative business models (Akuraju et al., 2022).

3 METHODS

For this exploratory descriptive research, a combination of bibliometric analysis and content analysis was employed to map areas of convergence and gaps between the literature on the Sustainable Development Goals (SDGs) and sustainable cities.

Bibliometric analysis provides an objective (quantitative) perspective on a subject (Henry et al., 2021). The main objectives of the bibliometric method are to map the volume of scientific production, identify the most cited works in a specific field of knowledge, and enable the identification of scientific communities and networks of relationships among researchers addressing the topic or constructs of interest (Nunes et al., 2020). The results of bibliometric analysis assist young and experienced researchers in navigating new subject matter (Quevedo, 2016). This study aimed to identify the key publications that converge between the themes of

sustainable cities and the SDGs. The quantitative analysis of scientific production considered the publication year, authors, countries, and journals facilitating the discussion of the topic and highlighting the subject matter.

For the qualitative phase, aiming to analyze content, a scoping review was adopted. This review is characterized as a valuable tool in the growing arsenal of evidence synthesis approaches. The review aims to identify knowledge gaps, assess a body of literature, clarify concepts, investigate research conduct, or inform a systematic review (Munn et al., 2018). Thus, to map and identify gaps, this scoping review followed the methodological framework of Arksey and O'Malley (2005), encompassing five phases: I - Research Question; II - Relevant Studies; III - Selection; IV - Mapping; and V - Presentation.

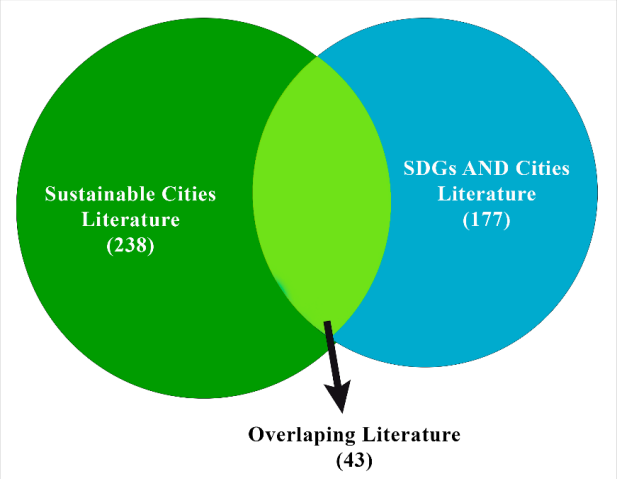
The strength of an analysis depends on the scope of the underlying database (Henry et al., 2021). Among the large academic databases, Web of Science and Scopus (Elsevier), it was concluded that Scopus is the best choice for this study due to its broader coverage and suitability for a keyword analysis to map emerging phenomena.

To identify convergences and gaps between sustainable cities and the SDGs literature, we adopted the procedure suggested by Henry et al. (2021). We specifically searched for queries related to "sustainable cities" (using different syntax) in the title or author keywords. A similar procedure was applied to identify the SDGs literature using different search queries; however, in this search, the Boolean connector "AND" was used as the logical operator to direct the search in a combined form with the keywords "cities." Only publications containing "SDGs" and "cities" were targeted. The search took place in titles and keywords since both sections are the primary tools for positioning an article in bibliographic research, and their relevance has become increasingly important in the last decade, as documents are ranked in both Google and Google Scholar. Selecting a suitable set of keywords in the title and keywords section is relevant to improving the accessibility of scholarly research and, in fact, its chances of improving its H-index (Blasi et al., 2022).

The searches were limited to articles from journals and conferences in business, management, and accounting; economics, econometrics, and finance; and social sciences. No temporal criteria were used for article selection to observe the evolution of publications on the theoretical approach.

In this manner, 415 published works were retrieved from Scopus. Subsequently, we examined the analysis of keyword (co)occurrence centered on the two focal keywords. This resulted in 43 studies for both focal keywords. Data collection was completed on January 30, 2023. Fig. 1 summarizes the key characteristics of our bibliographic dataset.

Figure 1 - Literature Set on Sustainable Cities and SDGs



Source: The Authors (2023).

The Mendeley software was used to manage the articles in the databases for the content analysis. Selection and exclusion criteria for the articles were applied, excluding articles that were not available and studies that, after reviewing the title, abstract, and keywords, did not align with the objective of this study: to present contributions for mapping the literature on the interconnection of sustainable cities and the SDGs. Thus, 39 articles were selected to compose this study to delve into the content analysis, as they fully met the inclusion criteria; among these, a thorough reading of the full articles was conducted.

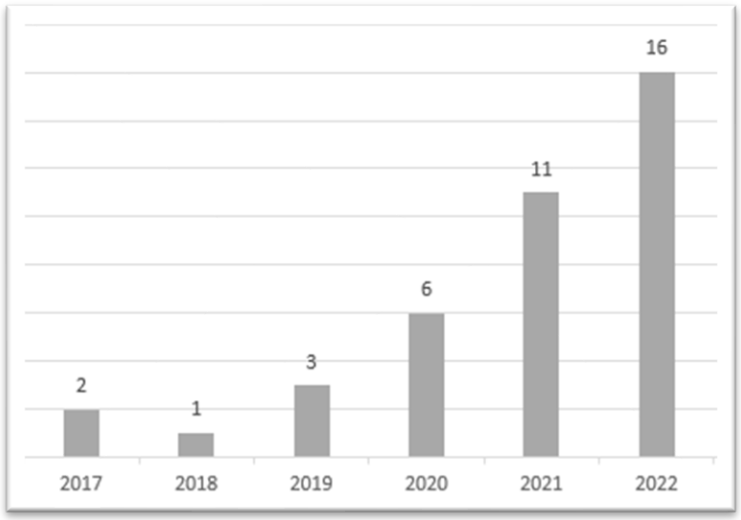
4 RESULTS AND DISCUSSION

This study aimed to present the published overview in the literature of the interconnection between sustainable cities and the Sustainable Development Goals (SDGs) for a better understanding of trade-offs and co-benefits. To achieve this, publications from the Scopus database (Elsevier) were reviewed. Consequently, through a content analysis conducted using a scoping review, the article enabled the mapping of topics, summarizing research findings, and drawing inferences from existing literature regarding the state of research activity. It also allows for a deeper understanding of research in this field.

4.1 BIBLIOMETRIC ANALYSIS

Figure 2 presents the chronological distribution of the sample in this research, indicating a growing academic interest in the topic. However, it is worth noting that the subject has been relatively underexplored over the years, considering the number of articles found, with a significant increase observed in recent years.

Figure 2 – Chronological Distribution of the Sample



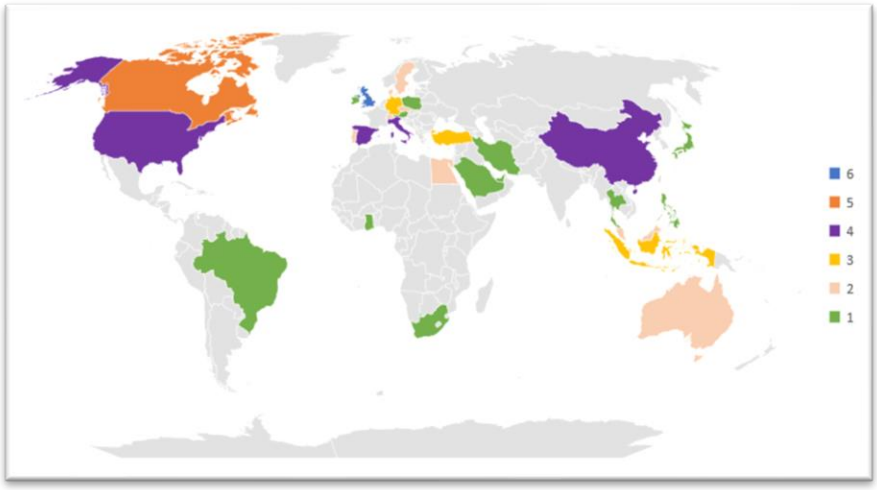
Source: The Authors (2023).

Through this survey, it was observed that 30 countries have articles related to the topic. However, there are relatively few studies within these countries, with the United Kingdom standing out with six studies (4 articles and two conferences). Canada also stands out with 5 article publications, all from 2020 and 2021, highlighting the emerging nature of the subject in research. China, Italy, Spain, and the United States are also in the early stages of their research efforts (4), as are Germany, Indonesia, and Turkey. As shown in Figure 3, the topic is addressed

across all continents, demonstrating the global interest in advancing sustainable development and aligning researchers with the Sustainable Development Goals in urban areas.

In Brazil, only one study was published in the Sustainable Cities and Society Journal in 2021. This study, authored by Lamy, R., Dziedzic, R.M., Rauen, W.B., and Dziedzic, M., focuses on a case study conducted in Curitiba, Paraná.

Figure 3 – Distribution by Countries of Origin



Source: The Authors (2023).

Among the 43 articles in the bibliometric sample, 20 were published in 34 journals and five conference proceedings. Therefore, we can observe that the distribution of publications in journals has occurred in a balanced manner, with no journal standing out regarding the quantity of publications. However, what stands out (see Table 1) is the quality of the journals, rated between A1 and A3 according to Qualis-Capes (journal classification system used to evaluate graduate programs).

Table 1 – Key Journals for Sustainable Cities and SDGs Publication.
Years 2017-2023.

Journals	Participation (43)	CiteScore 2021	Qualis (Capes)
Sustainability Switzerland	7	5.0	A2
Journal Of Cleaner Production	6	15.8	A1
Sustainable Cities And Society	4	14.4	A1
Proceedings Of The Institution Of Civil Engineers Transport	3	2.6	A3
Land Use Policy	2	9.9	A1

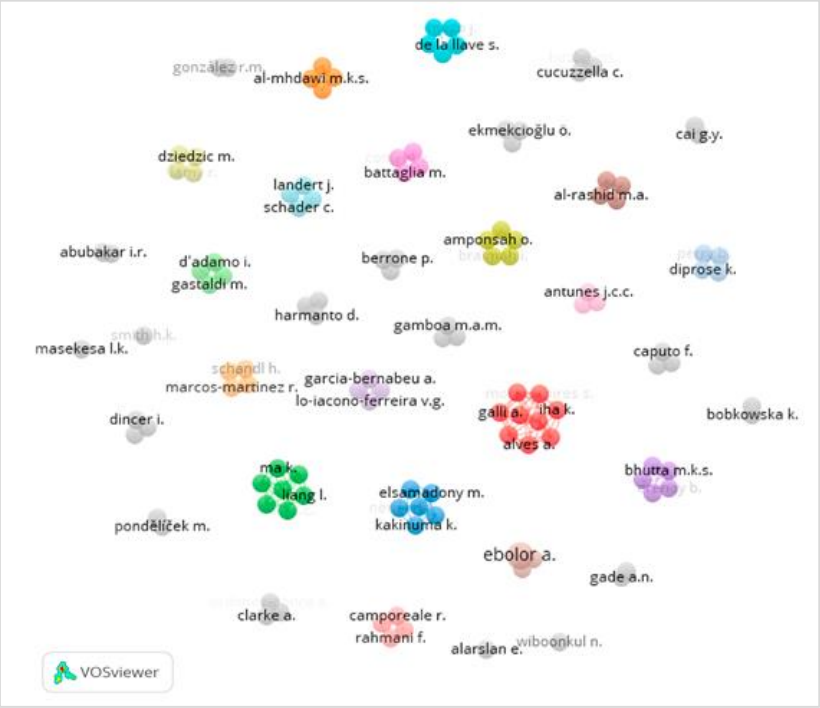
Source: The Authors (2023).

The portfolio of our analysis consisted of 145 authors and co-authors. Approximately 86% of the sample involves multiple authors, with 65% of the published studies having between 3 and 5 authors. Additionally, we identified three studies with 6, 7, and 9 authors, while only

14% of the articles were written by a single author. It is important to emphasize that, despite the significant number of co-authorships, we do not observe an integrated cooperation network among the authors. On the contrary, we identified several smaller collaboration networks, as evidenced in the map generated by VOSViewer (Figure 4).

The analysis of co-authorship relationships revealed that, even when there are no affinities or explicit cooperation among groups of authors, collaboration among individuals still occurs. Furthermore, this collaboration often transcends the boundaries of universities and countries. We highlight that the study with the highest number of authors (9 authors) is the one that received the most citations in our database, totaling 128 citations recorded on Google Scholar as of the date of data collection of the studies."

Figure 4 – Authors Network



Source: The Authors (2023).

However, as mentioned earlier, we conducted a content analysis of 39 studies, which underwent an in-depth review. Following this stage, the articles were reclassified (see Table 2) according to the Sustainable Development Goals (SDGs) and the five main themes identified during the in-depth analysis. These themes were categorized as urban development, governance, social inequality, indicators, and sustainable development.

The Table highlights that most articles address SDG 11, related to sustainable cities and communities. Furthermore, many studies fall under the category of urban development within cities. Therefore, within the scope of SDG 11, we can observe studies across all categories.

Table 2: Reclassification of 39 Articles by Identified Categories and SDGs.

	Urban Development	Governance	Social Inequality	Indicators	Sustainable development
ODS 1 - NO POVERTY				(Qazi et al., 2023)	

ODS 2 – ZERO HUNGER				(Qazi et al., 2023)	
ODS 3 – GOOD HEALTH AND WELL-BEING	(Wiboonkul, 2021); (Ekmekcioğlu et al., 2022)			(Gamboa et al., 2019); (Qazi et al., 2023)	(Wiboonkul, 2021)
ODS 4 – QUALITY EDUCATION	(Tapiador et al., 2021); (Antunes et al., 2022); (González & Sebastián-López, 2022); (Ekmekcioğlu et al., 2022);			(Gamboa et al., 2019); (Cucuzzella et al., 2021); (Qazi et al., 2023)	(Ebolor et al., 2022)
ODS 5 – GENDER EQUALITY	(González & Sebastián-López, 2022)		(González & Sebastián-López, 2022)	(Qazi et al., 2023); (Elsamadony et al., 2022)	
ODS 6 – CLEAN WATER AND SANITATION	(Lamy et al., 2021); (Ekmekcioğlu et al., 2022)			(Qazi et al., 2023)	
ODS 7 – AFFORDABLE AND CLEAN ENERGY	(Dincer et al., 2022)			(Elsamadony et al., 2022); (Qazi et al., 2023)	(Ebolor et al., 2022)
ODS 8 – DECENT WORK AND ECONOMIC GROWTH	(Lamy et al., 2021)			(Elsamadony et al., 2022) (Qazi et al., 2023);	(Ordonez-Ponce et al., 2021)
ODS 9 – INDUSTRY, INNOVATION, AND INFRASTRUCTURE	(Wiboonkul, 2021); (Quaye et al., 2022); (Dincer et al., 2022)			(Qazi et al., 2023)	(Wiboonkul, 2021); (Ebolor et al., 2022);
ODS 10 – REDUCED INEQUALITIES	(González & Sebastián-López, 2022)		(Masekesa, 2021); (González & Sebastián-López, 2022)	(Qazi et al., 2023)	(Masekesa, 2021) (Ebolor et al., 2022);
ODS 11 – SUSTAINABLE CITIES AND COMMUNITIES	(Alarslan, 2018); (Zhang & Cai, 2020); (Gade & Opoku, 2020); (Wen et al., 2020); (Tapiador et al., 2021); (Tapsuwan et al., 2021); (Kongboon et al., 2021); (Conti et al., 2021); (Lamy et al., 2021); (Antunes et al., 2022); (González & Sebastián-López, 2022);	(Perry et al., 2021); (Giuliodori et al., 2023)	(González & Sebastián-López, 2022); (Masekesa, 2021)	(Landert et al., 2017); (Gamboa et al., 2019); (Smith, 2019); (Galli et al., 2020); (Wen et al., 2020); (Cucuzzella et al., 2021); (Lamichhane et al., 2021); (D'Adamo et al., 2022); (Lo-Iacono-Ferreira et al., 2022); (Elsamadony et al., 2022); (Qazi et al., 2023).	(Šilhánková & Pondělíček, 2017); (D'Adamo et al., 2022); (Galli et al., 2020); (Ordonez-Ponce et al., 2021); (Masekesa, 2021); (Abubakar & Aina, 2019); (Wiboonkul, 2021); (Ligorio et al., 2022)

	(Lo-Iacono-Ferreira et al., 2022); (Campisi et al., 2022); (Nadimi et al., 2022); (Quaye et al., 2022); (Zielinska-Dabkowska & Bobkowska, 2022); (Ekmekcioğlu et al., 2022); (Ebolor, 2023); (Giuliodori et al., 2023).				
ODS 12 – RESPONSIBLE CONSUMPTION AND PRODUCTION	(Wen et al., 2020); (Lamy et al., 2021); (Ebolor, 2023)			(Wen et al., 2020) (Elsamadony et al., 2022); (Qazi et al., 2023)	
ODS 13 – CLIMATE ACTION				(Qazi et al., 2023)	
ODS 14 – LIFE BELOW WATER				(Qazi et al., 2023)	
ODS 15 – LIFE ON LAND	(Conti et al., 2021)			(Qazi et al., 2023)	
ODS 16 – PEACE, JUSTICE, AND STRONG INSTITUTIONS				(Qazi et al., 2023)	(Ebolor et al., 2022)
ODS 17 – PARTNERSHIP FOR GOALS				(Qazi et al., 2023)	

Source: The Authors (2023).

In 2015 the United Nations established 17 Sustainable Development Goals to transform our world by 2030. These comprehensive and interconnected goals encompass dimensions such as poverty eradication, zero hunger, good health, and quality education, focusing on sustainable cities, responsible consumption, climate action, and life in water and on land. The SDGs represent an expansion of the 8 Millennium Development Goals (MDGs), endorsed in 2000 by leaders from 189 countries to achieve them by 2015 (Smith, 2019).

As our study aimed to relate to sustainable cities, we observed that the first relevant research emerged in 2017, significantly addressing the topic of sustainable development and methods for assessing indicators within cities. This research sought to present complex strategies for municipalities to adapt to the impacts of climate change and was directly related to Goal 11, which aims to make cities and human settlements inclusive, safe, resilient, and sustainable. Goal 11 is composed of a series of primary goals and secondary tasks, including mitigating the impacts of climate change, adapting settlements to the impacts of climate change, and reducing the risk of disasters (Šilhánková & Pondělíček, 2017).

Over time, we have observed exponential growth in the number of studies related to this topic, accompanied by an increasing diversification of subjects. However, this diversification is still relatively limited. While many studies focus on urban development, we have also begun to see isolated research on governance and social inequality. Table 2 reflects this trend, showing that none of the themes have lost their relevance since the beginning of the research, although some have received more attention than others.

4.2 DESCRIPTIVE QUALITATIVE ANALYSIS

The analysis conducted in this study revealed six different and interconnected trends in sustainable cities research (see Table): urban development, governance, sustainable development, social inequality, and assessment methods. These findings underscore a strong connection with SDG 11 from the UN's 2030 Agenda, "Sustainable Cities and Communities" (United Nations, 2015).

SDG 11 consists of a set of ten goals characterized by high heterogeneity. These goals address aspects such as housing, health crises, and urbanization, and achieving these ambitious targets requires the development of specific policies crafted in collaboration with experts (Ligorio et al., 2022).

In general, countries that perform better on the SDGs were also less affected by the pandemic, highlighting the importance of progress on the SDGs in building social resilience (Elsamadony et al., 2022).

4.2.1 Sustainable Development

Sustainable development can be described as development that meets the needs of the present without compromising the ability of future generations to meet their own needs (Alarslan, 2018). Fundamentally, the city of the future is defined by two overarching concepts: innovation and sustainability. The current state of cities requires innovation, while the future state achieved through innovation must be sustainable. It also leads to the concept of sustainable development (Ebolor, 2023).

In 2015, with the Sustainable Development Agenda 2030, detailed in 17 Sustainable Development Goals (SDGs), it was the first time that the UN and the international community generally recognized the fundamental role of municipalities in development. The development agenda addresses issues that are primarily local problems that cannot be solved without local government involvement. It is villages and cities that have the means and competencies to improve administration and plan and implement solutions locally (Šilhánková & Pondělíček, 2017).

However, in our sample, a significant portion of the studies related to sustainable development are empirical, aiming to develop results showing whether cities and their governments are achieving the SDGs. Since the unsustainable use of our planet's resources needs to be tackled from various angles and multiple levels of governance, having access to reliable, cross-cutting, and quantitative metrics of sustainability at the city level is essential for understanding the environmental impacts of urban residents and the role that cities can play in the sustainability challenge of the 21st century (Galli et al., 2020).

Sustainability is impossible if cities do not use appropriate sustainability performance systems. Monitoring sustainability performance in cities provides insights to decision-makers that are valuable for planning activities and reinforces their commitment to the SDGs (Ligorio et al., 2022).

4.2.2 Urban Development

Various authors have discussed the theme of urban development for sustainable development since the inception of studies. According to Ligorio et al. (2022), urban development is crucial for achieving eco-efficiency in cities.

In 2018, the first study within our sample conducted at a conference (Alarslan, 2018) highlighted that by 2050, nearly 66% of the world's population will live in urban areas. While urban settlements offer improved living opportunities, they also put tremendous pressure on

natural resources. However, some models of urban development align with Goal 11, "Sustainable Cities and Communities," and provide complementary actions. These models include smart cities, green/ecological cities, livable cities, branded cities, inclusive cities, and resilient cities. Despite thematic differences, all these models share standard programs to promote sustainable cities and communities worldwide. In particular, Alarslan (2018) addresses the resilient city model, focusing on Turkey as its subject of study. Turkey faces rapid urbanization, and Turkish cities have grappled with issues like overcrowding, informal settlements, and challenges in providing urban amenities, along with high disaster risks. Developing a resilient city model requires assessing disaster risk profiles for a specific city and formulating essential policies, strategies, and measures to reduce relevant risks in the short, medium, and long term.

Furthermore, micro, meso, and macro stakeholder engagement should be encouraged and promoted. In other words, to create sustainable cities, social, economic, and environmental issues in designing development programs/disaster mitigation plans/spatial development plans for disaster-prone cities must be considered. Therefore, many of the studies addressing urban development are related explicitly to Goal 11, which is "to make cities and human settlements inclusive, safe, resilient, and sustainable," with a strong connection, especially to SDG 11.3: "By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated, and sustainable human settlement planning and management in all countries" (Ligorio et al., 2022).

Within urban development, cities must adopt technologies that enhance sustainability while protecting natural resources and other infrastructure. By implication, cities should not only involve integrating smart computing technologies into infrastructure systems and related services but also consider the habitability and sustainability of the entire system. Overlaying this with the SDGs underscores the need for inclusion, equity, and social justice (Ebolor et al., 2022).

Historically, urban infrastructure policies have led to an increase in the rate of urbanization, and this rapid population growth and high rate of urbanization have given rise to the concept of smart sustainable cities as a response to the challenges posed by urbanization (Ebolor, 2023). However, while innovative initiatives promote resilience and have positive implications for the sustainable development agenda of cities, states, and municipal authorities must be aware that innovations do not have adverse consequences for health and the environment (Quaye et al., 2022).

Many of these studies that address urban development encompass a significant portion of a city's infrastructure, addressing urban settlements and urban mobility. As both are part of the same concept of SDG 11, "sustainable cities and communities," it is noticeable that studies focusing on infrastructure consider strategies for urban improvements (Ekmekcioğlu et al., 2022). These themes span a broad range of discussions, from how urban vegetation management can help achieve the SDGs at the local level to changes in accessible transportation within cities as part of more sustainable urban development, considering that even slight modifications and conceptual changes in standard practices can make a difference (Tapiador et al., 2021; Wiboonkul, 2021).

Therefore, in 2021 and 2022, studies addressing urban development have elevated the discourse surrounding the SDGs, showcasing interdisciplinary relationships between various SDGs, primarily through an increase in research analyzing diverse factors within different situations and cities (Antunes et al., 2022; Conti et al., 2021; Dincer et al., 2022; González & Sebastián-López, 2022; Lo-Iacono-Ferreira et al., 2022; Tapiador et al., 2021). The underlying principle is that the primary goal of modern cities is to become smart and sustainable, reducing social inequalities and improving urban infrastructure through synergistic collaboration between communities and administrations (Ligorio et al., 2022).

4.2.3 Governance

Upon analyzing the studies, it becomes evident that there have been relatively few approaches to city governance (Table 2). However, a recent study by Giuliodori et al. (2023) highlights that smart governance can positively influence all three pillars of sustainability. As such, this finding holds several implications for management researchers and policymakers.

Smart governance is critical for advancing the 2030 agenda, where national and local smart governance are positively associated with economic well-being. National smart governance influences social equality, while local smart governance is related to environmental quality. Therefore, comprehending the various facets comprising smart governance, how it operates across multiple levels, and how it impacts the sustainable development of territories presents an excellent opportunity for the management field to contribute to achieving the SDGs (Giuliodori et al., 2023).

Perry et al. (2021) asserted that the United Nations Sustainable Development Goals (SDGs) have faced criticism but are still seen as a significant international effort to address climate change, environmental degradation, resource depletion, and the unsustainability of contemporary life. What is crucial is the role and effectiveness of local governments in localizing the SDGs, as they depend on multi-level agreements within their respective national contexts.

Poor governance quality can hinder progress toward the SDGs, and governments should assess their outcomes and prioritize the development of smart governance if they intend to make substantial strides toward the SDGs. Smart governance can act as a vehicle for achieving sustainability. Professionals can assist city managers in developing skills and knowledge related to smart governance, such as transparency, collaboration, problem-solving, strategic thinking, innovation, and thought leadership (Giuliodori et al., 2023).

4.2.4 Social Inequality

The relationship between social inequality and sustainable cities is closely intertwined; however, our sample reveals a limited number of studies exploring these dimensions. González & Sebastián-López (2022) delve into the connection between SDG 11, "Sustainable Cities and Communities," and SDG 5, "Gender Equality," to achieve gender equality and empower all women and girls. In this context, they examine a geographical aspect of urban development—an empirical scenario involving naming streets after women. The direct participation of elementary and secondary school student teachers in this project facilitated the consolidation of a specific narrative and instructional design related to education for sustainable development, mainly focusing on SDG 5 (gender balance) and SDG 11 (sustainable cities and communities).

The concept of a sustainable city aligns with sub-target 11.7 of SDG 11: "By 2030, provide universal access to safe, inclusive, and accessible, green, and public spaces, in particular for women and children, older persons, and persons with disabilities" (United Nations, 2015). Therefore, while acknowledging the SDGs' interdependencies, sustainability needs to be viewed as a guiding light. A city cannot be considered sustainable unless inclusive, safe, and resilient. It is expected that cities on the path to a sustainable future, in terms of SDG 11, will invest in public infrastructure to sustainably provide services to local communities (Masekesa, 2021).

4.2.5 Indicators

When publications on the connections between the Sustainable Development Goals (SDGs) and sustainable cities began, the studies primarily focused on evaluating indicators in public administration and local political policies and measures, developing assessment methods to measure participation processes in various areas of urban development (Ekmekcioğlu et al., 2022; Landert et al., 2017).

Therefore, our analysis categorized these studies as indicators because they addressed evaluation models encompassing multidisciplinary knowledge areas. In these studies, some aimed to achieve effective methods for enhancing contributions to urban development for the SDGs, presenting practical tools capable of scientifically quantifying these contributions to SDG attainment (Wen et al., 2020).

Specific research endeavors delved into the interconnections between the SDGs. For instance, one study sought to establish a framework for evaluating the sustainable development performance of OECD countries in line with the 2030 agenda based on the 17 Sustainable Development Goals (Lamichhane et al., 2021).

However, it remains a challenge to find well-developed methodologies in research that can assist researchers and public policymakers. A recent study by Qazi et al. (2023) aims to model the risks associated with individual SDGs in a network environment. Its objective is to determine the relative importance of individual SDGs in predicting the aggregate SDG index. This developed network model provides valuable insights to policymakers, revealing causal relationships between the SDGs. For example, "health and well-being," "sustainable cities and communities," "peace, justice, and strong institutions," and "partnerships for the goals" are mutually interdependent. Similarly, there are other causal relationships within the network.

5 CONCLUSION

This article aimed to provide academics and policymakers with a roadmap of the key achievements and gaps in sustainable cities. Our analysis highlights that the relationship between the Sustainable Development Goals (SDGs) and the concept of sustainable cities is still in its infancy, with only a few articles truly making this connection.

Even though the United Nations has indicated that the SDGs agenda is indivisible, suggesting that all 17 SDGs are interconnected, and simultaneous action is required for all of them, it is evident from existing studies that due to their interconnected nature across economic, social, and environmental elements, addressing them concurrently poses challenges. Consequently, these goals are often seen as a set of largely independent objectives to be achieved rather than a holistic system of interconnected goals, leading many studies related to sustainable cities to address the SDGs individually.

The most common approach taken is within the field of urban development, with a direct focus on Goal 11, "Sustainable Cities and Communities." While this approach is understandable, it is necessary for researchers to recognize this as a significant gap for future research and to understand that all objectives can be organically connected to benefit from deeper collaboration across fields.

Initially, research focused on models for verifying indicators and developing methods to analyze the SDGs within sustainable cities. This approach remains relevant for policymakers but is somewhat overlooked in studies where few methods have been developed to measure outcomes within cities.

From a broader perspective, the literature lacks an examination of how other fields can be evaluated in conjunction with urban development. For example, smart governance has proven to be an essential factor, yet it has received limited research attention. Similarly, just as

urbanization is seen as a significant driver that enables and hinders society from achieving the SDGs, governance needs to be examined more closely to assess its significance in cities reaching their goals and becoming increasingly sustainable.

This article provides theoretical, practical, and social contributions to academia and administration. The theoretical contribution lies in surveying studies on how the literature on sustainable cities and SDGs is interconnected, assisting scholars who wish to continue contributing to developing more sustainable cities. As a contribution aimed at policymakers, this study offers new possibilities for identifying areas of research that require further investment and development. The social contribution focuses on the benefits of city development, including demographic, economic, social, environmental aspects, and political pathways leading to more sustainable development, contributing to SDG goal 11 - Sustainable cities and communities. However, policymakers and academics must continue working together to implement policies and solutions that promote sustainability at both local and global levels.

Among the limitations, this research relied on one database, which may contain limitations, presenting an opportunity for future research.

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