

Humanizing Urban Public Space: A Bibliometric Analysis of Children's Perspectives

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Abstract

What does global scholarship reveal about the relationship between children and urban public space? Which dimensions remain underexplored?

This study addresses these questions through a bibliometric analysis of 452 Scopus-indexed documents published between 2000 and 2026. The analysis combines bibliometrix/biblioshiny and VOSviewer to provide an evidence-based overview of the field.

The results point to an annual growth rate of 13.98%. This growth unfolds across three distinct phases. The analysis also identifies seven core journals that concentrate a substantial share of the scientific output. In parallel, six thematic clusters emerge, structured around an intellectual core linked to Jacobs' notion of neighbourhood vitality.

At the same time, the findings highlight a structural imbalance. Urban planning appears in the emerging-themes quadrant of the thematic map. By contrast, a health-oriented framework—focused mainly on children's physical activity—occupies a more central position.

The geographical distribution of research reveals another gap. The Moroccan and North African context, including the arrondissement of Saïss in Fez, remains largely absent from the indexed literature. This absence persists despite the area's significant demographic and spatial dynamics.

Taken together, these results suggest that children's presence in public space can serve as a useful analytical lens for assessing urban humanization,

Keywords: bibliometric, children, public space, walkability, child-friendly city, urban humanization, Fez, Morocco, functional zoning

1. Introduction

The city was not originally conceived for traffic. Aristotle's claim that the human being is, by nature, a political animal (*zoon politikon*) implies that the city functions as a framework for human fulfilment rather than merely as a system for the circulation of vehicles and goods (Aristotle, *Politics*, Book I, Chapter 2). Contemporary urban transformations suggest a gradual shift away from this premise, with visible consequences in the organization of urban space.

During the second half of the twentieth century, functional zoning reorganized cities according to economic and administrative logics. Influenced by modernist urbanism and extended to Moroccan cities through colonial planning practices, this model promoted the separation of functions. Streets were widened to facilitate automobile flow, while residential areas became increasingly detached from commercial and social uses. Environments structured around motorized mobility progressively replaced the dense, mixed-use fabric of the traditional medina where a child could access nearby spaces without crossing major roads.

This transformation is not only morphological but also demographic. In the arrondissement of Saïss, located in the southern extension of Fez, these dynamics are directly observable. The population increased from 156,550 in 2004 to 236,305 in 2024, representing a growth of 51%. The population under 15 years of age rose from 46,808 to 56,240 during the same period. At the same time, the urban context is characterized by a car ownership rate of 30.03% (2014) and an unemployment rate of 22.60% (2024), suggesting a mismatch between mobility requirements and socio-economic capacity. Children, who represent nearly 24% of the population (HCP, 2024), are particularly exposed to these conditions.

From an exploratory perspective, functional zoning may influence children's access to public space through its effects on urban mobility patterns. The separation of residential, commercial, and service functions can encourage greater reliance on motorized transport, potentially reducing opportunities for independent walking. While this relationship requires further empirical examination, it raises questions about how urban form shapes children's everyday experiences of the city. In the study area, despite a population density of 9,531 inhabitants per km², the division of territory into multiple functional zones may affect the development of a more integrated and walkable urban environment.

The academic literature addressing these issues has expanded significantly. It draws on children's geographies (Kytta, 2004; Malone, 2007), urban design (Ward, 1978; Riggio, 2002), and public health (Sallis et al., 2006; Giles-Corti et al., 2011). While these approaches provide valuable insights, the field remains fragmented. In particular, it lacks an integrated framework that considers the child as a central reference for assessing urban humanization.

A comprehensive bibliometric mapping of this research area remains limited. This study seeks to address this gap.

Specifically, the analysis examines 452 Scopus-indexed documents (2000–2026) with four objectives:

- (1) to trace the temporal evolution of scientific production;
- (2) to identify the most influential sources, authors, and cited documents;
- (3) to reconstruct the intellectual and conceptual structure of the field through co-citation and keyword co-occurrence analyses; and (4) to identify research gaps that a child-centered perspective—grounded in contexts such as Fez—may help to address.

1.1. Research Context: The Arrondissement of Saïss, Fez

The arrondissement of Saïss constitutes the main southern expansion area of Fez and forms part of the Fès–Meknès region. Its territorial boundaries extend from Oued Boufekrane in the north to Oued Mehraz in the south, and from Ain Ghabe in the west to the eastern and peripheral extensions of the city (Agence Urbaine de Fès, Plan d’Aménagement, Article 1).

Saïss is characterized by a relatively recent urban fabric compared with the historic medina of Fez. The coexistence of these different urban forms within the same city provides an opportunity to examine variations in spatial organization and urban development patterns.

For the purposes of this study, the arrondissement of Saïss is used as a case study to explore the relationship between urban spatial organization, mobility patterns, and the use of public space within a contemporary urban context.

1.2. Demographic Dynamics

Table presents the evolution of key demographic and urban indicators in Saïss between 2004 and 2024.

Table 1: Demographic and urban indicators, Arrondissement Saïss (2004–2024)

Indicator	2004	2014	2024
Total population	156,550	207,053	236,305
Children under 15 (%)	29.9%	26.18%	23.80%
Children under 15 (n)	46,808	54,198	56,240
Number of households	—	48,983	64,927
Car ownership rate (%)	—	30.03%	—
Unemployment rate (%)	—	—	22.60%
Informal housing (%)	—	1.47%	13.50%
Dwellings under 10 years old (%)	—	20.84%	26.70%
School enrolment, ages 7–12 (%)	—	98.17%	96.60%
Literacy rate (%)	—	79.58%	84.20%

Source: Haut-Commissariat au Plan (HCP), General Population and Housing Census 2004, 2014, 2024.

Two key trends emerge from these data.

- First**, the proportion of children under the age of 15 declined from 29.9% in 2004 to 23.8% in 2024. At the same time, their absolute number increased from 46,808 to 56,240. This suggests a process of demographic concentration occurring alongside a declining proportional share, within a context of rapid urban growth.
- Second**, the share of informal housing (dour badaiya) increased considerably, rising from 1.47% in 2014 to 13.50% in 2024. While the implications of this trend require further investigation, it may raise questions regarding the adequacy of the residential environment for children and their access to urban spaces and services. These issues have been highlighted in previous studies examining child-friendly urban environments and spatial inequalities.

1.3. The Spatial Logic of the Plan d'Aménagement

The Plan d'Aménagement of Saïss organizes the territory into a set of functionally distinct zones (A, B, C, D, E, ER, AI, AL, AA, OFSH, T), in accordance with the regulatory framework defined by Loi 12.90 (Règlement d'Aménagement, Article 2).

Some of these zones are associated with specific land-use regulations that may limit the coexistence of different urban functions. For example, Zone D excludes commercial activities, while Zones E and ER place restrictions on residential uses. Industrial and logistics activities are primarily located in Zones AI and AL.

From an exploratory perspective, this spatial organization may influence patterns of movement and accessibility within the territory. In particular, connections between different zones may not always be supported by pedestrian-oriented infrastructure, potentially affecting the continuity of everyday walking routes.

The dominant residential typology may also play a role in shaping the relationship between private and public space. The Dar Maghrebiya, organized around an inward-facing courtyard, tends to prioritize internal domestic space, which may reduce direct interaction with the street environment.

By contrast, the historic medina contains a variety of intermediate spaces, such as derb (semi-public alleys) and zenqa (neighbourhood passages), which can facilitate gradual transitions between private and public domains.

Although Saïss exhibits a population density of 9,531 inhabitants per km², a level often associated with walkable urban environments, the relationship between density, spatial organization, and everyday mobility remains an empirical question that warrants further investigation.



Figure 1. Road hierarchy and pedestrian network in the Arrondissement of Saïss, Fez

The road network of Saïss extends over 496.23 km, while pedestrian routes account for 32.74 km, representing approximately 6.6% of the total network length. Although this indicator alone does not determine the overall level of walkability, it provides a quantitative description of the spatial distribution of transport infrastructure within the arrondissement and offers a useful basis for examining patterns of pedestrian accessibility and mobility.

2. Research Questions and Hypotheses

Building on the bibliometric analysis, this study addresses the following research questions:

- RQ1.** How has scientific production on children, public space, and urban environments evolved between 2000 and 2026?
- RQ2.** Which authors, journals, institutions, and countries have played the most influential roles in the development of this research field?
- RQ3.** What are the main intellectual and conceptual structures of the field as revealed through co-citation and keyword co-occurrence analyses?
- RQ4.** What major research themes, emerging trends, and knowledge gaps can be identified in the literature?
- RQ5.** To what extent have child-centered perspectives been integrated into studies of urban planning, public space, and urban humanization?
- RQ6.** What opportunities exist for future research on children as indicators of urban quality and human-centered urban development?

3. Objectives

The study pursues four main objectives:

- To analyze the temporal evolution of scientific production in the field.
- To identify the most influential authors, sources, institutions, and countries.
- To map the intellectual and conceptual structure of the literature through bibliometric techniques.
- To identify research gaps and future directions, particularly regarding child-centered approaches to urban planning and urban humanization.

4. Bibliometric Methodology

4.1. Data Collection

Data were retrieved from Scopus on April 18, 2026. The search query combined child-related and space-related descriptors across the title, abstract, and keyword fields:

TITLE-ABS-KEY((child* OR children) AND ("public space" OR "urban space" OR "urban environment" OR "walkability" OR "child-friendly"))

Screening

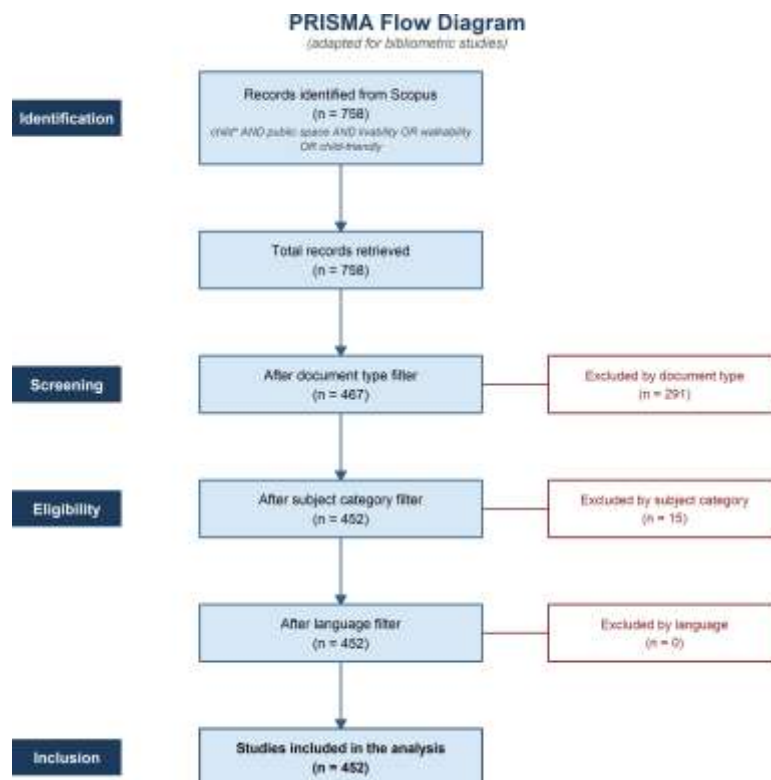


Figure 1: PRISMA flow diagram of the dataset selection process.

Three screening stages, following the PRISMA protocol, reduced 758 records to 452 documents. Table 2 details each stage.

Table 2 summarizes the dataset selection process.

Table 2: Dataset selection process following the PRISMA protocol

Stage	Documents	Procedure
Identification	758	Initial search in Scopus
Screening	467	Exclusion of 291 documents based on document type
Eligibility	452	Exclusion of 15 documents based on subject area
Inclusion	452	Final dataset used for analysis

4.2. Analytical Tools

The bibliometric analysis was conducted using the bibliometrix/biblioshiny R package (Aria & Cuccurullo, 2017), which was used to compute descriptive statistics and core bibliometric indicators. VOSviewer (version 1.6.20) was employed to construct co-citation and keyword co-occurrence networks (Van Eck & Waltman, 2010). Bradford's law was applied to assess the concentration of sources. In addition, thematic mapping was used to position research themes along centrality and density dimensions, following the framework proposed by Donthu et al. (2021).

5. Results

5.1. Descriptive Overview

Table 3 summarizes the main quantitative characteristics of the dataset.

Table 3: Main descriptive indicators

Indicator	Value
Time span	2000–2026
Sources (journals)	169
Total documents	452
Annual growth rate	13.98%
Number of authors	1,359
Single-authored documents	57
International co-authorship (%)	23.67%
Avg. authors per document	3.8
Author keywords	1,331
Total references	24,153
Avg. document age (years)	6.44
Avg. citations per document	33

Source: bibliometrix/biblioshiny analysis.

5.1.1. Temporal Evolution

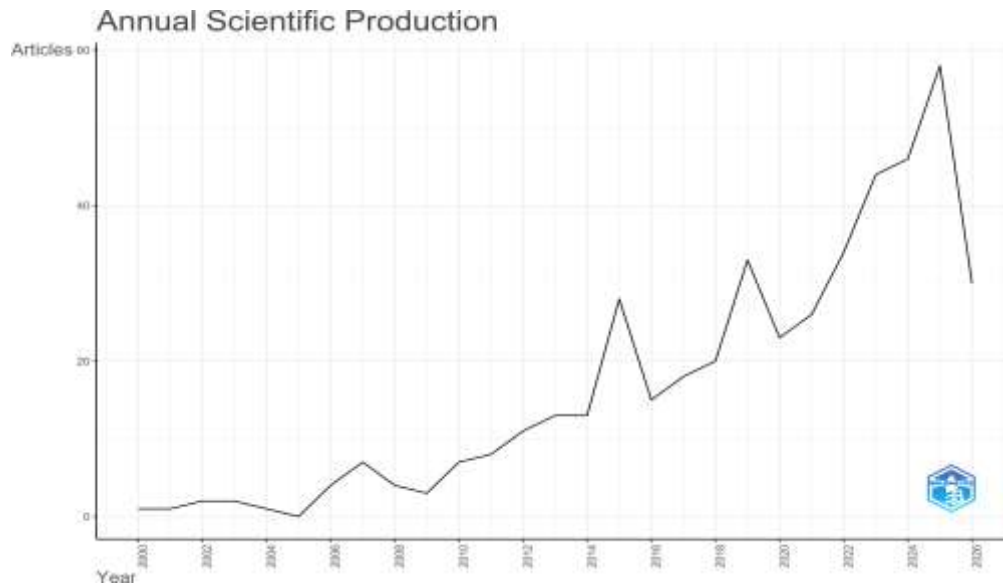


Figure 2: Annual scientific production (2000–2026).

5.1.2. Temporal Evolution

The evolution of scientific production reveals three distinct phases in the development of this research field.

Phase 1: Emergence (2000–2010).

This initial phase comprises 32 publications. Scientific output remained limited, never exceeding seven publications per year, and no documents were published in 2005. During this period, the field was still in an exploratory stage and had not yet developed a clearly defined research identity.

Phase 2: Expansion (2011–2019).

A total of 161 publications (35.6% of the dataset) were produced during this period. A noticeable increase occurred in 2015, when annual output reached 28 publications. This growth coincided with increasing international attention to sustainable urban development, particularly following the adoption of Sustainable Development Goal 11. Research activity became progressively structured around measurable aspects of urban environments, public space, and quality of life.

Phase 3: Acceleration (2020–2026).

This represents the most dynamic phase, accounting for 259 publications (57.3% of the total output). Scientific production reached its highest level in 2025, with 58 publications. The sustained growth observed during this period suggests increasing scholarly interest in the relationships between children, public space, and urban environments.

Overall, the annual growth rate of 13.98% indicates a rapidly expanding field within urban studies. However, this growth remains geographically concentrated, as demonstrated in the author and country analyses presented below.

5.1.3. Source Distribution

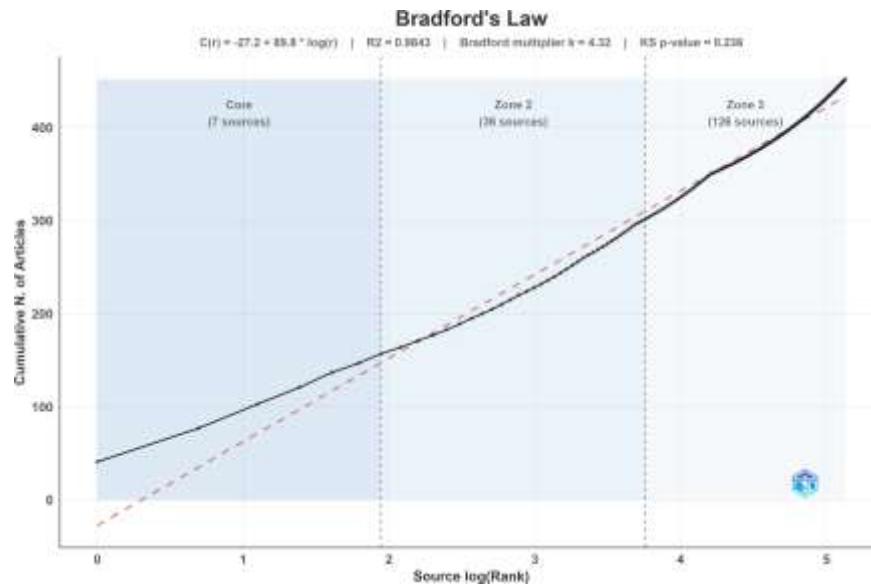


Figure 3: Bradford's law distribution of sources.

Table 4 lists the ten most productive journals.

Table 4: Top 10 journals in the dataset

Rank	Journal	Docs	Discipline
1	Int. J. Environmental Research and Public Health	41	Public Health
2	Children's Geographies	36	Geography
3	Health and Place	26	Health Geography
4	Journal of Transport and Health	18	Transport / Health
5	Cities	16	Urban Studies
6	Cities and Health	10	Urban Health
7	Journal of Transport Geography	10	Transport Geography
8	Environment and Behavior	7	Environmental Psychology
9	Social Science and Medicine	7	Social Health
10	American Journal of Health Promotion	6	Public Health

Source: bibliometrix/biblioshiny analysis.

We identify a clear structural pattern. Five of the ten leading journals belong to public health and medical disciplines, while only Cities (rank 5, 16 documents) represents core urban planning scholarship. The Bradford's law fit is strong ($R^2 = 0.9843$, multiplier $k = 4.32$), with seven core journals concentrating the plurality of production.

The implication extends beyond bibliographic distribution. A field whose measurement frameworks are primarily oriented toward individual health

outcomes—such as body mass index, physical activity levels, and diet quality—may provide only a partial basis for assessing collective spatial conditions.

5.1.4. Author Distribution

Table 5 presents the ten most productive authors.

Table 5: Top 10 most productive authors

Rank	Author	Articles	Country
1	Witten K.	14	New Zealand
2	Villanueva K.	12	Australia
3	Smith M.	10	New Zealand
4	Badland H.	8	Australia
5	Carroll P.	8	New Zealand
6	Giles-Corti B.	8	Australia
7	Timperio A.	8	Australia
8	Veitch J.	6	Australia
9	Asiasiga L.	5	New Zealand
10	Buliung R.N.	5	Canada

Source: bibliometrix/biblioshiny analysis.

Seven of the ten most influential authors in this field are affiliated with academic institutions in Australia and New Zealand. This geographical concentration reflects the development of a substantial portion of the literature within urban contexts characterized by relatively low population densities, structured street networks, high levels of automobile dependence, and temperate climatic conditions.

These characteristics differ in several respects from the urban context of Saïss, which is home to approximately 56,240 children, has a population density of 9,531 inhabitants per km², and a household unemployment rate of 22.6%. This contrast highlights the diversity of urban settings within which children's experiences of public space are shaped and underscores the importance of expanding research to include a broader range of geographical and socio-spatial contexts, thereby contributing to a more comprehensive understanding of the factors influencing children's relationship with the urban environment.

5.1.5. Most Cited Documents

Table 6 lists the ten most globally cited documents.

Table 6: Top 10 most globally cited documents

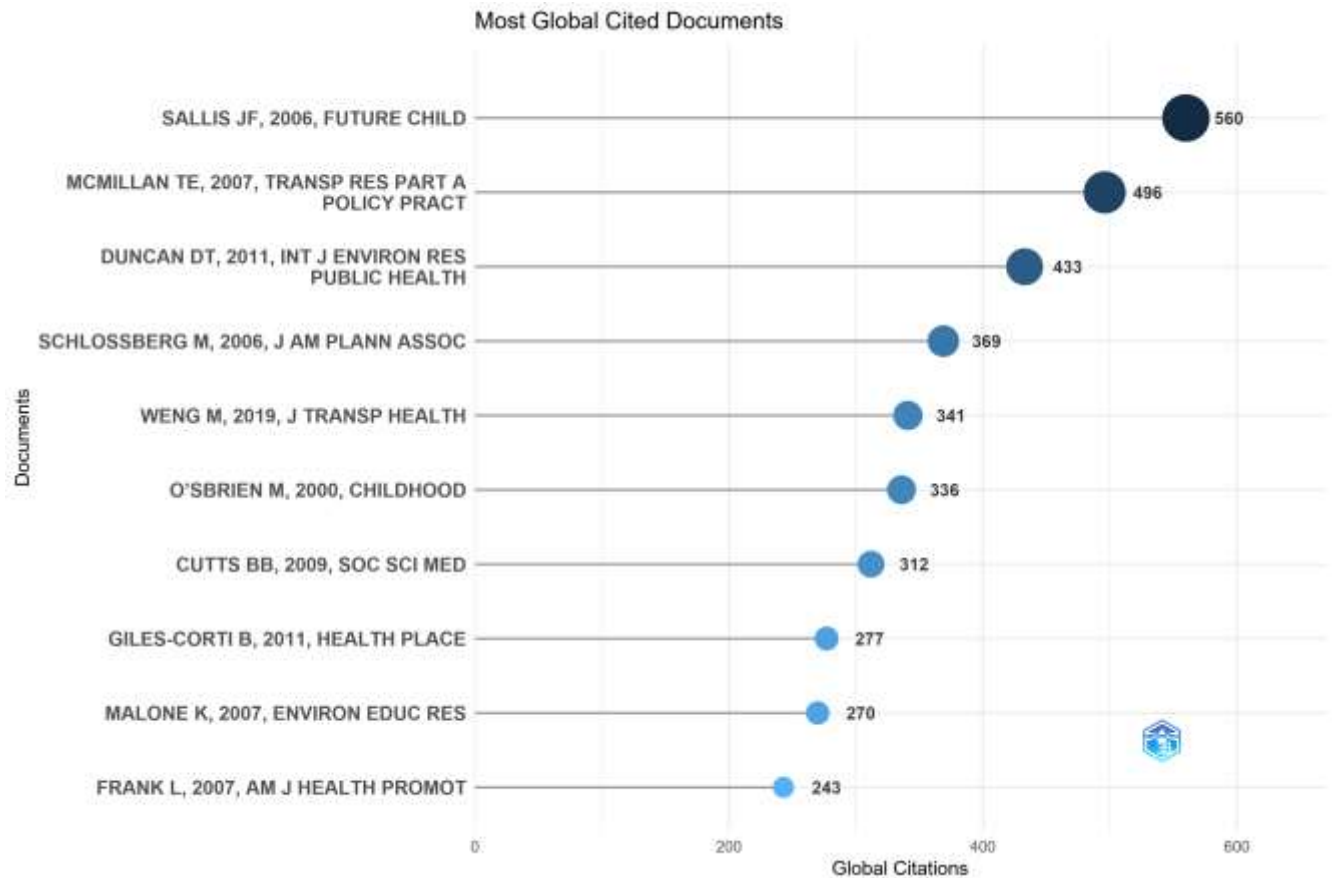


Figure 3: Most Global Cited Document
Source: bibliometrix/biblioshiny analysis.

Weng et al. (2019), a study of 15-minute walkable neighbourhoods, records the highest annual citation rate (42.6 per year), exceeding that of studies published more than a decade earlier. This suggests an acceleration in the practical relevance of the field, rather than merely an accumulation of historical output.

All ten references are published in health- or transport-related journals. The Death and Life of Great American Cities (Jacobs, 1961), which occupies a central position in the co-citation network, does not appear in this ranking, as bibliometric tools primarily capture journal articles rather than monographs. While a theoretical foundation exists, its translation into measurable frameworks remains limited.

5.2. Conceptual Analysis

5.2.1. Keyword Co-occurrence Network

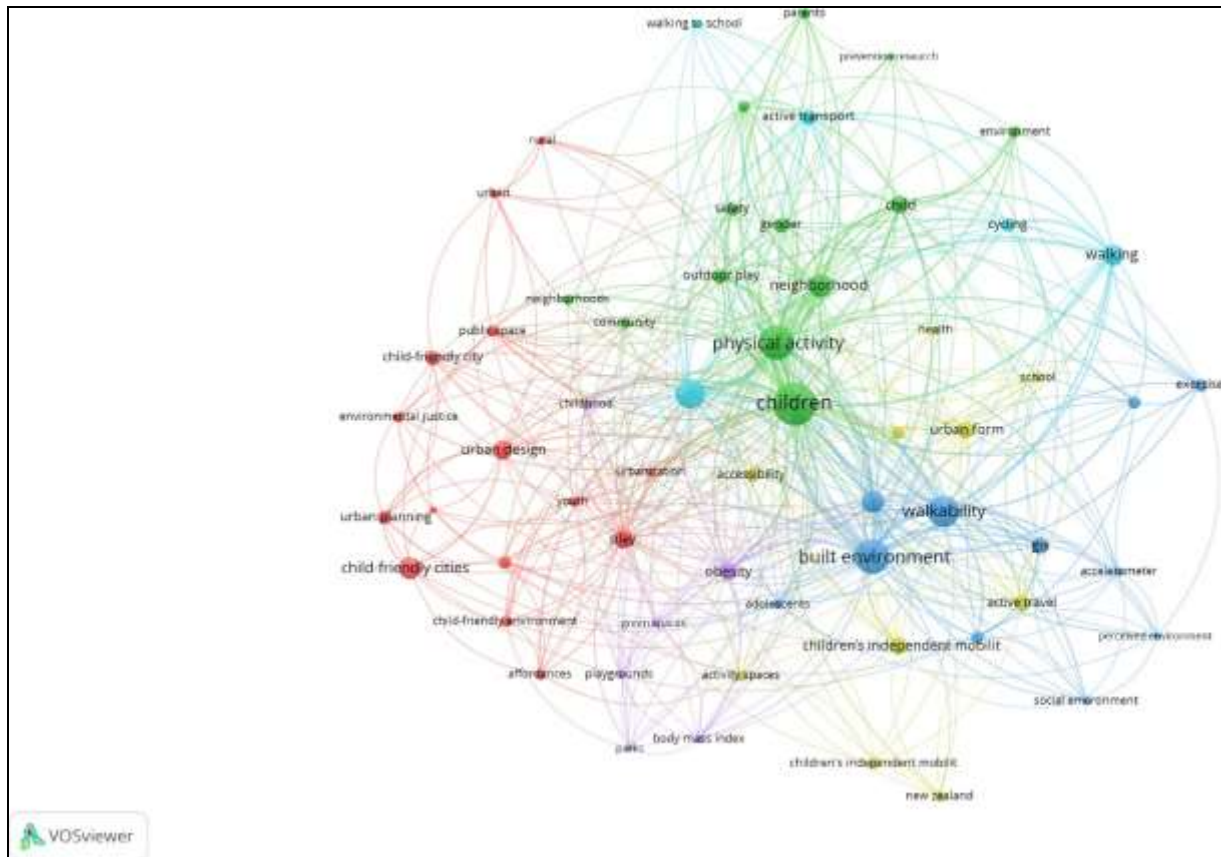


Figure 6: Keyword co-occurrence network.

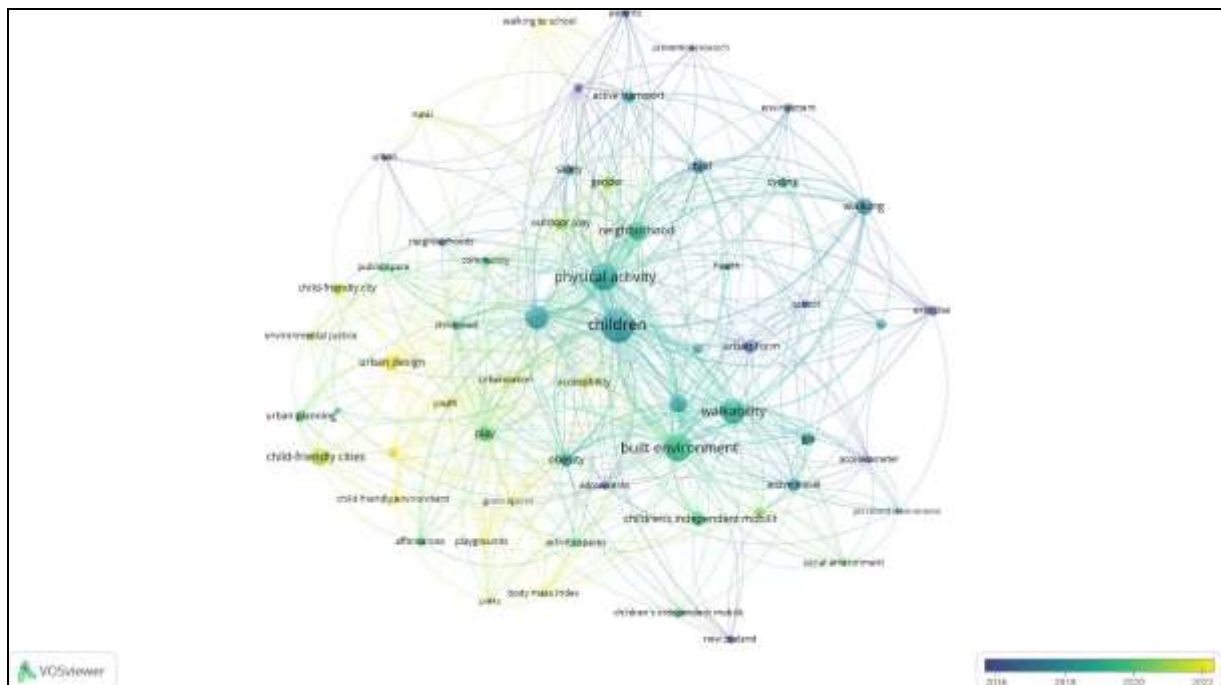


Figure 7: Temporal evolution of keywords (overlay visualization).

A total of 60 author keywords meeting a minimum occurrence threshold of three were included in the co-occurrence analysis. The resulting network revealed three prominent nodes—children, physical activity, and built environment—organized into six thematic clusters.

Cluster 1 (green) is centered on physical activity and active mobility. **Cluster 2 (red)** focuses on urban design and child-friendly cities, while **Cluster 3 (blue)** relates to the built environment and walkability. Clusters address obesity and health outcomes, play and green spaces, and independent mobility, respectively.

The temporal overlay analysis provides additional insight into the evolution of research priorities. Keywords appearing before 2016 were primarily associated with health and physical activity, whereas those emerging between 2020 and 2022 increasingly reflected themes related to urban design, public space, and child-friendly environments.

This pattern suggests a gradual broadening of the field from a predominantly health-oriented perspective toward a more interdisciplinary engagement with planning and urban design issues. At the same time, health-related themes continue to occupy an important position within the conceptual structure of the literature.

5.2.2. Thematic Map

The thematic map is structured around four quadrants, each representing a different level of development and integration within the field.

Motor themes (upper-right quadrant) include child, human, and female. These themes exhibit both high centrality and high density, indicating that they occupy a well-developed and influential position within the research landscape.

Niche themes (upper-left quadrant), such as physical activity and perception, are characterized by strong internal development but relatively limited connections to the broader conceptual network.

Basic themes (lower-right quadrant) include walking, built environment, and demography. These themes form an important conceptual foundation for the field and are closely connected to other research areas, although their internal development remains comparatively moderate.

The fourth quadrant, representing emerging or declining themes, includes keywords such as neighbourhood, urban area, and urban planning. The position of urban planning within this quadrant suggests that it occupies a less consolidated position in the literature than the themes located in the core areas of the map. This finding may reflect a growing research interest in planning-related dimensions of children's urban experiences, while also indicating opportunities for further conceptual and empirical development within this area.

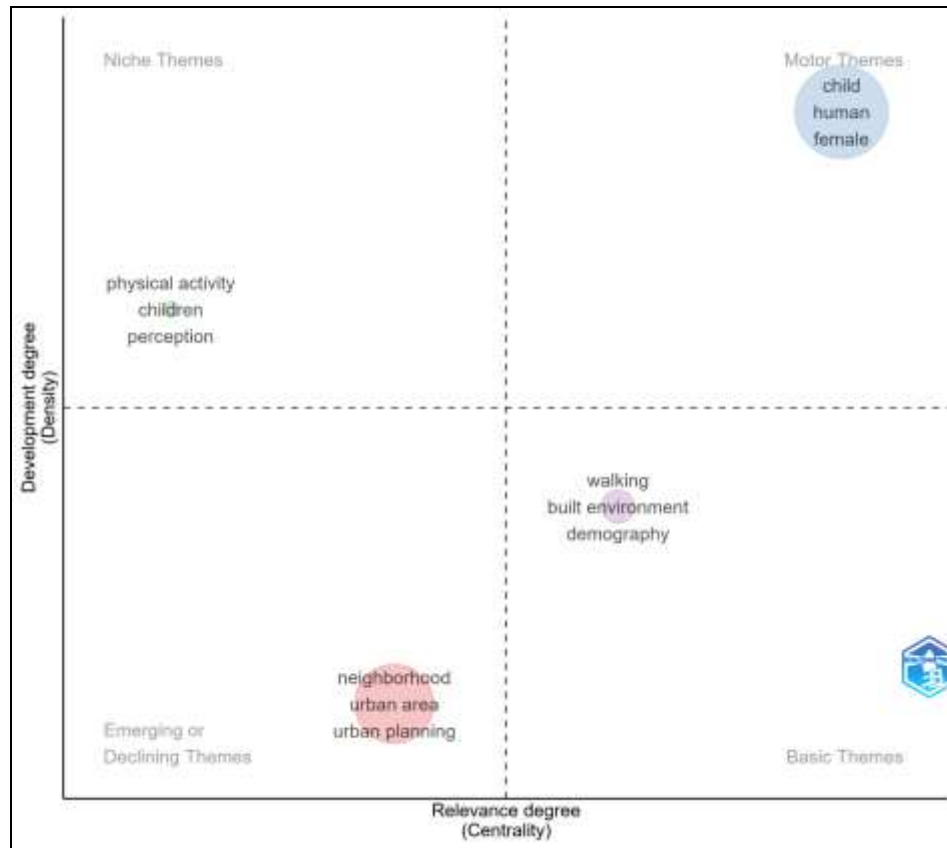


Figure 8: Thematic map

6. Discussion

6.1. Growth Without Geographical Balance

The annual growth rate of 13.98% indicates that research on children and urban public space has entered a phase of accelerated scientific expansion. The COVID-19 pandemic contributed to this trend by making children's exclusion from outdoor environments more visible across multiple contexts, thereby increasing academic and policy attention.

However, this growth remains unevenly distributed. Scientific production is concentrated in Australia, New Zealand, the United States, and the United Kingdom. In contrast, Saïss—where 56,240 children live within a functionally zoned urban fabric shaped by a car ownership rate of 30.03%—does not appear in any of the intellectual networks identified in this analysis. Similarly, major North African cities such as Fez, Rabat, Cairo, and Algiers remain largely absent. This pattern reflects broader structural inequalities in research funding, language, and publication systems, which tend to marginalize Global South contexts.

6.2. The Productive Limits of the Health Framework

The prominence of public health journals within the source distribution indicates a strong research focus on individual-level outcomes, including physical activity, body mass index, and active transport behaviour. These dimensions provide important insights into children's interactions with urban environments and constitute a substantial component of the existing literature.

At the same time, the co-citation and thematic analyses suggest comparatively less attention to spatial and urban design dimensions. For example, indicators of active mobility may not fully capture other characteristics of urban space, such as thermal comfort, opportunities for social interaction, or the degree of independence with which children can access and use public environments.

Urban perspectives associated with Jacobs (1961) and Gehl (2010) emphasize the importance of considering not only children's activities within public space, but also the qualities of the environments that support their presence and use. In this regard, the position of urban planning within the emerging-themes quadrant of the thematic map suggests opportunities for further research at the intersection of child studies, urban design, and planning.

6.3. The Child as a Diagnostic Criterion: Theoretical Potential and Empirical Gap

The central position of Jacobs within the co-citation network highlights the continuing influence of her argument that children's presence in public space may serve as an indicator of neighbourhood vitality. However, this perspective appears to have received comparatively limited attention in highly cited empirical studies. The bibliometric analysis suggests that children's spatial presence has rarely been examined as a primary indicator within the literature reviewed.

This observation points to opportunities for further methodological development. Approaches such as structured observation based on Gehl's classification of activities (necessary, optional, and social), participatory mapping with children, and GIS-based spatial analysis provide potential tools for examining children's presence and use of public space across different urban contexts.

Building on these perspectives, the present study considers children's presence in public space as a potential indicator of urban humanization. The conceptual framework guiding the field investigation explores the possibility that urban spatial organization, mobility patterns, environmental conditions, and opportunities for social interaction may collectively influence children's experiences of the urban environment.

To examine these relationships, the analysis is organized around four complementary dimensions: the physical dimension (surface coverage, thermal conditions, and street proportions), the safety dimension (traffic intensity, lighting, and perceived security), the social dimension (activity patterns and interaction levels), and the functional dimension (walkability, land-use diversity, and accessibility).

6.4. The North African Context: Absence and Specificity

The geographical patterns identified in the literature raise questions regarding the applicability of existing analytical frameworks across different urban contexts. Many of the frequently cited studies were developed in cities such as Auckland and Melbourne, where urban environments are often

characterized by relatively low densities, regular street networks, and clearly defined distinctions between public and private space.

These characteristics differ in several respects from those found in Moroccan cities. Urban spaces in Morocco are frequently structured through spatial elements such as the *homa*, *derb*, and *zenqa*, which are associated with gradual transitions between private and public domains, semi-public environments, and localized social interactions.

In Saïss, the dominant residential typology, the *Dar Maghrebiya*, tends to prioritize inward-facing domestic space. As a result, the relationship between residential environments and surrounding public space may differ from that observed in the contexts most frequently represented in the literature.

The demographic characteristics of the area further highlight the relevance of examining these issues. With 26.70% of dwellings constructed during the last decade and a school enrolment rate of 96.60% among children aged 7–12, everyday mobility constitutes an important component of children's urban experience. These characteristics suggest the value of developing analytical approaches that are sensitive to local urban conditions and children's lived experiences within them.

7. Conclusion

Five main findings emerge from this study. First, research on children and urban public space has developed through three distinct phases, reaching an annual growth rate of 13.98% and a peak of scientific production in 2025. Second, scientific output remains concentrated in a limited number of countries, particularly Australia, New Zealand, the United States, and the United Kingdom. Third, the intellectual structure of the field is organized around four major co-citation communities, with Jacobs occupying a bridging position between them. Fourth, urban planning appears as an emerging rather than a central theme within the thematic structure of the literature. Fifth, North African and Arab urban contexts remain relatively less visible in the body of research examined.

These findings point to several opportunities for future research, including the development of analytical frameworks adapted to diverse urban contexts, the further exploration of children's spatial presence as an indicator of urban quality, comparative studies between traditional and planned urban fabrics, and greater attention to the relationships between planning practices and children's everyday experiences of urban space.

In this regard, the *arrondissement* of Saïss offers a useful context for future empirical investigation. Its demographic characteristics, spatial organization, architectural forms, and proximity to the historic *medina* provide conditions for examining children's experiences across different urban settings. The methodological approach proposed for future research combines structured observation, participatory mapping, and GIS-based analysis to explore children's presence and use of public space.

More broadly, children's presence in public space may provide valuable insight into the social, spatial, and functional qualities of urban environments.

Expanding research on this topic, particularly in contexts that have received limited attention in the international literature, may contribute to a more comprehensive understanding of child-friendly and human-centered urban development.

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