The Limits of the 15-Minute City: a Systematic Qualitative Literature Review

Beniamino Murgante and Alfonso Annunziata(✉)

Department of Engineering, University of Basilicata, 85100 Potenza, Italy
alfonso.annunziata@unibas.it

Abstract. The 15MC has gained prominence as a planning paradigm aimed at addressing spatial inequality, car dependency, and the environmental and social externalities of urban dispersion through proximity-based urban organization. Yet, despite its increasing influence in academic and policy debates, the concept remains marked by theoretical ambiguity, methodological inconsistency, and implementation challenges. This article presents a structured qualitative literature review of the limitations associated with the 15MC, organized via a conceptualization–operationalization–implementation–impact framework. The study combines systematic review procedures with AI-assisted semantic relevance ranking and inductive content analysis. A Scopus-derived corpus of 242 publications was first prioritized through semantic ranking, after which the 25 most relevant articles were qualitatively examined. The findings develop a systematic taxonomy of the concept's limitations, underlining conceptual tensions, measurement issues, governance constraints, and potential unintended effects. The article concludes by identifying key directions for reinforcing the model's theoretical, methodological, and policy foundations.

Keywords: 15MC · Limit · Critique · Policy

1 Introduction

In recent years the 15-min city (15MC) concept has emerged as a significant paradigm for addressing emerging urban issues related to spatial inequalities, environmental and climate crises, urban dispersion, and car-dependency [1–4]. Grounded in the principles of chrono-urbanism, the 15MC proposes an urban configuration in which six core functions - housing, employment, education, healthcare, commerce, and leisure - are located within a distance from each residence equivalent to a travel time of 15 min by foot or by bicycle [4–7]. The aim is to reduce travel time, promote active mobility, and foster proximity-based living. Chrono-urbanism emphasizes the spatio-temporal organization of urban systems, advocating for decentralization and re-distribution of functions to optimize individuals' time use. By minimizing travel time related to basic activities, this paradigm reallocates time toward social interaction and recreational activities. Moreover, reduced travel demand contributes to decreased car dependency, improved access to services of general interest (SGI), and increased reliance on active modes of transport.

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Adopting a time-centric planning perspective yields multiple co-benefits. These include more equitable access to urban amenities, lower energy consumption, reduced noise and air pollution, social cohesion, and overall improvements in urban quality of life [4, 5]. This concept has emerged as a significant interpretative lens for evaluating cities' performance in terms of access to essential functions [1, 8–10], and as a model informing urban policies and planning initiatives [11, 12]. At the same time, the model has been subject to substantial criticism regarding its conceptual foundations, issues of replicability and transferability, structural impediments to the development of robust and standardized compliance assessment protocols, feasibility and governance constraints, and the potential for unintended adverse effects. This article presents a structured qualitative literature review of the limitations, critiques, and objections concerning the 15MC concept, organized via a conceptualization–operationalization–implementation–impact lens. The study combines systematic literature review and inductive content analysis, by introducing a procedure that integrates computational and qualitative methods. First, it uses semantic relevance ranking of a Scopus-derived corpus (n = 242) to prioritize the literature. Then, an inductive content analysis is conducted on the 25 most relevant articles. By combining AI-assisted retrieval techniques and comprehensive qualitative synthesis, the study advances a systematic taxonomy of the limitations of the 15MC concept. This article contributes to the debate on the 15MC in three ways. First, it develops a systematic taxonomy of the concept's limitations across four analytical dimensions - conceptualization, operationalization, implementation, and impact - clarifying the structural, methodological, and governance-related barriers that may prevent urban policies based on the model from delivering expected outcomes in terms of equity, social inclusion, sustainability, and health. Second, it advances methodological practice by combining AI-assisted semantic relevance ranking with inductive content analysis, enhancing transparency and replicability while maintaining interpretive rigor. Third, it identifies priority inquiry directions to improve the model's conceptual foundations, measurement procedures, and policy feasibility, thus contributing to bridging the gap between normative urban visions and operational planning tools. The article is structured into six sections. After the introduction, Sect. 2 outlines the conceptual foundations, and Sect. 3 describes the proposed method. Section 4 presents the results, which are discussed in Sect. 5. Finally, the Conclusions summarize the main findings and outline directions for future research.

2 Theoretical Framework and Key Concepts

The 15-min city is defined as an urban model based on chrono-urbanism aimed at ensuring that all residents are able to access all basic essential functions - including Living, Employment, Commerce, Healthcare, Education, and Entertainment - within 15 min on foot or by bicycle. The model is based on the principle that the quality of urban life is inversely proportional to time spent in automobile-based commuting and aims to counteract the socio-spatial fragmentation produced by modernist, car-dependent planning paradigms. More precisely, the 15MC aims to address interrelated issues, including environmental degradation, climate alteration, spatial and social inequalities, declining public health, and inadequate urban resilience exposed by the COVID-19 pandemic. In

this sense, the concept advances a proximity-based planning concept intended to improve urban resilience, sustainability, and social cohesion while reducing car dependency and improving equitable access to essential services.

The 15-min city concept entails a reorganization of cities compliant with the components of density, proximity, diversity, and digitalization. Density is framed as a functional and relational dimension, and refers to the optimal number of people per unit area that can be sustained in terms of service provision and resource consumption [4, 5]. A complementary definition considers density as the optimal number of residents per unit area required to sustain service diversity and plurality [6, 7]. Proximity is conceptualized as a multidimensional principle integrating spatial and temporal access to essential urban functions. Proximity refers to the close spatial distribution, decentralization, and redistribution of services at the district scale and promotes the multifunctional use of urban infrastructures [4, 6, 7, 13]. It supports active mobility, reduces automobile dependence, enhances inclusiveness and social interaction, and contributes to urban sustainability and quality of life [14–16]. Diversity refers to the coexistence and integration of varied urban functions and socio-cultural identities at the local scale [4, 5, 7, 17]. It encompasses the presence of mixed-use environments and the co-presence of heterogeneous populations, practices, and cultural expressions. Lastly, digitalization, or digital ubiquity, refers to the use of Information and Communication Technologies (ICT), Internet of Things (IoT) systems, distributed sensors, and digital twin platforms to optimize service delivery, foster inclusivity, enhance participation, and generate data streams that can be analyzed to inform decision-making, measure performance indicators, and monitor policy implementation and outcomes [4, 6, 18, 19].

The 15MC concept, particularly in the aftermath of the COVID-19 pandemic, has emerged as a robust interpretative lens for assessing urban performance in terms of equitable access to essential services and functions. It has also been advanced as a policy model for addressing environmental degradation, climate alteration, and socio-spatial inequalities. Consequently, a growing body of literature proposes quantitative methods to evaluate the extent to which urban areas align with the foundational principles of the 15MC. Empirical applications include assessments of equitable access to urban functions in the Liverpool City Region [20], in Barcelona [21], Oslo and Lisbon [22] in the Italian cities of Terni, Matera [6], Cagliari, Perugia, Pisa, Trieste [7]. Comparative studies measure cumulative opportunities and variety of destinations across European Cities with more than 100,000 inhabitants [23], compliance of distinct city typologies with 15MC criteria across 24 global cities [24], and measure levels of proximity across the 500 largest cities in the United States and 43 urban areas in New Zealand [25]. Moreover, the C40 initiative - comprising 100 major cities across multiple countries - has identified the 15MC concept as a relevant paradigm for sustainable and equitable post-pandemic recovery [26]. Numerous global cities - including Paris, New York, Washington, Dublin, London, Seattle, Portland, Toronto, Melbourne, Bogotá, Milan, Lisbon, and Rome - have incorporated the 15MC concept into their urban policy documents as a model to improve proximity, ensure equitable access to services of general interest, and foster social cohesion [6, 7]. Despite its prominence in academic and policy discourse, substantial criticism has emerged regarding the conceptualization, operationalization, practical feasibility, and unintended consequences of the 15MC model. In response to

these debates, the subsequent sections present a structured qualitative literature review that aims to systematize a taxonomy of the principal limitations associated with the 15MC concept.

3 Methodology

The analysis integrates a structured literature review with an inductive qualitative content analysis. The objective is to develop a systematic taxonomy of the limitations, objections, and critiques of the 15MC concept, organized along the dimensions of conceptualization, operationalization, implementation, and impact. The methodological procedure is structured into three stages: (i) corpus construction; (ii) semantic relevance ranking of the corpus; and (iii) inductive content analysis.

3.1 Corpus Construction

The corpus was constructed through a replicable search strategy applied to the Scopus database. Scopus was selected based on two criteria: (i) its extensive coverage of peer-reviewed scientific publications relevant to the research topic; and (ii) the completeness and standardization of its metadata, which facilitate subsequent bibliometric analysis.

Relevant articles focusing on the limitations of the 15MC concept were identified via the development and iterative refinement of search queries incorporating the terms "15-min city," "x-minute city," "limitation*," and "critic*." The preliminary query was subsequently refined to improve precision and recall. This refinement involved restricting the search to the TITLE-ABS-KEY field and incorporating frequently used terminological variants of the concept. The final search string was structured as follows:

TITLE-ABS-KEY (("15MC" OR "15 min city" OR "15min city" OR "20-min city" OR "20 min city" OR "20min city" OR "20-min neighbourhood" OR "20-min neighborhood" OR "15-min neighbourhood" OR "15-min neighborhood" OR ("N-minute" W/1 (city OR cities OR neighbourhood OR neighborhood)) OR ((minute* W/2 (city OR cities OR neighbourhood OR neighborhood)) AND (15 OR 20))) AND (limitation* OR critic* OR criticism OR drawback* OR challenge* OR concern*)). The structured search resulted in the construction of a corpus of 242 items.

3.2 Semantic Relevance Ranking

To prioritize the literature in relation to the research question, a semantic relevance ranking procedure was implemented. Rather than relying exclusively on Boolean keyword matching, the study adopted a transformer-based semantic similarity approach.

For each record, a textual representation was constructed by concatenating the title, abstract, author keywords, and index keywords.

These document representations were encoded into dense vector embeddings using a pre-trained Sentence-Transformers model (all-mpnet-base-v2). The embeddings were L2-normalized, and document relevance was calculated as the cosine similarity between each document vector and a natural-language query explicitly formulated to capture discussions of limitations, criticisms, and implementation challenges associated with the 15MC concept. The natural-language query was formulated as follows:

Table 1. List of scientific articles selected for the inductive content analysis

AU	TI	TC	S_SC
Mahmoudpour A; Shirazi Mr [27]	Critical Debates On The 15MC: A Systematic Content Analysis Of The Literature	2	0.827
Megahed G; Elshater A; Abdelmoneim Elrefaie M; Afifi S [11]	Exploring The X-Minute City: A Chronological Analysis And Thematic Review Of Proximity-Based Urbanism	0	0.815
Mouratidis K [28]	Time To Challenge The 15MC: Seven Pitfalls For Sustainability, Equity, Livability, And Spatial Analysis	69	0.808
Khavarian-Garmsir Ar; Sharifi A; Sadeghi A [29]	The 15MC: Urban Planning And Design Efforts Toward Creating Sustainable Neighborhoods	251	0.795
Khavarian-Garmsir Ar; Sharifi A; Hajian Hossein Abadi M; Moradi Z [30]	From Garden City To 15MC: A Historical Perspective And Critical Assessment	83	0.779
Allam Z; Khavarian-Garmsir Ar; Lassaube U; Chabaud D; Moreno C [2]	Mapping The Implementation Practices Of The 15MC	33	0.775
Iqbal A; Nazir H; Qazi Aw [31]	Exploring The 15-Minutes City Concept: Global Challenges And Opportunities In Diverse Urban Contexts	4	0.765
Pozoukidou G; Angelidou M [19]	Urban Planning In The 15MC: Revisited Under Sustainable And Smart City Developments Until 2030	79	0.764
Teixeira Jf; Silva C; Seisenberger S; Büttner B; et al. [32]	Classifying 15-Minute Cities: A Review Of Worldwide Practices	58	0.764
Arias-Molinares D; Geurs K; Grigolon A; Ulak B; et al. [33]	Exploring The 15MC Concept For The Urban Outskirts: A Systematic Literature Review	0	0.760
Lu M; Diab E [34]	Developing A 15MC Policy? Understanding Differences Between Policies And Physical Barriers	11	0.760
Carvalho T; Farber S; Manaugh K; El-Geneidy A [35]	Assessing The Readiness For 15-Minute Cities: A Literature Review On Performance Metrics And Implementation Challenges Worldwide	10	0.757

(*continued*)

Table 1. (*continued*)

AU	TI	TC	S_SC
Chau H-W; Gilzean I; Jamei E; Palmer L; Preece T; Quirke M [1]	Comparative Analysis Of 20-Minute neighborhood Policies And Practices In Melbourne And Scotland	22	0.751
Wang H; Tsoi Kh; Loo Bpy [1]	An Assessment Framework For 15-Minute Cities: Progress Worldwide And The Impact Of Urban Form	5	0.750
Pirmoradi P; Garshasbi D; Solgi N [36]	A Critical Review: The 15MC	1	0.750
Casarin G; Macleavy J; David Manley D [37]	Rethinking Urban Utopianism: The Fallacy Of Social Mix In The 15MC	60	0.743
Thornton Le; Schroers R-D; Lamb Ke; Daniel M; et al. [38]	Operationalising The 20-Minute neighborhood	61	0.731
Szymańska D; Szafrańska E; Korolko M [39]	The 15MC: Assumptions, Opportunities And Limitations	6	0.729
Sharma A; Chandi A; Winters M [40]	An Investigation Of 15-Minute neighborhoods In Surrey, British Columbia: A Community-Informed Social Equity Analysis For A Fast-Growing, Diverse, Canadian City	2	0.728
Sepehri B; Sharifi A [41]	X-Minute Cities As A Growing Notion Of Sustainable Urbanism: A Literature Review	24	0.727
Bonfantini Gb; Galimberti B; Ventura E [42]	There Are No 'Solutions' In Urban Planning: Against The Idea Of A Ready-Made Urbanism And The 15MC's Uncritical Branding	1	0.726
Baldwin J [43]	Proximity Without Equity? Racialized Housing Organizations And The 15MC	0	0.726
Papadopoulos E; Sdoukopoulos A; Politis I [9]	Measuring Compliance With The 15MC Concept: State-Of-The-Art, Major Components And Further Requirements	88	0.723
Branco Da Silva J; Ricardo Da Costa A; Morais De Sá A [44]	The 15MC: Application To Two Parishes Of The City Of Lisbon	1	0.722
Pinto F; Akhavan M [12]	Reimagining Proximity: Operationalising The X-Minute City And Urban Regeneration In Amsterdam And Milan	0	0.721

> "What are the limitations, criticisms, and implementation challenges of the 15MC (or 20-minute neighborhood) concept, including issues related to definition, equity, exclusion, gentrification, governance, scalability, measurement, and unintended consequences?"

While this formulation may have oriented the retrieval process towards these themes, the subsequent inductive coding did not impose these categories a priori, enabling additional or differently framed critiques to emerge from the selected set. Articles were subsequently ranked in descending order of similarity and exported for screening and further qualitative analysis.

3.3 Inductive Content Analysis

In the final stage, the 25 most semantically similar articles were selected for inductive content analysis (see Table 1). This threshold was adopted as a purposive and exploratory cut-off, suitable for a preliminary application of the analytical procedure and for enabling detailed qualitative coding of the most relevant contributions. During corpus screening, substantial thematic saturation was observed, as additional high-ranking records largely reiterated critique domains already identified in the selected set. Subsequently, the limitations and critiques of the 15MC model were systematically extracted and synthesized. The ultimate objective was to develop a taxonomy structured around four analytical dimensions: conceptualization, operationalization, implementation, and impact. More specifically, the conceptualization dimension encompasses limitations related to the theoretical assumptions underpinning the definition of the 15MC concept. The operationalization dimension refers to limitations associated with the development and application of quantitative methods and indicators used to assess the degree of alignment between urban environments and the 15MC framework. The implementation dimension encompasses barriers related to the feasibility, democratic legitimacy, and transparency of urban policies intended to reorganize urban environments in accordance with the 15MC framework. The impact dimension, by contrast, concerns the potential unintended negative consequences arising from the implementation of the model. The inductive analysis is articulated in four steps. First, each article was analyzed independently to identify all explicit and implicit limitations, criticisms, risks, or constraints related to the 15MC concept. No cross-article merging was conducted at this stage, and conceptually distinct limitations were retained to preserve analytical granularity. For each limitation, a structured record was created including: a neutral label; a definition; the mechanism explaining its relevance; a provisional domain classification; spatial level (where identifiable); impacted groups (if specified); and a supporting evidence excerpt with page reference. No interpretive generalization beyond the source text was introduced. After every five articles, a controlled within-batch normalization was performed. Each batch resulted in a refined limitation list, an Article $\times$ Limitation comparison matrix, and a descriptive summary of emerging patterns. Following article-level extraction and batch-level harmonization, a global normalization across subsets of articles was conducted by merging synonymous or near-synonymous limitation labels, removing redundancies, and clarifying boundaries among overlapping concepts. Secondly, each normalized limitation was allocated a primary macro-category - Conceptual, Measurement/Operationalization,

Governance/Implementation, or Impact. Then, a hierarchical taxonomy (articulated on three levels) was derived via rule-based assignment to categories and sub-categories, complying with size constraints (≤25 categories; ≤ 45 sub-categories). An analytical definition was formulated for each taxonomy node.

4 Results

The search strategy implemented in the Scopus database retrieved a corpus of 242 documents. Semantic relevance ranking, based on cosine similarity scores, confirmed the pertinence of the 100 most relevant items selected for the exploratory bibliometric analysis. These items directly address the research question concerning critiques and limitations of the 15MC concept in the scientific literature. The similarity scores ranged from 0.64 to 0.83, indicating a high degree of thematic alignment.

The inductive content analysis of the selected subset of 25 articles returns 255 observed limitations or critiques of the 15MC. Most critiques concern the governance/implementation domain (62 occurrences), operationalization and measurement issues (60 observed limitations), unintended adverse impacts on social justice and equity (44 instances), and inconsistencies in the conceptualization of the model (34 instances). The final taxonomy comprises 15 categories and 34 sub-categories (see Table 2).

The most frequently supported limitation category is Equity and Exclusion, addressed by 21 articles and associated with the Impact domain. This category encompasses four sub-categories related to unintended negative consequences of the 15MC concept: accessibility inequality and uneven service distribution; insufficient consideration of disability, ability, and diverse needs; exclusion, rights, and stigmatization; and segregation, stratification, and spatial exclusion mechanisms. Collectively, these sub-categories underline the inadequacy of proximity alone in addressing disparities in access to urban functions between central and semi-central areas [28, 37]. They also reflect the limited consideration of diverse mobility and accessibility needs determined by class, disability, and race [8, 29]; the locational advantages and disadvantages produced by district-level policies [19, 43]; and the risk that social-mix strategies may reduce the visibility of poverty rather than reinforce social capital [37]. Together, these dynamics may contribute to the reproduction of spatial inequalities [37, 42, 45].

The Category "Metrics and Operationalization" refers to gaps in indicator frameworks and evaluation design, and to limitations in operational definitions and knowledge. These issues include the absence of a unified measurement framework [8, 9, 27, 42], the loss of relevant information due to aggregation methods [11], and persistent gaps in practical definitions, implementation strategies, experiential evidence, and context-sensitive needs in operationalizing the 15MC [32, 39]. Such limitations lead to constrained transparency and accountability in policy performance, reducing relevance for planning and equity assessment, limiting robust cross-case comparison, and ultimately restricting evidence-based implementation and comparative learning [2, 11, 27].

Concerning the governance and implementation dimension, limitations related to Capacity and Coordination emerge as particularly significant. These include delays and accountability gaps, inter-departmental and multi-level coordination limitations, and institutional capacity constraints. These issues underline the persistent gap between policy discourse and actual implementation [11]. In particular, prolonged administrative

Table 2. Taxonomy of limitations of the 15MC concept

Category	Sub-Category	Definition
Context & Scale	Context dependence and non-transferability	Implementation and meaning vary strongly by local conditions, making generalization difficult[27, 29]
Context & Scale	Scale ambiguity and level mismatch	Scale ambiguity refers to unclear and inconsistent specification of the spatial scale of the 15MC, leading to misalignment between district-level interventions and city- or metropolitan-level governance and planning [29]
Definition & Framing	Ambiguous concept definition and scope	Criticisms emerge, underlining concerns that foundational principles, particularly proximity, remain inadequately specified [42]
Definition & Framing	SGI scope and functional coverage	The 15MC may adopt an overly simplistic understanding of accessibility by focusing predominantly on spatial proximity [11]
Definition & Framing	Branding, rhetoric and utopian framing	The 15MC is regarded as overly utopian and abstract, inadequately reflecting the complexity of urban phenomena and functioning as a place-branding slogan lacking clear metrics, benchmarks, and operational criteria [27, 29]
Definition & Framing	Originality and novelty critique	The concept may overstate its originality, reframing and rebranding pre-existing ideas under a distinct label [28, 42]
Determinism & Reductionism	Overemphasis on decentralisation	Emphasis on decentralization risks reducing the 15MC's transformations to a simplistic polycentric model, disregarding urban center hierarchy and the benefits of centralizing specialized functions [27, 29]

(*continued*)

Table 2. (*continued*)

Category	Sub-Category	Definition
Determinism & Reductionism	Oversimplification of complex urban systems	Simplistic and rigid planning structures overlook the interdependencies among urban subsystems, thereby weakening cities' resilience to systemic challenges such as climate change, pandemics, and transportation crises [19, 29]
Determinism & Reductionism	Reductionism to proximity/time threshold	Proximity reductionism refers to reducing urban complexity to fixed time-distance metrics, neglecting contextual specificity, infrastructure quality, and sociodemographic diversity [1]
Determinism & Reductionism	Spatial/physical determinism	Refers to reducing 15MC outcomes to spatial proximity alone, while neglecting the social, economic, and governance conditions shaping urban life [2, 30]
Capacity & Coordination	Bureaucracy, delays and accountability gaps	The critique posits that 15MC realization is constrained by fragmented, inadequately accountable governance, where complex processes, limited statutory force, and digital divides obstruct implementation [12]
Capacity & Coordination	Coordination gaps (inter-departmental / multi-level)	The critique posits that 15MC implementation is hindered by siloed departments and multilevel regulatory complexity, which limit state capacity for integrated action [11, 12]
Capacity & Coordination	Institutional capacity and skills gaps	This critique posits that 15MC implementation is constrained by limited administrative capacity, staffing, and technical expertise in local institutions [11]

(*continued*)

Table 2. (*continued*)

Category	Sub-Category	Definition
Politics & Legitimacy	Participation, representation and legitimacy gaps	15MC planning often relies on uneven, episodic or tokenistic participation, constraining representation and democratic legitimacy [19, 42]
Politics & Legitimacy	Public resistance and contested politics	15MC measures, particularly car restrictions, can determine public opposition, conflict, and legitimacy disputes that obstruct implementation [11]
Regulation & Instruments	Regulatory rigidity	Car-oriented traffic rules and national and regional legal constraints institutionalise automobility, limiting local sustainable mobility transitions [11]
Resources & Feasibility	Funding and cost constraints	15MC implementation is limited by insufficient funding and rising development costs, delaying implementation and constraining maintenance [19]
Resources & Feasibility	Implementation feasibility in existing urban forms	Implementation feasibility of 15MC principles in existing urban forms is limited by rigid zoning, cost burdens, and land scarcity; in suburban areas, these constraints are compounded by low density and structural car dependency [27, 29, 30, 34]
Economic & Labor	Economic trade-offs and externalities	District-scale gains from 15MC policies may displace environmental and economic costs across scales, complicating net-impact assessment and causal attribution [27, 29, 30, 34]
Economic & Labor	Local jobs feasibility and agglomeration limits	Labour-market agglomeration and job concentration make universal local employment unrealistic, requiring robust regional transit [27]

(*continued*)

Table 2. (*continued*)

Category	Sub-Category	Definition
Equity & Exclusion	Accessibility inequality	15MC models overprivilege local proximity while neglecting public transport, thereby reproducing unequal access to regional opportunities [28]
Equity & Exclusion	Disability/ability and diverse needs	15MC models rely on standard walking/cycling assumptions, disregarding disability, age-related mobility differences, and heterogeneous daily accessibility needs [27, 28]
Equity & Exclusion	Limited impact on segregation/injustice	Proximity-based planning cannot by itself redress structural inequality, exclusion, or segregation, and may reproduce injustice via selective inclusion, digital divides, and paternalistic social-mix logics [37]
Equity & Exclusion	Spatial exclusion mechanisms	District-based service allocation can generate uneven locational advantage, thus reproducing intra-urban spatial disparities and territorial segregation [19]
Housing & Affordability	Gentrification and displacement	Proximity-led improvements can capitalise into land and housing values, increasing exclusionary pressures and displacing lower-income residents from areas with greater service provision [27, 31]
Mobility Outcomes	Limitations to modal transition	Proximity alone does not modify travel practices; without safe, continuous pedestrian and cycling infrastructure, mode transition and access to urban functions remain limited [9, 27, 44]

(*continued*)

Table 2. (*continued*)

Category	Sub-Category	Definition
Data & Evidence	Data availability, coverage, and quality gaps	15MC evaluation is constrained by incomplete, non-longitudinal, and low-granularity data, which obscure quality-of-life, amenity quality, and equity impacts [2]
Methodological & Scale Sensitivity	Composite index and weighting issues	15MC indices can be distorted by arbitrary weighting and equal treatment of opportunities, neglecting distance sensitivity and limiting measurement validity [40]
Methodological & Scale Sensitivity	Scale/aggregation sensitivity and counting problems	Operational specifications related to the definition of spatial units, aggregation procedures, and threshold specifications can generate MAUP-related distortions, edge effects, and unstable accessibility assessments [8]
Metrics & Operationalization	Indicator scope omissions	15MC metrics omit substantive dimensions - including amenity quality, public transport, digital access, and equity - yielding incomplete and policy-misleading assessments [9, 34]
Metrics & Operationalization	Benchmarks/targets unclear	15mC assessment relies on non-standardised operational definitions, measurement frameworks, accessibility parameters, and temporal assumptions, hence reducing cross-context and cross-group comparability and constraining evaluative robustness and accountability [27]

(*continued*)

Table 2. (*continued*)

Category	Sub-Category	Definition
Metrics & Operationalization	Operational definitions and knowledge gaps	A Limited agreed evidence base on definitions, implementation experiences, and needs and issues in operationalising 15mC across contexts constrains evidence-based action and comparative learning [32]
Metrics & Operationalization	Improper aggregation of facilities	Improper facility aggregation conflates distinct essential services into composite accessibility scores, obscuring service-specific deficits and biasing proximity assessment [28]
Thresholds & Standards	15-min threshold validity and time budgets	Fixed x-minute cut-offs provide insufficient behavioural and contextual justification, rendering 15mC assessments sensitive to the selected time limit, of limited comparability, and normatively fragile [27]

procedures and bureaucratic delays may undermine timely delivery [12], while siloed organizational structures and inadequate coordination across agencies and levels of government can obstruct coherent and integrated action, reducing the effectiveness of urban strategies [12, 39]. Moreover, local institutions may not possess sufficient personnel, specialized expertise, or administrative capability to adequately design, manage, and execute interventions consistent with the 15MC concept [11, 19, 31, 45]. These limitations undermine the clarity, feasibility, and credibility of implementation processes. They may reduce progress, generate public dissatisfaction, decrease trust in policy commitments, and risk compromising the equitable distribution of the benefits generated by the implementation of the 15MC model.

Determinism and Reductionism emerge as significant limitations in the conceptualization of the 15MC. Physical determinism posits that spatial form and built-environment properties exert direct causal influence on individual practices and socio-economic outcomes [2, 27, 29, 30]. This perspective implies that complex social and economic problems can be solved via urban configuration and proximity-based interventions alone [27, 29]. An excessive focus on decentralization can lead to the risk of reducing the complex social, environmental, and economic transformations envisioned by the 15MC model into a simplistic image of a polycentric city [27, 29]. Moreover, extreme decentralization disregards the hierarchical structure of urban centers and services [28], and the advantages of centralizing specialized services and functions [39]. Lastly, the decentralization of labor

may conflict with prevailing economic dynamics that favor hyper-specialisation [27, 30]. A related aspect concerns the risk of oversimplification of complex structures: simplistic, rigid structures disregard the interdependencies among urban sub-systems, thus reducing cities' resilience to climate alteration, pandemics, and transportation crises [29]. Moreover, proximity reductionism refers to the tendency to oversimplify the complexities of urban and social life, disregarding the interactions among complex sub-systems, hence compressing urban planning to the sole, variously interpretable dimension of spatial proximity [27, 36]. Moreover, Uniform targets, in terms of time and distance, disregard context specificity and needs subjectivity, reducing feasibility and meaningfulness of evaluation [1, 44]. Finally, critics argue that proximity alone is insufficient to guarantee equity and social cohesion [37]. Further critiques address an area at the intersection of conceptualization and governance implementation dimensions: definition and framing issues include limitations related to Ambiguous concept definition and scope, Scope of amenities and functions, Branding, rhetoric and utopian framing, and Originality and novelty critiques. The latter underlines the overstatement of the concept's originality, positing that the 15MC concept may represent a recirculation and reframing of preexisting ideas under a distinct brand name [28]. Regarding the scope of amenities and functions, critics argue that an exclusive emphasis on distance may neglect other critical dimensions of access, including availability, acceptability, affordability, adequacy, and awareness of services [1, 40]. This reductionist perspective can undermine the validity of 15MC classifications and result in misguided or incomplete policy interventions [1].

Ambiguity in concept definition and scope, refers to concerns that foundational principles, particularly proximity, remain inadequately specified [27, 28, 42]. Varying interpretations relating to targets, destination types, and thresholds - as well as the tendency to employ the concept as a broad guideline [33] rather than a framework integrated with specific measures, regulations, and implementation tools [34, 42] - contribute to conceptual uncertainty. Such ambiguities may result in inconsistent policy strategies and uneven implementation, ultimately limiting accountability, standardization, and comparability across cases [34]. Lastly, the 15MC concept is regarded as overly utopian and abstract, inadequately reflecting the complexity of urban phenomena and functioning as a place-branding slogan, unsubstantiated by clear metrics, benchmarks, and operational criteria [27, 33, 42].

5 Discussion

The results underline several critical issues that limit both the implementation of the 15MC concept and its transformative potential across distinct dimensions. Overall, the findings of the literature review provide relevant indications for policy design and future research. Concerning conceptualization, a major critical issue regards the reduction of the 15MC to a branding slogan, unsupported by clear metrics, operational criteria, and an organic urban strategy articulated via interdependent and trans-scalar actions [27, 33, 42]. In such cases, implementation may result in isolated and episodic interventions merely framed under the umbrella of the 15MC. This underscores the need for urban policies to recognize and incorporate the set of interdependent actions and processes of structural reorganization required to create the functional and spatial conditions necessary to sustain a minimum demand base and enable the relocation or redistribution of

urban functions [6, 7, 24, 46, 47]. These actions include the densification of semi-central areas, the intensification of the system of urban spaces and its reconfiguration into a more continuous grid through the regeneration of marginal spaces, and the improvement of enclosure conditions and urban porosity arising from the interaction between public and private spaces [7, 46]. Such interventions increase permeability, spatial integration, and the number of potential users, thus fostering the co-presence of pedestrians in public space. In line with the principle of movement economy, pedestrian co-presence constitutes a fundamental precondition for the emergence of centres and for the localization of services in the most vital urban areas [48]. A second, related concern lies in the predominant focus on spatial proximity, often to the neglect of the complementary conditions that inform access to services of general interest and the complexities of urban social and economic problems [27, 36]. This limitation points to the need for metrics measuring service quality, availability, and affordability. More broadly, it calls for analytical procedures able to incorporate multiple dimensions of justice, particularly recognitional and procedural justice, digital divide, and socio-economic conditions [13].

Pursuing unrealistic decentralization targets and outlining a simplified polycentric urban configuration result in inadequate consideration of the diversification of centres, the articulation of the urban structure across local and urban-scale centralities, the specific functional role of each centre, and the concentration of specialized functions in urban-scale centres [27]. As a result, it becomes necessary to define the amenities to be included, focusing decentralization on services of general interest that are accessed on a daily basis and meet everyday needs at the district scale. Access to public transport also remains a central component of distributional equity, as it connects districts to broader urban structures organized around centralities of different levels and functions, and ensures access to specialized urban-scale services [37].

More broadly, social justice concerns reveal the limitations inherent in operationalizing the 15MC by means of uniform standards and fixed limit values. This indicates the need to define distance- and time-based limit values differentiated by service category and user group. It also requires the incorporation into measurement procedures of the perceived importance of services, as determined by the needs, preferences, and abilities of different users [1].

Limitations concerning the conceptualization and operationalization of the 15MC model imply the development of articulated and multidimensional measurement tools for the identification and prioritization of underserved areas presenting multiple dimensions of socio-spatial injustice, including distributional, recognitional, and procedural injustice [13, 49].

Concerns related to implementation feasibility within existing urban forms, particularly in marginal and peri-urban areas, imply two distinct sets of considerations. From a planning perspective, they underline the need for interventions aimed at reinforcing and creating local centralities via densification around existing public services and the regeneration of amenities as multifunctional spaces incorporating social, administrative, cultural, and civic functions [50]. These interventions can increase proximity to urban resources. At the same time, the reinforcement of mobility-as-a-service solutions and demand-responsive transport can improve access to urban functions from areas of dispersed urbanization.

From a governance perspective, these concerns point to the need for public–private cooperation and the relevance of a two-level governance process, whereby a coherent urban-scale vision is implemented through local interventions in specific district contexts. This strategy entails prioritizing deprived and vulnerable areas and implementing district-scale regeneration via participatory laboratories and context-specific governance structures; the objective is to contribute to broader urban restructuring and address issues of scale ambiguity, participation, and legitimacy. This issue also intersects with the need for mitigating governance barriers and coordination gaps. A fundamental concern relates to the risks of direct displacement, exclusionary displacement pressure, and gentrification [51]. Urban regeneration interventions may reproduce forms of marginalization, particularly in contexts already affected by socio-spatial inequality [27, 31]. Addressing these dynamics requires the integration of anti-displacement measures into regeneration policy, including linearly decreasing property taxes around urban regeneration interventions, property tax subsidies targeted at vulnerable residents, zoning buffer policies limiting transactions in areas contiguous to intervention sites, and social housing measures [27, 52]. The latter may take the form of direct public provision in priority areas, mandatory or negotiated on-site affordable housing requirements in private redevelopment, and in-lieu contributions, including financial payments or land transfers. In combination, these instruments can promote social mix in regeneration areas and expand access to affordable housing. At the same time, urban regeneration strategies require participatory governance processes and co-design activities capable of incorporating the needs, perceptions, and lived experiences of residents, particularly those of vulnerable and underrepresented groups [13, 27]. Within this perspective, co-design, participation, and anti-displacement measures become essential to address gaps in participation, representation, and legitimacy, to improve equity, and to reduce the potential displacement effects associated with urban regeneration.

6 Conclusions

This study develops a taxonomy of the emerging limitations of the 15MC concept, structured around four interdependent dimensions: conceptualization, operationalization, implementation, and impact or unintended consequences. The article aims to advance the debate on the adaptation of urban environments to contemporary urban issues, including environmental degradation, climate alteration, and persistent socio-spatial inequalities. More precisely, the study identifies fundamental directions for future inquiry and derives policy implications for reducing the risk that reductionist interpretations, fragmented strategies, simplistic forms of operationalization, and inconsistent implementation may not only fail to deliver the expected outcomes in terms of equity, social inclusion, and sustainability but also reproduce existing inequalities.

The article's contribution relies on three main aspects. First, it systematizes the limitations of the 15MC via a structured taxonomy that clarifies the conceptual, structural, and governance-related barriers.

Second, it introduces a review procedure that combines AI-assisted semantic relevance ranking with inductive content analysis, thus increasing the transparency and replicability while preserving interpretive rigor. Third, it contributes to bridging the gap

between normative urban visions and operational planning by identifying the conditions under which the 15MC can be translated into coherent policy and planning practice. The findings also open several directions for future research. These include the refinement of the proposed taxonomy through further empirical testing; the review of urban plans and policy documents incorporating the 15MC model, in order to assess the limitations that emerge in its translation into policy documents; and the identification of measures capable of addressing governance and implementation barriers, as well as mitigating unintended consequences such as gentrification, displacement, the reproduction of marginalization among vulnerable social groups, and persistent intra-urban disparities.

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