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A SYSTEMATIC LITERATURE REVIEW OF ACCESSIBILITY STANDARDS, UNIVERSAL DESIGN PRINCIPLES, AND IMPLEMENTATION GAPS IN THE INDIAN URBAN PUBLIC OPEN SPACES

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ABSTRACT

While inclusive public open spaces are essential to equitable living in the city, they are not always achieved using accessibility standards and universal design principles, especially in fast-growing cities in the Global South. The aim of this SLR is to identify findings from current research on inclusive public open spaces, particularly in relation to the incorporation of accessibility standards and universal design principles into urban design practice. According to PRISMA 2020 guidelines, articles were identified in Scopus, Web of Science and Google Scholar databases, 1247 articles were found, 78 were included for full-text analysis. Seven themes emerged from the review: the shift from architectural to urban scale of universal design; operationalization of the seven universal design principles in the context of public open space; the limitations of existing accessibility audit methodologies; intersectional perspectives on gender, age, disability and class; gaps in the policy arena of developing countries; participatory and co-design approaches; and the emerging integration of universal design and sustainability frameworks. The challenges that still need to be addressed are the lack of representation of South Asian urban contexts, lack of incorporating multi-dimensional aspects of universal design with the environmental sustainability aspects, lack of enforcement of accessibility legislations in India, and lack of validated multi-dimensional evaluation frameworks which are specifically calibrated to Indian metropolitan public spaces. Based on the above, the review suggests a holistic framework of universal design, sustainability and user experience, which has four dimensions, and has direct implications for the rollout of the Smart Cities Mission, AMRUT 2.0 and SDG 11 in Indian cities.

Keywords: Inclusive Public Spaces, Universal Design, Accessibility Standards, PRISMA Systematic Review, India, Sustainability Framework

1. INTRODUCTION

1.1. BACKGROUND AND SIGNIFICANCE

Public open spaces are one of the most basic elements of urban infrastructure, as places for civic life, social interaction, cultural expression, ecological connection and physical activity (Gehl, 2011; Carmona, 2010). They are directly related to the quality of life of city dwellers, including health, wellbeing and social cohesion, and integral to

equitable access to public life (Mehta, 2014; Pineo, 2020). In a time of rapid global urbanisation The need to make public places accessible to all citizens, irrespective of their ability, age, gender or socio-economic status, has now become more urgent than ever before, particularly with over half of the world's population now living in urban areas and projected to be 68% of the world's population by 2050 (United Nations, 2022). The concept of universal design, described by Story, Mueller and Mace (1998) as 'the design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design' has become a normative framework in the field of inclusive design in architectural and urban contexts. The seven UD principles (equitable use, flexibility in use, simple and intuitive use, perceptible information, tolerance for error, low physical effort, and size and space for approach) offer a broad-based evaluative tool for designers, whether for specific building parts or for the space as a whole (Steinfeld and Maisel, 2012). Although there are important international policy commitments such as the UN Convention on the Rights of Persons with Disabilities (2006), the Sustainable Development Goals (including SDG 11 on sustainable cities and SDG 10 on reduced inequalities) and the New Urban Agenda (Habitat III, 2016), the practical application of the principles of universal design for public open spaces is inconsistent and often deficient, especially in urban settings in developing countries. India is the most populous country in the world with more than 470 million of urban citizens, and the context is highly interesting but less explored to look into how much the universal design aspiration is still missing from its implementation reality.

1.2. RESEARCH OBJECTIVES

The purpose of this systematic literature review is to achieve four related outcomes:

- To build the current state of the scholarly literature on inclusive public open space and measuring its accessibility using accessibility standards and universal design principles.
- To determine the main features, methods and theories used in the last decades in the field of inclusive design of public space in the city.
- To reflect the gaps in the implementation of universal design legislation in real life space experience, especially in the context of Indian and broader South Asian urban contexts.
- To suggest an integrated conceptual framework that combines universal design, environmental sustainability and user experience principles as a basis for future empirical research and design practice of public space in Indian metropolitan areas.

1.3. SIGNIFICANCE OF THE REVIEW

This review makes three principle contribution. First, this is a first systematic synthesis of literature on inclusive public open space with a purposeful analytical orientation to the Indian urban context, a context that is underrepresented in other reviews on which the current literature draws, and which is generally dominated by western and east Asian case studies. Second, it will promote the synergy of universal design and environmental sustainability frameworks, filling a gap in the theories on which these two fields of knowledge are developed, where they have evolved mostly separately. Third, it provides a holistic 4D conceptual model of UD, sustainability, and user experience principles that can be translated into an operational model for empirical analysis of public spaces, and can be applied to research and policy.

2. METHODOLOGY

2.1. SYSTEMATIC REVIEW PROTOCOL

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 guidelines (Page et al., 2021) were used for this review, but with adaptations for design and environmental research disciplines. The review protocol was established before the beginning and registered with the research office of the corresponding author in his/her institution. The review process involved five steps: (1) identification of the databases, (2) systematic search using a series of defined keyword strings, (3) two-stage screening (title-abstract and full-text), (4) quality assessment using a standardised proforma, and (5) thematic synthesis of included studies.

Figure 1

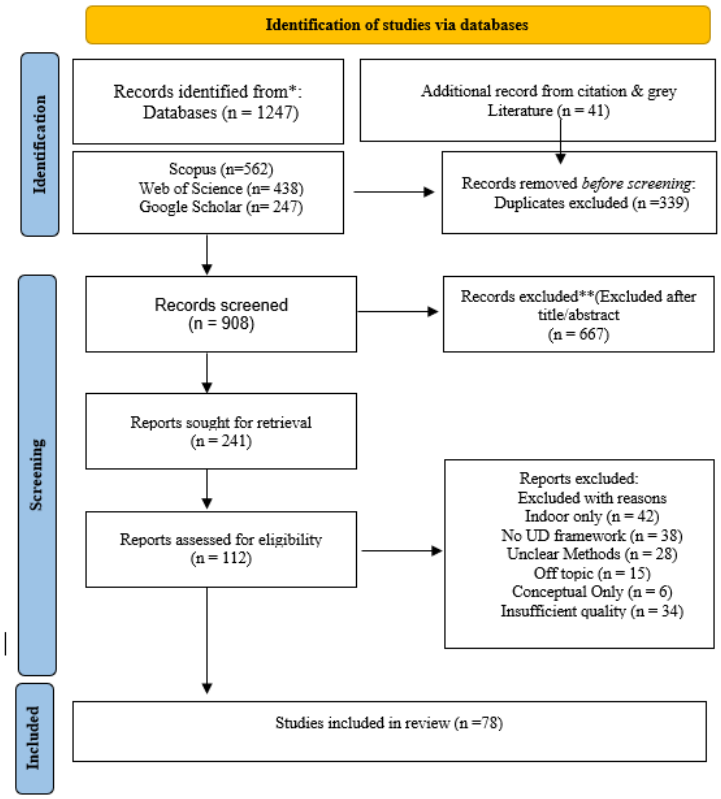

Figure 1 PRISMA 2020 Flow Diagram Showing the Systematic Identification, Screening, Eligibility Assessment, and Inclusion of Studies in this Review (N = 78 Included Studies). Adapted from Page et al. (2021).

2.2. DATABASE SELECTION AND SEARCH STRATEGY

The three primary databases used were Scopus (Elsevier), Web of Science (Clarivate) and Google Scholar. The two databases selected, Scopus and Web of Science, provided broad coverage of peer-reviewed publications in the fields of urban design, environment, and disability. Google Scholar was used as an additional source to obtain relevant grey literature, conference proceedings and recently published works that may not have been included in the major databases. Further searches were done in Shodhganga (India's national repository for PhD thesis) and selected institutional repositories (MoHUA, NCPEDP, Jagori) for policy documents and literature on Indian-context. The search strategy used was Boolean combinations of clusters of keywords in four thematic areas. The first search term that was used:

("universal design" OR "inclusive design" OR "accessible design") AND ("public space" OR "public open space" OR "urban space" OR "urban park") AND ("accessibility" OR "disability" OR "inclusion")

Secondary search strings were created for the following topics: Gender and safety in public space, Sustainability and integration of inclusive design, India and South Asian urban context, and post-occupancy evaluation and accessibility audit methodologies. The search included only peer-reviewed papers published in English from January 2010 to October 2025, except for seminal papers before 2010, which are directly relevant to the theoretical foundations.

Figure 2

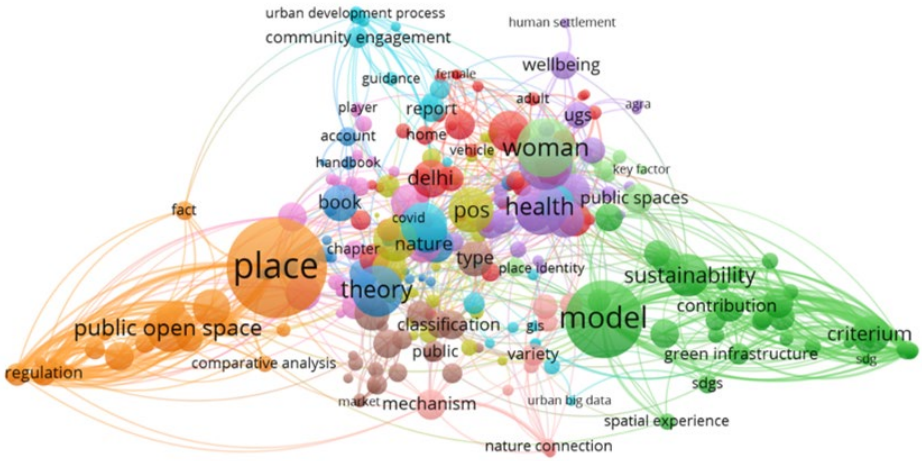

Figure 2 Network Visualization of Clusters of Keywords of Searched Database. Created Through VOS Viewer.

Figure 3

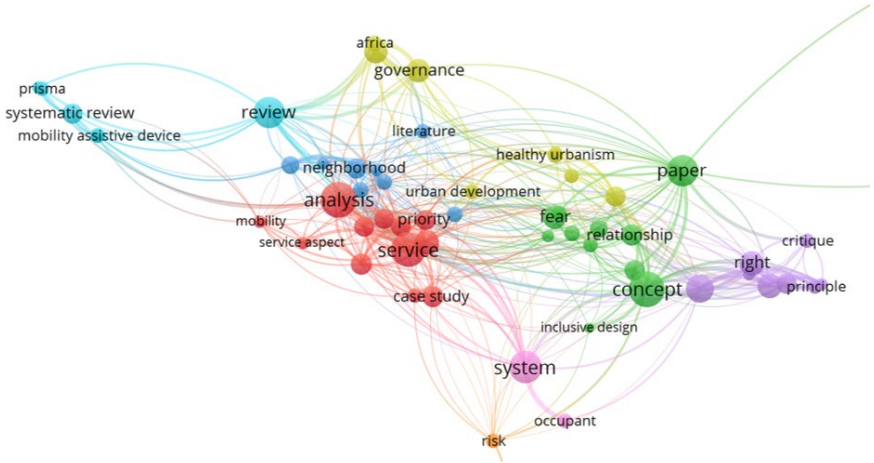

Figure 3 Network Visualization of Eligible 78 Papers of Searched Database. Created Through VOS Viewer

Figure 4

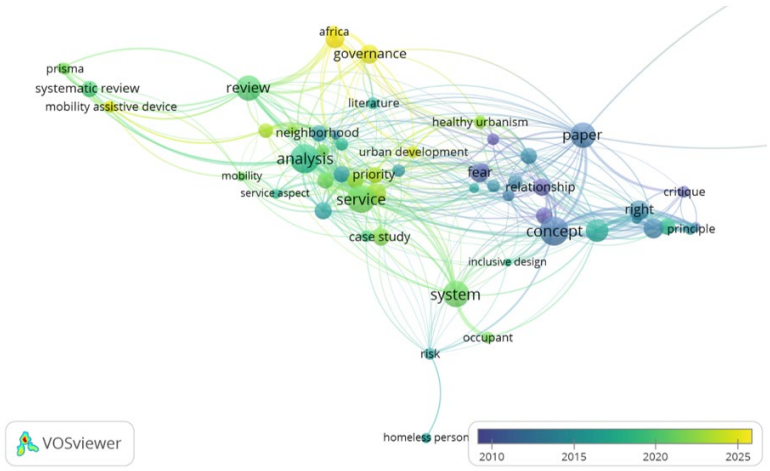

Figure 4 Overlay Visualization of Eligible 78 Papers of Searched Database. Created Through VOS Viewer

Figure 5

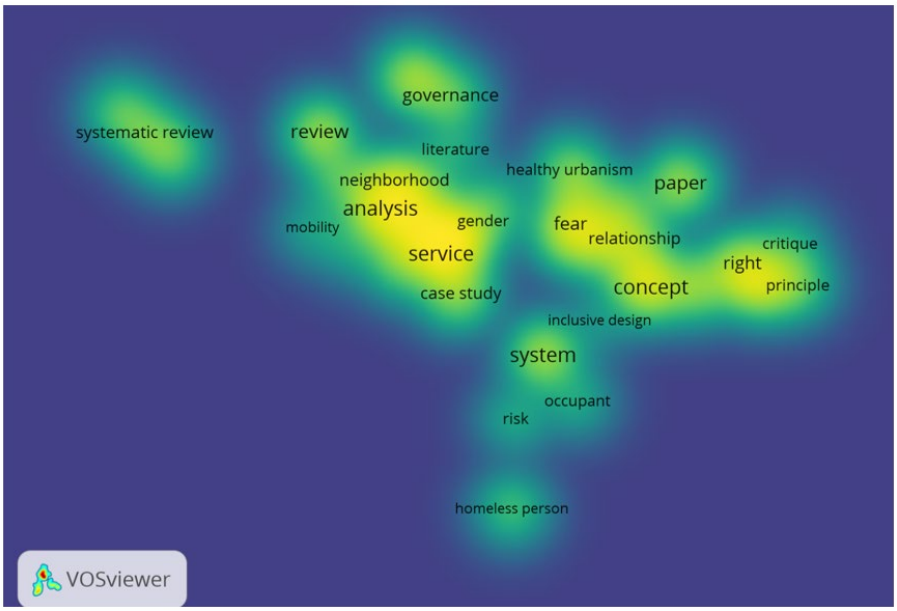

Figure 5 Density Visualization of Eligible 78 Papers of Searched Database. Created Through VOS Viewer

2.3. INCLUSION AND EXCLUSION CRITERIA

Table 1

Table 1 Inclusion and Exclusion Criteria Applied to the Systematic Review

Inclusion Criteria	Exclusion Criteria
Peer-reviewed journal articles or scholarly book chapters	Non-peer-reviewed sources (blogs, magazine articles, opinion pieces)
Published in English between 2010 and 2025	Studies published before 2010 (except seminal theoretical works)
Empirical, theoretical, or review studies on inclusive public open spaces	Studies focused exclusively on indoor accessibility or private space design
Studies addressing accessibility, universal design, or inclusivity dimensions	Studies addressing only physical accessibility without UD framework reference
Studies including Indian, South Asian, or comparable Global South contexts (priority weighting)	Duplicate publications across databases (retained only earliest version)
Studies of any methodology — qualitative, quantitative, mixed	Studies lacking methodological transparency or critical analysis

2.4. PRISMA FLOW OF THE REVIEW PROCESS

After the four stages of PRISMA flow, a final set of 78 articles were selected for full-text thematic synthesis as summarized in the table below (Table 2). The review process followed was methodologically sound and minimized selection bias, with both screening and quality assessment phases independently carried out by the lead researcher and secondly verified by the supervisory team.

Table 2

Table 2 PRISMA Flow — Stage-Wise Article Selection Process

PRISMA Stage	No. of Records	Action	Rationale
1. Identification	1,247	Initial database search	Scopus (562) + WoS (438) +
			Google Scholar (247) using primary search strings

2. Duplicate removal	908	Duplicates removed	339 duplicates identified using Zotero deduplication tool
3. Title and abstract screening	241	Screened for relevance	667 articles excluded as off-topic, off-scope, or not in English
4. Full-text eligibility assessment	112	Full text reviewed	129 articles excluded after full-text review (insufficient depth, lacking UD framework, indoor-only)
5. Quality assessment	**78**	**Final included studies**	34 articles excluded after quality assessment using standardised proforma

2.5. QUALITY ASSESSMENT PROFORMA

All 112 full text articles were assessed using a standardised quality assessment proforma based on six criteria: (1) clarity of research question and objectives; (2) appropriateness of methodology for research question; (3) rigour of data collection and analysis; (4) explicit engagement with universal design or accessibility frameworks; (5) transparency in reporting limitations and biases; and (6) contribution to theoretical or practical knowledge. A score of 0 (absent), 1 (partially present) or 2 (clearly present) was given for each criterion, for a maximum score of 12. Articles that scored less than 7 were not included in the final synthesis. The mean quality score for the 78 articles that were included was 9.4 (SD = 1.6), indicating a high level of evidence.

2.6. THEMATIC SYNTHESIS APPROACH

Thematic synthesis was conducted in three stages as described by Thomas and Harden (2008): (1) line-by-line coding of findings; (2) descriptive themes creation; and (3) analytical themes creation that surpasses primary studies. Thematic mapping and code management were completed using NVivo 14. This synthesis identified seven major themes which are used as the structure for the Results section that follows.

3. RESULTS

3.1. BIBLIOMETRIC OVERVIEW OF INCLUDED STUDIES

The 78 studies that were included were published over 15 years (2010–2025), with a more pronounced publication trend in recent years: 56% of studies (n = 44) were published in the last five years (2020–2025), and the number of studies published has been increasing since the COVID-19 pandemic and SDG 11's rise in urban policy discussions. Geographically these studies include 27 countries, 23 of which are European (29%), 17 North American (22%), 14 East Asian (18%) mainly China and South Korea, 11 South Asian (14%) including 8 Indian studies, and the remaining studies spread across the Global South. The geographical distribution alone indicates a key research gap: Lack of research on inclusive public space design in Indian and South Asian urban context.

Figure 6

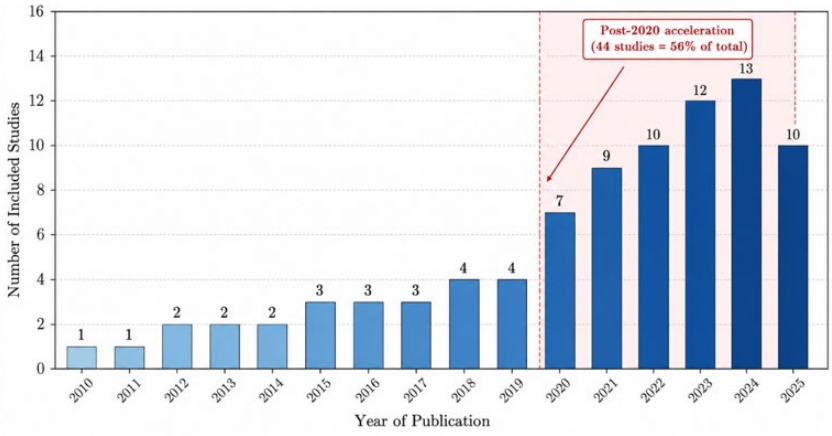

Figure 6. Annual Publication Trend of Included Studies (N = 78) Showing Pronounced Acceleration of Scholarly Attention yo Inclusive Public Open Spaces Since 2020, Reflecting SDG 11 Prominence and Post-COVID Urban Research Priorities.

Figure 7

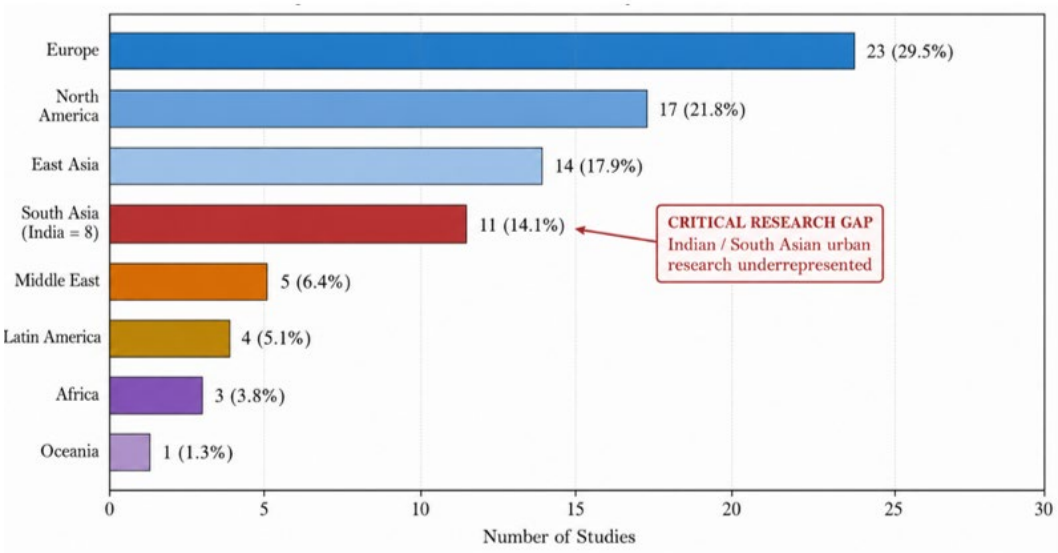

Figure 7 Global Geographic Distribution of Included Studies (N = 78), Highlighting Underrepresentation of Indian, South Asian, African, and Latin American Urban Contexts.

3.2. METHODOLOGICAL DISTRIBUTION

Table 3

Table 3: Methodological Distribution of Included Studies (N = 78)

Methodology	N	Percentage	Representative Studies
Mixed-methods empirical	24	31%	Dane et al. (2024); Pineo (2020); Zhang et al. (2024)
Qualitative case study	18	23%	Patrick & McKinnon (2022); Datta (2016)
Quantitative survey-based	14	18%	Benny et al. (2024); Xiao et al. (2024)
Systematic / scoping reviews	10	13%	Moore et al. (2023); Ghavimi et al. (2025)
Theoretical / conceptual	8	10%	Steinfeld & Maisel (2012); Carmona (2010)
Policy / document analysis	4	5%	MoHUA (2021); WHO (2022)

Figure 8

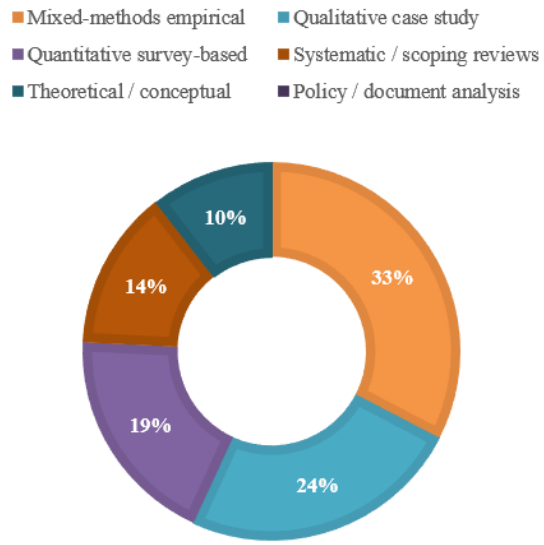

Figure 8 Methodological Distribution of Included Studies Showing Dominance of Mixed-Methods Approaches, Reflecting the Inherent Complexity of Evaluating Inclusive Public Space Across Multiple Dimensions

3.3. THEME 1 — THE EVOLUTION OF UNIVERSAL DESIGN: FROM ARCHITECTURAL TO URBAN SCALE

The first major theme that is evident from the synthesis is that the concept of universal design has developed from product and architectural design (beginning with Mace, 1985 and then Story, Mueller and Mace, 1998) and has been steadily expanding into urban-scale applications. Twenty-three studies (29%) focused on this evolution, describing the ways in which the seven UD principles, originally developed for built environment components, have been extended to landscape design, transportation, wayfinding and urban public space more broadly (Steinfeld and Maisel, 2012; Heylighen et al., 2017).

Figure 9

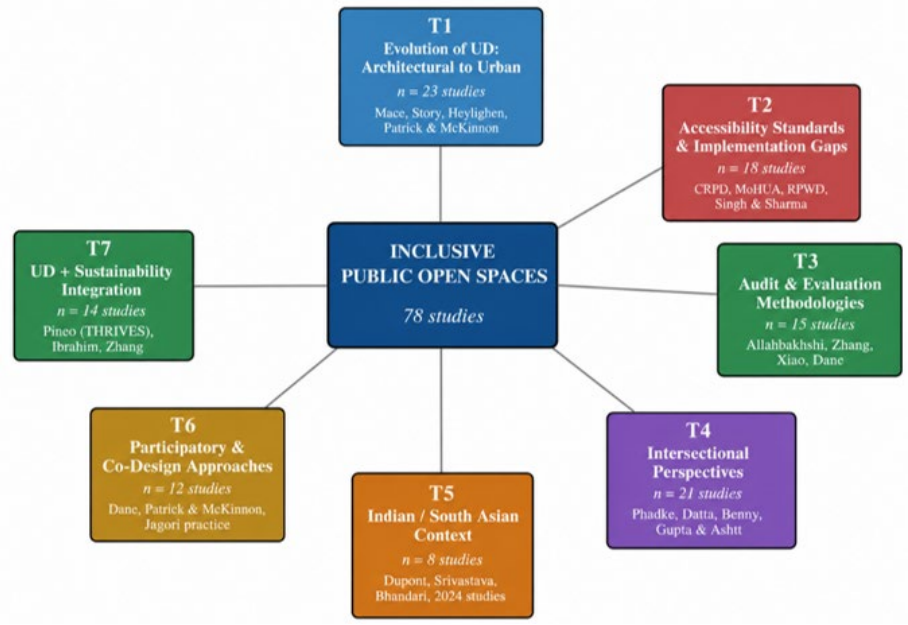

Figure 9 Hierarchical Concept Map of the Seven Themes Emerging from Thematic Synthesis, Showing Interconnections and the Relative Density of Scholarly Attention Per Theme.

This theoretical extension, however, is still not complete: nineteen studies identified the lack of guidance to designers in the application of the principles of UD in the context of the public space, where the spatial, social and temporal dynamics are more complex than in the building context. In recent years, there have been several attempts to define the principles of urban scale UD more clearly. In a global study of four case studies that includes India, Patrick and McKinnon (2022) outline seven inclusive city design principles that explicitly consider the dimensions of public space: choice and equity, dignity, integration, recognition, participation, environmental sustainability and resilience. This new framework transcends the original UD principles of a narrowly physical approach to a socio-spatial inclusivity agenda that is reinforced by the systematic review. A review by Moore et al. (2023) of inclusive playground design also contends that there is a need to expand the definition of UD to include physical, social and developmental accessibility.

Figure 10

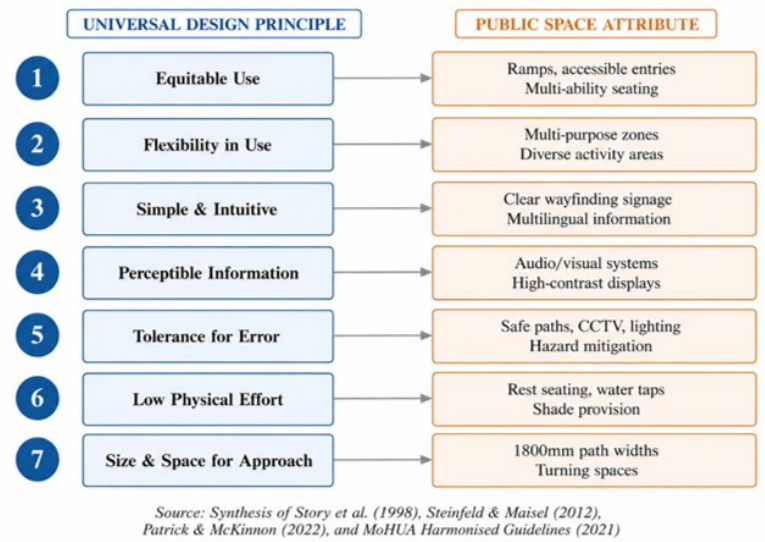

Figure 10 Mapping the Seven Universal Design Principles (Story, Mueller, & Mace, 1998) to Their Operationalization as Public Space Evaluation Attributes in Recent Literature.

3.4. THEME 2 — ACCESSIBILITY STANDARDS: CODIFICATION AND PERSISTENT IMPLEMENTATION GAPS

18 studies (23%) focused on the codification of accessibility standards in legislation and design guidelines and the continuing lack of implementation of these standards. There are strong normative frameworks for accessible public space in international documents, notably the UN CRPD (2006), the Americans with Disabilities Act Accessibility Guidelines (ADAAG) and the European Accessibility Act (2019). The key legislative mechanisms in India are the Rights of Persons with Disabilities Act, 2016 and Harmonised Guidelines and Space Standards for Barrier Free Built Environment for Persons with Disabilities, MoHUA, 2021. However, the literature across all geographic contexts studied shows a consistent disconnect between the standards that are codified and those that are put into practice. This implementation gap is especially pronounced in the context of developing countries. Less than 30% of audited public spaces in India meet basic accessibility standards as required by national legislation (Singh and Sharma, 2022; NCPEDP, 2020). Similar patterns have been reported in Latin American (Lopes and Alves 2021) and African contexts (Okwandu and Ike, 2024). These causes cited in the various studies are: (a) lack of effective enforcement; (b) lack of local authority design skills; (c) competing priorities in the city budget; (d) lack of disability voice in the design process; and (e) seeing accessibility as a compliance afterthought rather than a design priority.

3.5. THEME 3 — AUDIT AND EVALUATION METHODOLOGIES

Fifteen studies (19%) dealt with the methodology for auditing and assessing accessibility and universal design compliance in public spaces. The literature can be divided into three methodological approaches: (a) physical compliance audits with checklist-based protocols, based on legal requirements (Allahbakhshi, 2023; Becchimanzi and Pistolesi, 2021); (b) user-perception surveys based on access experience reported by participants (Zhang et al., 2024; Mela et al., 2023); and (c) new digital approaches such as participatory GIS mapping, virtual reality co-design, and street-view image analysis (Dane et al., 2024; Lopes and Alves, 2021; Malekzadeh et al., 2025). One important methodological lesson from this is that there is less intersection between the objective compliance audit and the subjective user experience assessment. Several studies (Mela et al., 2023; Allahbakhshi, 2023) report spaces that comply with formal compliance criteria but are said to be inaccessible by its users, and spaces that are not formally compliant but are perceived as accessible by users through informal adaptations. This difference highlights the importance of the need for integrated evaluation frameworks, which integrate objective audit data and subjective user perception, as addressed later in this review.

3.6. THEME 4 — INTERSECTIONAL PERSPECTIVES: GENDER, AGE, AND MULTIPLE MARGINALIZATIONS

Twenty-one studies (27%) took intersectional approaches that considered the intersections of gender, age, disability, class and other social identity characteristics and the compounded forms of exclusion from public space. This theme is well represented in the Indian and South Asian literature, including Phadke et al. (2011) on Marine Drive Kochi, Datta (2016) on Delhi, and the recent literature on women's safety in Indian urban parks (Journal of Urbanism, 2025), which report on the systematic exclusion of women from public space through design, cultural norms and lack of safety infrastructure. Disability research within an intersectional frame is particularly illuminating. The Co-creating Inclusive Public Spaces research Programme (Patrick and McKinnon, 2022) records multi-dimensional exclusion (physical, attitudinal, communicative and political) which is layered with gender, age and economic status for persons with disabilities. This compounding effect is repeatedly reported across studies, but is not methodologically developed in most studies, as the majority of those that mention intersectionality do not operationalize it in an empirical way by disaggregating the quantitative data. This is a very important methodologically missing area that is addressed by the proposed integrated framework by applying systematic demographic disaggregation for user perception analysis.

3.7. THEME 5 — THE INDIAN AND SOUTH ASIAN CONTEXT: AN UNDERREPRESENTED DOMAIN

The eight studies specifically focused on the Indian context encompassed the entire South Asian research base included in the studies. This is a very small evidence base compared to the challenge of public space and urbanisation in the region. The existing Indian research is grouped around four sub-themes: (a) gender and women's safety in public space (Phadke et al., 2011; Datta, 2016; Dhasmana et al., 2022); (b) accessibility audit and disability inclusion (Singh and Sharma, 2022); (c) public space studies in the context of Delhi (Dupont, 2011; Srivastava, 2014; Gupta and Ashtt, 2024); and (d) public space studies of the accessibility to heritage (limited; Bhandari, 2023 on riverfront accessibility).

3.8. THEME 6 — PARTICIPATORY AND CO-DESIGN APPROACHES

Twelve studies (15%) examined participatory and co-design approaches as methodologies for ensuring inclusive public space design. The study by Dane et al. (2024) provides a new methodological horizon with the development of the CoHeSIVE participatory framework based on the immersive virtual reality, which needs to be adapted for low-resource settings. Other more accessible methods are community workshops, photo-elicitation, and walk-along interviews, which are well represented in the studies included. The importance of participation going beyond consultation to co-creation is particularly highlighted by the work of Patrick and McKinnon (2022), who argue for including persons with disabilities and other marginalized groups in design teams and decision-making processes, rather than as informants. There is emerging participatory practice in the Indian context, especially in the NGO led initiatives. Although not formally disseminated in peer-reviewed publications, the Jagori Safe City Delhi Programme has generated substantial empirical and practice knowledge of participatory women's safety mapping which has shaped the ongoing Indian urban gender-design conversation. The combination of this practice-led knowledge and academic research is an important methodological approach for Indian public space scholarship in the future.

3.9. THEME 7 — INTEGRATION OF UNIVERSAL DESIGN WITH SUSTAINABILITY

The last theme that emerged (14 studies, 18%) relates to the incorporation of universal design in environmental sustainability frameworks. At present this integration is not well developed, as in most of the literature universal design and sustainability can be considered as two parallel but distinct normative principles of urban design, lacking in any integration from a theoretical or practical perspective. The most explicit attempt at integration comes from Pineo (2020), who lays the foundation for the THRIVES framework (Towards Healthy Urbanism: Inclusive, Equitable, and Sustainable), which integrates UD with sustainability in both the context of shared traditions of ecosocial epidemiology and just sustainabilities. There have been recent efforts to investigate the practical synergies. Ibrahim (2024) explores the concept of universal design in public open spaces for wellbeing cities, clearly connecting it to SDG 11. In addition to accessibility and spatial quality, Zhang et al. (2024) add ecological dimensions, including greenery, microclimate and

biodiversity, to their user-perception framework. These are important contributions in an emerging direction: Integrated frameworks increasingly treat universal design and environmental sustainability not as separable quality aspects but as two interwoven dimensions of inclusive public space. This integration is one of the core tenets of the framework that is proposed in Section 4 of this review.

4. SYNTHESIZING THE FINDINGS: A PROPOSED INTEGRATED FRAMEWORK

4.1. RATIONALE FOR AN INTEGRATED FRAMEWORK

The thematic synthesis described in Section 3 shows that although there are well-established and well-documented areas of scholarship on each of these topics, there is a lack of coherence in how they are brought together in a single evaluative framework. Current frameworks tend to be based on one paradigm, such as the seven UD principles that are mostly based on physical accessibility and do not explicitly include environmental aspects, or sustainability frameworks such as SDG 11, which focus on ecological quality, but lack effective ways to operationalize accessibility, or user experience methods based on IPA and POE traditions, which enable user-centered evaluation, but do not include normative aspects of accessibility in their reasoning. The Indian context of urban living is marked by extreme socio-spatial inequity, climate stress, heritage complexity and rapid urbanisation which demands a framework that takes care of all four

4.2. THE FOUR-DIMENSIONAL FRAMEWORK

The above synthesis is presented as a basis for proposing an integrated framework of four dimensions for assessing inclusive public open space. The dimensions are based on specific theoretical traditions identified in the systematic review, and operationalized into measurable attributes.

Table 4

Table 4: The Four-Dimensional Integrated Framework — Dimensions, Attributes, and Theoretical Grounding

D	Dimension	Core Attributes	Theoretical Grounding
1	**Spatial Quality**	Layout legibility, wayfinding, seating, maintenance, cleanliness, surface quality, aesthetic character	Gehl (2011); Carmona (2010); PPS framework
2	**Accessibility & Inclusivity**	Ramps, tactile paths, accessible facilities, gender-sensitive design, economic inclusivity, multi-ability use	Story et al. (1998); Steinfeld & Maisel (2012); RPWD Act (2016); MoHUA Guidelines (2021)
3	**Ecological & Environmental Comfort**	Thermal comfort, shade, greenery, air quality, acoustic environment, microclimate, biodiversity	Kaplan & Kaplan (1989); Ulrich (1983); SDG 11 + 13; NbS literature
4	**Socio-Cultural Vitality**	Social interaction, cultural expression, safety perception, gender safety, sense of belonging, demographic diversity	Mehta (2014); Low & Smith (2006); Phadke et al. (2011); Patrick & McKinnon (2022)

Figure 11

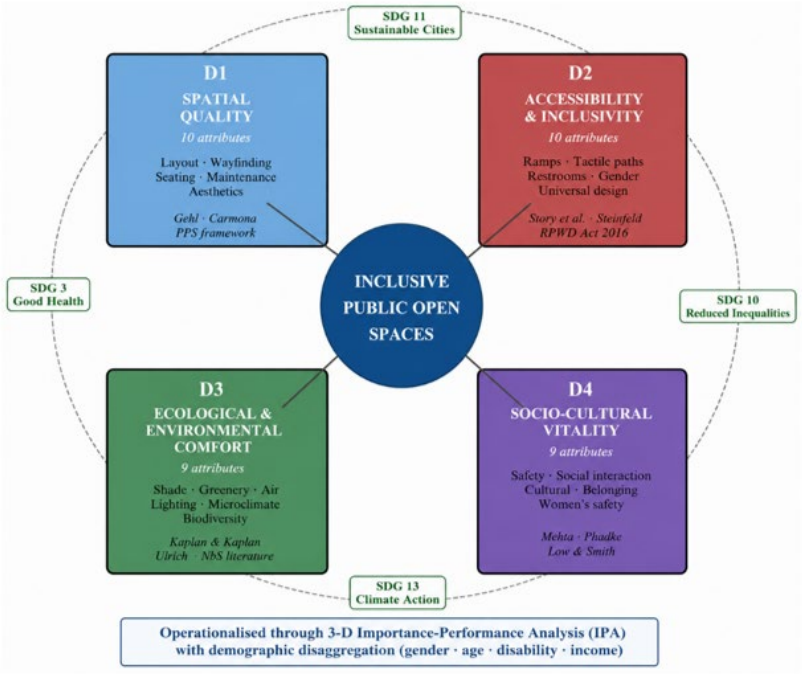

Figure 11 The Proposed Four-Dimensional Integrated Framework Synthesizing Universal Design, Environmental Sustainability, and User Experience Perspectives. Each Dimension Comprises 9-10 Measurable Attributes Grounded in Established Literature, With Explicit SDG Linkages.

4.3. OPERATIONALIZATION THROUGH IMPORTANCE-PERFORMANCE ANALYSIS

The framework is implemented in a three-dimensional Importance-Performance Analysis (IPA) model, which follows the methodological cycle set by Xiao et al. (2024) and Zhang et al. (2024). Three measurements are collected for each evaluative attribute: Importance (I) is the user-perceived priority of the attribute; Performance (P) is the current delivery against the attribute; and Gap Score (G = P − I) is the magnitude of underperformance relative to the importance of the attribute. This three-variable model allows prioritization of design interventions at the attribute level, dimension level and aggregate framework level, offering actionable advice for planners, designers and policymakers.

4.4. DEMOGRAPHIC DISAGGREGATION AS A METHODOLOGICAL IMPERATIVE

One of the methodological principles which underpin the framework is the systematic disaggregation of perception data by demographic subgroups, especially gender, age, disability and socio-economic position. Intersectional analysis was found to be a recurring theme in the systematic review: although many investigations recognize the significance of multiple marginalizations, few studies explicitly engage with the issue of multiple marginalizations in their analysis by using the method of demographic disaggregation. The proposed framework is explicit with regard to demographic subgroup analysis by using independent samples t-tests (two group), one-way ANOVA with Tukey post-hoc (multiple group) and Kruskal-Wallis (non-normally distributed variables), and reporting effect sizes for comparisons across studies and contexts.

5. DISCUSSION

5.1. WHAT THIS REVIEW ESTABLISHES

This systematic review concludes that the scholarly understanding of inclusive public open spaces has made significant progress in the last 15 years, marked by theoretical consolidation around principles of universal design, an increasing number of sophisticated methods to measure accessibility, and an emerging intersectional approach. Three

key areas of weakness still remain, however. Firstly, empirical studies are very unevenly distributed between contexts in Europe, North America and East Asia, and those in South Asia, Africa and Latin America. Second, the incorporation of universal design into the emerging frameworks for environmental sustainability — though present in recent writings — has been overlooked, and theoretically and methodologically underdeveloped. Third, the difference between codified accessibility legislation and actual reality is still a substantial one in all contexts, and still not sufficiently explained, which implies that there is still a research direction that is underdeveloped, namely research on policy implementation. This has special relevance for the Indian urban policy and practice.

Also, current best practice for instrument and framework validation goes beyond a single-panel Delphi (Lawshe CVR) design to multiple-stage Delphi designs with expert composition at each stage and multiple complementary validation indices such as the Content Validity Index at item and scale levels (Polit & Beck, 2006), Modified Kappa for chance-corrected agreement (Wynd et al., 2003), and Intraclass Correlation Coefficient for inter-rater reliability (Koo & Li, 2016). The findings from the systematic review show that many of the 78 studies included do not meet these more modern standards for validation, which this paper builds on in a 6-stage Delphi process with around 50-60 individual experts.

5.2. IMPLICATIONS FOR THE INDIAN URBAN CONTEXT

The policy and practice of cities in India are especially relevant. Underperformance of public spaces in India in comparison to international standards for accessibility (as shown in several of the studies included in this document) is not only due to the lack of resources. Similar contexts based on income levels in other parts of the country have had far greater rates of accessibility legislation implementation. The review indicates that the implementation gap in India is due to several factors – lack of enforcement mechanisms, deficiency in capacity of the design profession, lack of representation of disability voices in the planning process, and the continued approach of accessibility as a compliance afterthought and not a design priority. Solving these problems will require technical capacity building, as well as institutional and cultural changes in Indian urban design practice.

5.3. IMPLICATIONS FOR THE SMART CITIES MISSION AND SDG 11 IN INDIA

The Smart Cities Mission and Government of India's SDG 11 policy agenda offer a policy opportunity to mainstream universal design and sustainability in Indian urban public space programming. The proposed 4-dimensional framework provides a directly applicable tool for: (a) baseline assessment of current quality of public space in Smart Cities; (b) prioritisation of improvement investments based on the evidence from user perspective and not on the assumption of supply; (c) tracking the progress of implementation through replicable and comparable metrics; and (d) reporting on SDG 11 indicators with empirical rigour. The methodological simplicity of the framework (standard survey, observation and GIS tools) makes it applicable to all the urban local bodies of the country irrespective of their technical capacity.

5.4. LIMITATIONS OF THIS REVIEW

This review needs to be acknowledged with several limitations. First, the search was only carried out in English language publications, which may have missed out on significant scholarship in Hindi, Tamil and other regional languages. Second, the review was limited to peer-reviewed academic literature, which might under represent knowledge of NGOs and community organisations which is more relevant in practice, especially in the Indian context. Third, the period of time (2010-2025) does not include earlier works that have laid the groundwork for the works included in this report except where such works are referenced within the included works. These limitations should be addressed in future updates of this review, through: multilingual searching, systematic search of grey literature, and special attention to foundational scholarship prior to 2010.

6. CONCLUSIONS

This systematic literature review has captured 78 peer-reviewed studies on inclusive public open spaces, which revealed seven interrelated themes, and a proposed four-dimensional integrated framework to assess accessibility, universal design, environmental sustainability, and user experience in public space situations. The review highlights that while there has been significant scholarly development in inclusive design, there are still significant gaps – notably, the

lack of recognition of South Asian urban settings, the lack of full integration of universal design with sustainability agendas, and the general gap between the formal application of accessibility legislation and real-world spatial experience in developing country cities. The proposed integrated framework provides a platform for future empirical studies in similar cities in the Global South, as well as in India. Methodologically rigorous and practically actionable, its operationalization trough 3-D Importance-Performance Analysis, demographic disaggregation, physical audit, behavioral observation, and GIS spatial analysis is a tool for furthering inclusive public space scholarship and practice. Future research on transferability and refinement of this framework will benefit from empirical research in specific Indian metropolitan contexts, such as the empirical study of Delhi's typologically diverse public spaces that follows this review. The ultimate goal of this scholarship is not just descriptive but transformative, aiming to create urban public space in India and around the world that is truly inclusive, environmentally sustainable, and representative of the needs and aspirations of all citizens, irrespective of their ability, gender, age or socio-economic status. The realization of this aspiration will take time and effort in all aspects of academic research, policy implementation, professional practice and community engagement. This review and its proposed framework is one contribution to this collective endeavor.

CONFLICT OF INTERESTS

None.

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