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► **To cite this version:**

Zaheer Allam, Reza Amir, Ulysse Lassaube, Didier Chabaud, Carlos Moreno. Mapping the Implementation Practices of the 15-Minute City. *Smart Cities*, 2024, 7 (4), 10.3390/smartcities7040083 . hal-04666669

HAL Id: hal-04666669

<https://hal.science/hal-04666669v1>

Submitted on 1 Aug 2024

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Mapping the Implementation Practices of the 15-Minute City

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Abstract: This paper delves into the rapidly progressing 15-Minute City concept, an innovative urban planning model that envisions a city where residents can access essential services and amenities within a 15-min walk or bike ride from their homes. Endorsed by UN-Habitat as a critical strategy for sustainable urban regeneration, this concept has gained considerable worldwide recognition since its introduction in 2016. The 15-Minute City framework aims to enhance accessibility, sustainability, and social cohesion by emphasizing mixed-use development, compact urban design, and efficient transportation systems. Nevertheless, the swift expansion of this concept has surpassed the production of academic literature on the topic, leading to a knowledge gap that calls for alternative research methodologies. To address this gap, our paper adopts a mixed-method approach, systematically analyzing the scholarly literature, gray literature, media articles, and policy documents to offer a holistic understanding of the 15-Minute City concept, its real-world application, and the primary principles embraced by policymakers. By investigating the various manifestations of the 15-Minute City model and its potential advantages, challenges, and implications for urban planning and policy, this paper contributes to the ongoing conversation on sustainable urban development and planning. Through this study, we aim to inform policymakers, urban planners, and researchers about the current state of the 15-Minute City movement and its possible future trajectory.



Citation: Allam, Z.; Khavarian-Garmsir, A.R.; Lassaube, U.; Chabaud, D.; Moreno, C. Mapping the Implementation Practices of the 15-Minute City. *Smart Cities* **2024**, *7*, 2094–2109. <https://doi.org/10.3390/smartcities7040083>

Academic Editor: Pierluigi Siano

Received: 24 June 2024

Revised: 18 July 2024

Accepted: 23 July 2024

Published: 1 August 2024



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Keywords: 15-minute city; sustainable development; mixed-method approach; social cohesion; compact urban design; proximity; SDG 11

1. Introduction

The 15-Minute City has emerged as a powerful and transformative global policy measure for sustainability, resilience, and health, capturing the attention of urban planners, policymakers, and researchers alike. Recognized by UN-Habitat as a vital instrument for urban regeneration, this innovative model envisions a city where residents can fulfill their essential needs—work, shopping, education, leisure, and healthcare—within a 15-min walk or bike ride from their homes. By fostering local, accessible, and inclusive neighborhoods, the 15-Minute City aims to enhance the quality of life for urban dwellers while simultaneously addressing pressing environmental challenges such as climate change, air pollution, and resource depletion [1,2].

The origins of the 15-Minute City can be traced back to 2016, when Carlos Moreno first proposed the concept as a means of reimagining urban living in the 21st century [3]. Since then, the idea has gained significant traction in the urban planning community and has been embraced by cities worldwide. Paris, under the leadership of Mayor Anne Hidalgo, was the first to adopt this model in 2018, integrating the concept into its urban policy and development strategy [4]. Following Paris's example, numerous cities, neighborhoods, and regions worldwide, from Melbourne to Montreal, have also implemented various forms of the 15-Minute City model. Figure 1 showcases the popularity of the concept from 2016 to 2022, and underlines that the concept is yet to peak. Going forward, as the

concept continues to gain popularity, it is crucial to better understand its implementation, the common goals pursued by policymakers, and emerging trends and themes in the field.

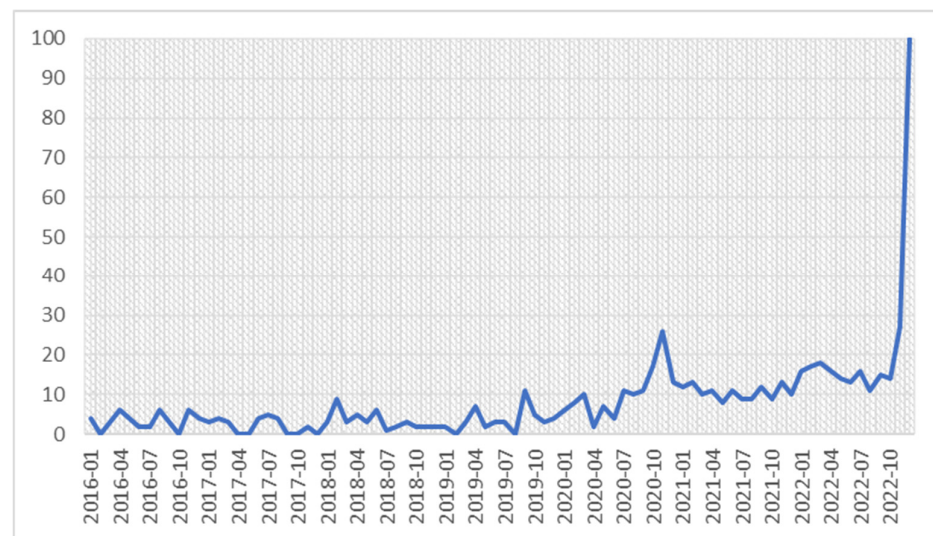


Figure 1. Popularity of the term ‘15 Minute City’ from 2016 to 2022 [5], with the *x*-axis highlighting the dates and *y*-axis evaluating popularity (measured from 0–100).

At its core, the 15-Minute City model seeks to create urban environments that prioritize accessibility, sustainability, and social cohesion. This is achieved by promoting mixed-use development, compact urban form, and efficient transportation networks, all of which contribute to reducing the need for long commutes and car dependency. By bringing essential services and amenities closer to where people live, the 15-Minute City fosters more walkable, bikeable, and transit-oriented communities, ultimately leading to reduced greenhouse gas emissions, improved air quality, and enhanced public health [6].

In addition to its environmental and health benefits, the 15-Minute City also seeks to foster social equity and inclusion by ensuring that all residents have equal access to essential services, opportunities, and amenities. This is particularly relevant in light of the growing concerns about social polarization, spatial segregation, and gentrification in contemporary cities [7,8]. By emphasizing local economies, public spaces, and community networks, the 15-Minute City aims to create more equitable and resilient urban environments that cater to the diverse needs and aspirations of all residents [3]. Despite its potential benefits, the implementation of the 15-Minute City model also faces several challenges, including resistance from vested interests causing a wave of conspiracy theories [9,10], inadequate regulatory frameworks [11], and financial constraints [12]. Moreover, the concept’s rapid proliferation has outpaced the production of the academic literature on the subject, creating a knowledge gap that underscores the need for alternative research methodologies to capture the full scope and nuance of this burgeoning urban planning paradigm. Recent studies have further elaborated on the theoretical and practical aspects of the 15-Minute City concept. For instance, Papadopoulos et al. [13] provide a comprehensive overview of the major components and requirements for measuring compliance with the 15-Minute City concept, while Lima and Costa [14] systematically review computational approaches to achieving proximity. Additionally, Wang et al. [15] and Liu et al. [16] examine spatial distribution and inequality issues in accessibility, providing critical insights into the implementation of 15-Minute City principles in different urban contexts. While exploring gray literature, this paper also acknowledges recent works by offering a holistic analysis of global initiatives, thereby distinguishing our review through its emphasis on practical application and diverse geographic contexts.

In this paper, we provide empirical evidence from various 15-Minute City projects, elucidating the real-world advancements of this emerging concept. The key contributions of

this study are delineated as follows. First, it highlights how the 15-Minute City framework has been practically implemented across different global contexts, showcasing tangible progress and lessons learned. Second, this study identifies that the 15-Minute City model has been discussed under different terminologies in other projects and scholarly works, yet previous studies have rarely examined these similar and related concepts collectively. Third, we explore the thematic domains within the 15-Minute City concept, offering a comprehensive overview of the current state of knowledge through bibliometric analysis tools. Fourth, this study evaluates the extent to which various 15-Minute City goals have been achieved in different projects, identifying which objectives have been prioritized and which have not. Consequently, it provides clear insights into the practical realization of the 15-Minute City model globally and offers guidance for future research by addressing the current knowledge gap and highlighting the novel contributions of our work.

2. Methods

2.1. Research Design

In this study, we employed a mixed-method approach to investigate the '15-Minute City' concept. A mixed-method approach combines both qualitative and quantitative research methods to provide a comprehensive analysis. This allows for a more holistic understanding of complex issues by integrating various types of data and perspectives.

2.2. Data Sources

Various sources including scientific papers, book chapters, gray literature (referring to materials and research produced by organizations outside of traditional commercial or academic publishing and distribution channels, such as reports, whitepapers, and policy documents), online pages, and newspapers were reviewed to understand the evolution, applications, and implications of this concept for urban planning and policy. Compiling both scientific and gray literature has been proven as being an effective research method [17–19]. Our methodology, designed to be rigorous and replicable, provides a solid foundation for further research and comprehensive analysis of available information, for the timeframe of the inception of the concept.

2.3. Methodological Steps

Overall, this research was conducted in two phases. In the first phase, the gray literature was reviewed to identify the common discourses surrounding the 15-Minute City concept. In the second phase, a bibliometric analysis was performed on scientific publications to identify the main thematic focuses that have been of interest to researchers in recent years.

2.3.1. Phase 1: Gray Literature Review and Media Analysis

In the first phase, the media analysis systematically tracked and reviewed news articles, editorials, and opinion pieces to explore public discourse around the concept in February 2023. A combination of keyword-based search strings, such as "15-Minute City", "Ville du quart d'heure", "Ciudad de los 15 minutos", "urban planning", "sustainable city", "15-Minute Neighbourhood", "Walkable Cities", "Pedestrian-friendly Cities", "Compact Cities" and "walkable neighborhood," were used to identify new publications in real-time. We conducted a content analysis, focusing on key themes, trends, and debates that shaped the '15-Minute City' narrative, tracing its evolution in the public sphere and gaining insights into its potential impact on urban policy and planning. The gray literature survey included reports, whitepapers, and other non-peer-reviewed publications from governmental, non-governmental, and private organizations. Manual searches of databases and institutional websites were conducted using similar keyword-based search strings as the media analysis. Lastly, we triangulated our findings from the media analysis and gray literature survey, corroborating our results and providing a more robust and nuanced understanding of the '15-Minute City' concept. Triangulation involved comparing and integrating data from

different sources, methods, or theoretical perspectives, enabling us to identify patterns and relationships that may not have been apparent when examining each data source in isolation. By combining insights from the media analysis and gray literature survey, we ensured a comprehensive and in-depth exploration of the '15-Minute City' concept and its implications for urban planning and policy.

2.3.2. Phase 2: Bibliometric Analysis

The second phase was conducted in May 2024. We searched the Web of Science databases to find relevant publications. With over one billion cited references and extensive bibliometric data collected over many years, this database enables academics to focus on various topics using bibliometric software tools. To ensure the study included as many relevant papers as possible ("15-min city" OR "minute city" OR "minute neighborhood" OR "minute town" OR "minute community" OR "minute districts" OR "Ciudad de los 15 minutos" OR "Ville du Quart d'Heure"), we utilized a broad search string, resulted in 133 records. About 17 documents that were not related to 15-Minute Cities were excluded. Therefore, 116 documents dealing with this concept were considered relevant and selected for in-depth research. We utilized VOSviewer software to perform a term co-occurrence analysis, which highlighted the primary thematic focus areas in the field over the past forty years. The software visualized the most commonly co-occurring keywords and used colors to group frequently co-occurring terms into thematic clusters. A network graph, composed of nodes and links, illustrated the results of the analysis. The size of each node reflected the frequency of its associated keywords. Links between nodes indicated keywords that appeared together in a minimum of three publications, with the thickness of the lines representing the strength of these co-occurrences.

This study distinguishes itself from previous reviews by adopting a mixed-method approach that not only synthesizes scholarly and gray literature but also incorporates media analysis and bibliometric analysis to capture a comprehensive and nuanced understanding of the 15-Minute City concept. Previous reviews, such as those by Papadopoulos, Sdoukopoulos, and Politis [13] and Lima and Costa [14], have primarily focused on theoretical frameworks and computational methodologies. In contrast, our approach integrates empirical evidence from various global initiatives, highlighting the practical implications and challenges faced during the implementation of the 15-Minute City model. Furthermore, we extend the analysis to include considerations of social equity and safety, thereby providing a broader perspective on the model's impact on urban planning and policy.

3. Results and Discussion

3.1. Geographic Distribution

In total, we mapped 77 initiatives, illustrated in Table 1, demonstrating the growing interest in adopting the 15-Minute City concept worldwide. For the purposes of this study, 'initiatives' refer to specific projects, policies, or programs implemented by cities, local governments, or organizations aimed at applying the principles of the 15-Minute City model in urban planning and development. Table 1 shows the geographic distribution of 15-minute initiatives. The geographic distribution of 15-min initiatives worldwide indicates that Western Europe leads with 37 initiatives, constituting 48% of the total. Within this region, France is the most active country, contributing 20 initiatives (26%), followed by the United Kingdom with 8 initiatives (10%), and Italy with 2 initiatives (3%). Several other Western European countries each account for 1% of the total, including Belgium, Denmark, Finland, Ireland, the Netherlands, Spain, and Sweden. North America follows with 20 initiatives, or 26% of the total, primarily from the USA (13 initiatives, 17%) and Canada (7 initiatives, 9%). Oceania, with seven initiatives (9%), is represented by Australia (five initiatives, 6%) and New Zealand (two initiatives, 3%). Asia accounts for six initiatives (8%), led by Korea with three initiatives (4%), followed by China with two initiatives (3%), and Singapore with one initiative (1%). Latin America contributes four initiatives (5%), with Argentina, Colombia, Ecuador, and Uruguay each accounting for 1%. Central and Eastern

Europe has two initiatives (3%), represented by Poland and Romania each contributing 1%. Lastly, the Mediterranean and Middle East region has a single initiative (1%) from Tunisia. This distribution highlights the concentration of initiatives in Western Europe and North America, with notable contributions from Oceania and Asia.

Table 1. The geographic distribution of 15-minute initiatives from 2008 to 2023.

Region	Number	%	Country	Number	%
Western Europe	37	48%	France	20	26%
			United Kingdom	8	10%
			Italy	2	3%
			Belgium	1	1%
			Denmark	1	1%
			Finland	1	1%
			Ireland	1	1%
			Netherlands	1	1%
			Spain	1	1%
			Sweden	1	1%
North America	20	26%	USA	13	17%
			Canada	7	9%
Oceania	7	9%	Australia	5	6%
			New Zealand	2	3%
Asia	6	8%	Korea	3	4%
			China	2	3%
			Singapore	1	1%
Latin America	4	5%	Argentina	1	1%
			Colombia	1	1%
			Ecuador	1	1%
			Uruguay	1	1%
Central And Eastern Europe	2	3%	Poland	1	1%
			Romania	1	1%
Mediterranean and Middle East	1	1%	Tunisia	1	1%

Overall, it implies that the 15-Minute City initiatives are predominantly concentrated in Western Europe, North America, and Oceania, with France having the highest number of initiatives (18). The “Ville Du Quart D’heure” concept was launched in Paris in 2020 [20], and has since been adopted by various cities and regions across the country. Other European countries, such as the United Kingdom and the Netherlands, have also embraced the concept, with initiatives like the “20-Min Neighbourhood” in Edinburgh, Scotland [21], and the “10-Min City” in Utrecht, Netherlands [22]. In Asia, China’s “15-Min Community Life Circle” in Shanghai was launched in 2014 [23], making it one of the earliest examples of such initiatives in the region. South Korea has since followed suit with the “15-Min City” initiatives in Busan and Jeju Province [24]. Latin America has also seen the emergence of 15-Minute City projects, including the “Ciudad De Los 15 Minutos” in Montevideo, Uruguay and the “15-Min City” in Quito, Ecuador.

The implementation of 15-Minute City initiatives spans various administrative scales, from the city level (e.g., Copenhagen’s “5-Min Principal” in the Nordhaven neighborhood) to the regional level (e.g., New South Wales’ “15-Min Neighbourhood/30 min-City”). This reflects the flexibility of the concept, which can be adapted to suit the unique spatial and infrastructural contexts of different urban areas. A further analysis of the terminologies is presented in Section 3.2. The analysis further showcases that while the C40 is actively promoting the concept of sustainable urban planning [25], only 21% of cities implementing the concept are members of C40. A significant 69% of cities embracing these planning strategies are not part of the C40 network. This highlights the widespread popularity and acceptance of the concept, which transcends the driving agendas of specific organizations, like the C40. It indicates that cities across the globe are recognizing the importance of

sustainable urban planning and taking independent action to develop urban environments that prioritize accessibility, sustainability, and the wellbeing of their residents. In fact, a recent UN Resolution supports that behavioral changes can further urban sustainability goals [26].

While the concept is not yet prevalent in Eastern Europe or as popular as in its western counterparts, Mocák et al. [27] highlight the application of this model in Slovak cities, underscoring its potential as a sustainable urban development alternative. Similarly, Neumannová [28] discusses the development of smart districts in Brno, Czech Republic, as a manifestation of sustainable urban planning. Including these cases provides a comprehensive understanding of the diverse geographic contexts in which the 15-Minute City is being implemented. Additionally, examining the implications of such planning on residents' quality of life and considering geographic determinism in the construction of public infrastructure can further enrich our discussion. For instance, Hegedűs et al. [29] analyze suburbanization in Debrecen, Hungary, while Tóth [30] examines mixed-use developments in Phoenix and Tempe, Arizona, offering valuable insights into sustainability concerns and current trends. The higher geographic distribution of the 15-Minute City suggests that Western Europe and North America have a greater focus on implementing these urban planning concepts, possibly due to a higher level of urban development and emphasis on sustainability. In contrast, Africa, Central and Eastern Europe, and Latin America exhibit lower percentages, suggesting that these territories are yet to fully embrace and implement these urban planning concepts. This discrepancy could result from a number of factors, including the fact that parts of those territories are urbanizing along historically and geographically specific trajectories, and may also point to a lack of financial means to invest in urban regeneration projects within these regions [31], underlining the need for context-specific mechanisms. To facilitate the adoption of such sustainable urban planning concepts, it may be necessary for the territories within these regions to explore and implement fiscal mechanisms and support systems. This contrasts with Western Europe and North America, where financial resources accompanying the implementation of urban sustainability measures, including investments in infrastructural reforms, are already in place, thus enabling the adoption and implementation of these urban planning concepts.

3.2. Terminology Variations

Table 2 shows the distribution of 15-Minute City initiatives across different administrative scales and under various terminologies. The most prevalent term is "15-Min City," accounting for 32.5% (25 out of 77) of the total initiatives, primarily within cities (22). "Ville Du Quart D'heure" follows with 24.7% (19 initiatives), mostly in cities (15), but is also present in neighborhoods (2), metropolitan areas (1), and regions (1). Other terms include "20-Min Neighbourhood" (eight initiatives, 10.4%), "15-Min Neighbourhood" (five initiatives, 6.5%), and "20-Min City" (three initiatives, 3.9%). Less common terms such as "10-Min City" and "15-Min Community Life Circle" each have two initiatives (2.6%), while others like "5-Min City", "Ciudad De Los 15 Minutos", and "Ville En 15 Min" each constitute 1.3% of the total with single instances.

Based on Table 2, the main administrative scales represented in the initiatives include cities, neighborhoods, metropolitan areas, regions, and countries. Cities dominate with 79.2% of the initiatives (61 out of 77), highlighting the focus on urban centers for implementing the 15-Minute City concept. Neighborhoods account for 9.1% (seven initiatives), illustrating the importance of localized interventions. Metropolitan areas represent 5.2% (four initiatives), regions account for 3.9% (three initiatives), and countries have 2.6% (two initiatives), showcasing the broader regional and national policy efforts to promote compact, sustainable, and walkable urban environments.

Overall, the distribution of 15-Minute City initiatives across both terminology and administrative scales highlights a strong emphasis on city-level implementation. While cities are the primary focus, the presence of initiatives in neighborhoods, metropolitan areas, regions, and countries underscores the concept's flexibility and adaptability to different

contexts. This integration of vertical (administrative scale) and horizontal (terminology) axes demonstrates the widespread adoption and diverse application of the 15-Minute City concept, reflecting its potential to address urban challenges through localized and scalable interventions.

Table 2. Distribution of initiatives by administrative scale. Percentages represent the proportion of total initiatives recorded at each scale. Color coding is applied as follows: red indicates no initiatives (nil), yellow represents a low number of initiatives, and green denotes a higher number of initiatives.

Initiative Name	City		Neighborhood		Metropolitan Area		Region		Country	
	Count	%	Count	%	Count	%	Count	%	Count	%
15-Min City	22	29%	2	3%	0	0%	1	1%	0	0%
Ville Du Quart D’heure	15	19%	2	3%	1	1%	1	1%	0	0%
20-Min Neighborhood	6	8%	0	0%	1	1%	0	0%	1	1%
15-Min Neighborhood	4	5%	1	1%	0	0%	0	0%	0	0%
20-Min City	3	4%	0	0%	0	0%	0	0%	0	0%
10-Min City	2	3%	0	0%	0	0%	0	0%	0	0%
15-Min Community Life Circle	2	3%	0	0%	0	0%	0	0%	0	0%
10-Min Neighborhood	1	1%	0	0%	0	0%	0	0%	0	0%
10-Min Town	0	0%	1	1%	0	0%	0	0%	0	0%
15-Min Districts	1	1%	0	0%	0	0%	0	0%	0	0%
15-Min Neighborhood/30min-City	0	0%	0	0%	0	0%	1	1%	0	0%
30-Min City	0	0%	0	0%	1	1%	0	0%	0	0%
5-Min City	1	1%	0	0%	0	0%	0	0%	0	0%
5-Min Principal	0	0%	1	1%	0	0%	0	0%	0	0%
Ciudad De Los 15 Minutos	1	1%	0	0%	0	0%	0	0%	0	0%
Ciutat De 15 Minuts	1	1%	0	0%	0	0%	0	0%	0	0%
One-Minute City	0	0%	0	0%	0	0%	0	0%	1	1%
Territoire De La Demi-Heure	0	0%	0	0%	1	1%	0	0%	0	0%
Ville En 15 Min	1	1%	0	0%	0	0%	0	0%	0	0%
Ville À 10 Min	1	1%	0	0%	0	0%	0	0%	0	0%

3.3. Implementation Timeline

Figure 2 shows the number of 15-Minute City initiatives per year. The evolution and implementation of the 15-Minute City concept have demonstrated a clear and progressive trajectory over the years, marked by significant milestones and periods of rapid expansion. Initially surfacing sporadically, the concept was referenced in the early part of the last decade with instances in 2008, 2011, and 2012. A pivotal shift occurred in 2014, evidenced by an increase to a total of three initiatives. Following this, there were fluctuations until 2018, which then gave way to a period of explosive growth.

The years 2019 to 2022 were particularly critical, witnessing a sharp rise in the number of initiatives from 6 in 2019 to a peak of 26 in 2022. This four-year period saw substantial growth, with increases of 200% in 2019, 66.67% in 2020, and 90% in 2021. This rapid expansion reflects the growing awareness among urban planners and decision-makers of the potential benefits associated with prioritizing accessibility and proximity in urban design.

The chronological distribution of the 15-Minute City initiatives, from Copenhagen’s Nordhavn [32] in 2008 to Boulder’s efforts [33] in 2022, underscores the enduring relevance of the concept in contemporary urban planning. Early adopters like Copenhagen have provided valuable insights and best practices, serving as catalysts for wider adoption. These early implementations highlighted the potential of the 15-Minute City concept to create more livable and sustainable urban spaces, thereby informing subsequent initiatives in other cities.

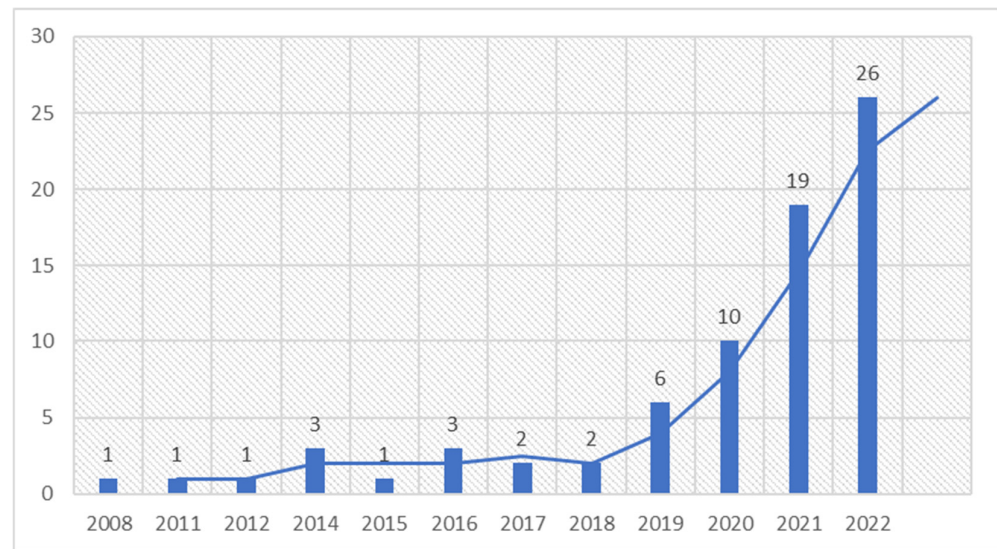


Figure 2. Number of 15-Minute City initiatives per year (2008 to 2022), where the bars represent the annual number of 15-Minute City initiatives from 2008 to 2022, and the line shows the cumulative total, illustrating escalating adoption by city councils.

The temporal distribution of the 15-Minute City concept's implementation mirrors the shifting priorities and emerging trends in urban planning, such as increased emphasis on environmental sustainability, social equity, and resilience against global challenges like climate change. The adaptability of the 15-Minute City concept to the unique characteristics of each adopting city ensures its continued relevance in the dynamic landscape of urban planning.

As cities continue to adopt and refine the 15-Minute City concept, its implementation is expected to become more widespread and varied. This ongoing evolution not only reflects the complex nature of urban planning but also demonstrates the concept's ability to meet the evolving needs and challenges of urban environments across the globe.

The study's analysis of the various 15-Minute City initiatives reveals interesting insights into the adoption and implementation of the concept. It was found that 26.3% of the initiatives are declarative, signifying formal announcements made by policymakers, politicians, and other relevant stakeholders. For instance, Ciudad de Buenos Aires, Mandurah, Busan Metropolitan City, and Jeju Province have all made formal announcements regarding the adoption of the 15-Minute City concept. This demonstrates a clear intention to publicize and garner support for the concept among the public and urban planning community. Moreover, 40.8% of the initiatives have been voted on in local councils as part of formal administrative processes. Cities such as Pleszew, Montevideo, Sousse, Edmonton, and North Vancouver have incorporated the 15-Minute City concept through local council votes. This underscores the commitment of policymakers to integrate the 15-Minute City concept into urban planning strategies and regulations, fostering a more comprehensive approach to creating sustainable and accessible urban environments.

Furthermore, the study identified that 32.9% of the initiatives have established structures to measure key performance indicators (KPIs), which are a critical aspect in evaluating the impact of the 15-Minute City concept on urban residents' quality of life. For example, Greater Melbourne, Copenhagen (Nordhaven), Detroit, and Urban Guangzhou have implemented KPI measurement structures to assess the success of their initiatives. The presence of KPI measurement structures indicates that both short-term and long-term results are expected from the implementation of the concept, allowing for evidence-based decision-making and continuous improvement.

Additionally, it was noted that 85% of the 15-Minute City efforts are led by public initiatives, while 12% are driven by private developments and 3% through public-private

partnerships (PPP). This suggests that public authorities play a pivotal role in shaping urban environments and fostering sustainable, compact, and walkable cities. For example, cities like Paris, Melbourne, and Barcelona have witnessed significant public investment in pedestrian and bicycle infrastructure, green spaces, and local amenities, thus facilitating the 15-Minute City vision. Conversely, private developments, such as those in Poblenou (Barcelona) and Hackney (London), have contributed to the transformation of neighborhoods through mixed-use projects and the introduction of public squares and playgrounds. The relatively low prevalence of PPP formats underscores the need for further collaboration between public and private entities to effectively address the challenges associated with urban growth, sustainability, and equitable access to resources and services.

3.4. Themes and Goals of the 15-Minute City

3.4.1. Thematic Clusters of the 15-Minute City

Figure 3 shows the most widely used keywords in the literature on 15-Minute Cities with the highest co-occurrence. The five keywords of (1) accessibility, (2) walkability, (3) mobility, (4) sustainability, and (5) proximity have the highest co-occurrence. This means that a significant proportion of previous studies have used these keywords as the main concepts of their research. Accessibility refers to how easily individuals can access locations and opportunities, including jobs, health and education services, cultural activities, green spaces, and other critical amenities [34]. The emphasis on this concept stems from the crucial role that access to services and amenities plays within 15-Minute Cities. Figure 3 further highlights the focus on walkability and mobility as the two key elements of urban movement. Walkability, which refers to the ease and safety of individuals walking within urban environments, has been a key research focus in 15-Minute Cities. It encompasses various physical and social factors that influence the quality of the walking experience. Mobility is a broader concept that emphasizes the efficiency and ease of the movement of people and goods by different transportation modes [35]. As ease of movement plays a crucial role in enhancing the quality of life through physical health, reducing car dependence, mitigating air pollution, and fostering social interactions, research on 15-Minute Cities strongly emphasizes walkability and mobility. Sustainability is a buzzword in urban studies, providing a comprehensive framework for examining various aspects of urban planning. Given the strong alignment between the goals of 15-Minute Cities and the principles of sustainable development, numerous studies have adopted sustainability as their overarching conceptual framework. Finally, proximity, as expected, has been a main focus in the literature. It has been directly and indirectly linked to various dimensions of 15-Minute Cities, including accessibility, walkability, mixed-use development, efficiency, and social interaction, and has become a focus in many studies.

The identification of the three main thematic clusters in Figure 3 was performed using VOSviewer software, version 1.6.20, which allows for the visualization of bibliometric networks. The software generates a term co-occurrence map based on the frequency of keyword appearances in the selected literature. The clustering algorithm groups terms into clusters based on their co-occurrence patterns, revealing the primary thematic areas of research. Each cluster is represented by a different color, and the size of the nodes corresponds to the frequency of the keywords. Links between nodes indicate keywords that have appeared together in at least three records, with the thickness of the lines representing the strength of these co-occurrences. Figure 3 illustrates the three main thematic clusters in 15-Minute City studies. The first cluster (red) includes terms centered on accessibility, positioned at the top of Figure 3. The second cluster (green) encompasses terms focused on walkability, located on the right side of this figure. The third cluster (blue) comprises terms situated at the bottom of Figure 3 with the centrality of sustainability.

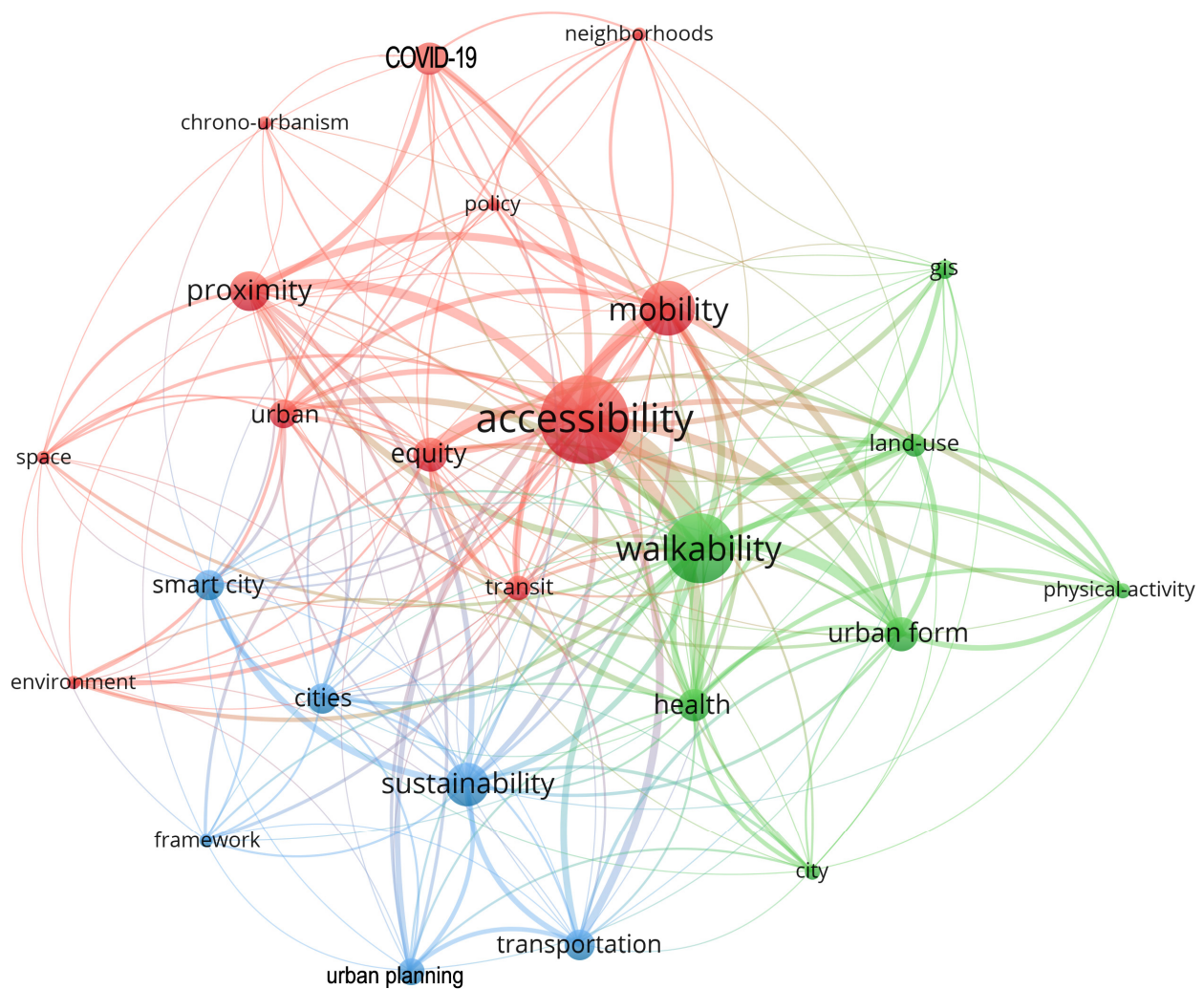


Figure 3. The term co-occurrence map. The size of the node is according to the frequency of the keyword. Links between nodes indicate keywords that have appeared in at least three records together. The thickness of the line corresponds to the degree of co-occurrence.

The red cluster has been the largest thematic focus in 15-Minute City studies over the past few years, emphasizing concepts such as accessibility, proximity, mobility, and equity, particularly during the COVID-19 pandemic. Accessibility, the central theme of these studies, examines how urban design, the distribution of urban services, and public transportation influence residents' access to urban amenities, including parks and healthcare facilities. Numerous studies in Norway, Estonia, Ghana, Canada, and Poland have shown that while some cities possess 15-Minute City characteristics, in some cases, proximity to facilities and urban services has not led to improved access for residents [36–39]. Consequently, these studies have stressed the 15-Minute City's attention to temporal and spatial aspects of accessibility, equity, and the integration of accessibility with critical urban planning concepts. Moreover, a line of studies within this cluster focused on proximity, demonstrating that mixed-used and equitable distribution of amenities can enhance residents' access to urban services [40,41]. Nevertheless, these studies continue to highlight social and economic inequalities and vulnerable populations as two fundamental challenges faced by 15-Minute Cities in implementing proximity-oriented urban planning [40,42].

The green cluster largely focuses on factors influencing the promotion of walkability and its associated outcomes, particularly for health. Within this cluster, factors that contribute to enhanced walkability, such as density, urban form, and the design of buildings, streets, and public spaces, are extensively discussed. Moreover, some studies delve into

the health implications of creating walkable 15-Minute Cities [43,44]. These studies posit the development of 15-Minute Cities as a strategy to promote walking, reduce car dependency, and consequently mitigate air pollution and carbon emissions, ultimately leading to improved health outcomes. Furthermore, proximity to green spaces is highlighted as a strategy for enhancing mental wellbeing by studies within this cluster [45,46].

Finally, the blue cluster, the smallest thematic focus, concentrates mostly on evaluating the 15-Minute City concept in light of important ideas like smart cities and sustainability. A group of studies within this cluster investigated the implications of 15-Minute Cities for sustainable development, notably in terms of lowering carbon emissions, optimizing energy use, and lowering infrastructure costs. Furthermore, some studies have attempted to combine smart technology and data analytics into 15-Minute Cities to boost mobility, service delivery, and resource optimization [47–49].

3.4.2. Mapping of Goals of the 15-Minute City

Figure 4 provides implementation rates of primary goals achieved by existing 15-Minute City concepts. Accessibility emerges as a dominant goal, with a strong emphasis on access to essential services like groceries (85.71%) and transportation (85.71%). Green spaces (84.42%) also feature prominently within the accessibility category, reflecting a concern for integrating nature into the 15-Minute City framework. This goal focuses on the importance of making all essential services and amenities available within a short distance from residents, typically within a 15-min walk or bike ride. This approach encourages sustainable transportation modes, such as walking, cycling, and public transport, thereby reducing the reliance on private automobiles. Consequently, this alleviates traffic congestion, reduces greenhouse gas emissions, and contributes to a healthier environment. The Ciudad de Buenos Aires, Greater Melbourne, and Shanghai have successfully incorporated essential services and amenities within a 15-min radius for their residents.

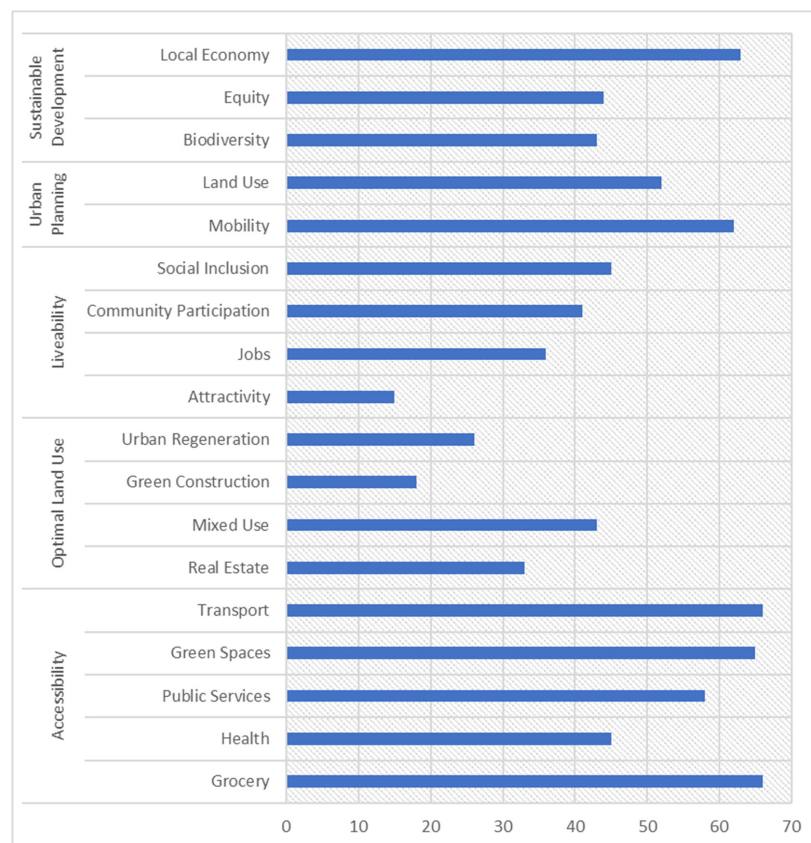


Figure 4. Mapping of primary goals achieved by existing 15-Minute City concepts.

Sustainability is another key theme, with a focus on the local economy (81.82%). This suggests an interest in fostering self-sufficient neighborhoods that minimize reliance on external resources. Equity (57.14%) and biodiversity (55.84%) are additional sustainability concerns, highlighting the importance of promoting social justice and environmental well-being within 15-Minute City designs. Sustainable development is a fundamental aspect of the 15-Minute City, as demonstrated by cities like Boulder (Colorado), Helsinki, and Sydney. These cities have made strides in balancing economic growth, social equity, and environmental protection, contributing to the United Nations' Sustainable Development Goals. For instance, Sydney has implemented policies to promote local businesses, green spaces, and sustainable transportation modes, fostering a low-carbon, circular economy. By promoting local businesses, green spaces, and sustainable transportation modes, the 15-Minute City can foster a low-carbon, circular economy, ultimately contributing to the United Nations' Sustainable Development Goals.

Urban planning is well-represented, with a strong focus on mobility (80.52%). This aligns with the core principle of the 15-Minute City, which emphasizes efficient movement within the local area. Land use (67.53%) is another crucial aspect of urban planning in this context, suggesting a need to explore optimal configurations for mixed-use developments (55.84%) that integrate residential, commercial, and recreational spaces within a short walking or cycling distance. Overall, urban planning plays a crucial role in the successful implementation of the 15-Minute City concept, as evidenced in cities such as Laval, Montréal, and Utrecht. These cities have prioritized the strategic allocation of land uses, the design of pedestrian-friendly streets, and the incorporation of sustainable infrastructure. In Montréal, for example, the city has focused on creating a human-centric urban environment, promoting mobility, land use efficiency, and biodiversity. Sensible and sustainable urban planning further involves the strategic allocation of land uses, the design of pedestrian-friendly streets, and the incorporation of sustainable infrastructure. By adopting a human-centric approach, urban planners can create vibrant, inclusive, and resilient communities that are equipped to meet the challenges of the 21st century.

Liveability is also a prominent goal, with social inclusion (58.44%) and access to health services (58.44%) receiving significant attention. This reflects a focus on creating neighborhoods that cater to the diverse needs of residents and promote a healthy lifestyle. However, aspects like community participation (53.25%) and job opportunities (46.75%) appear to be addressed to a lesser extent. In general, liveability relates to the overall satisfaction and well-being of residents in the 15-Minute City. As urban spaces are designed to be compact, walkable, and diverse, individuals can enjoy convenient access to essential services, social interactions, and recreational opportunities. This contributes to a sense of belonging, increased physical activity, and improved mental health, ultimately enhancing the overall liveability of the urban environment. Liveability is a key aspect that cities like Copenhagen (Nordhavn), Ottawa, and Toronto (Downsview Airport) excel in. These cities provide a high quality of life for their residents by fostering community participation, social inclusion, and job opportunities. Additionally, the availability of green spaces and efficient transport systems contributes to increased physical activity and improved mental health for citizens.

Finally, the figure highlights a limited focus on optimal land use beyond mixed-use development. Real estate considerations (42.86%) and urban regeneration (33.77%) receive moderate attention, while green construction (23.38%) and attractiveness (19.48%) are the least explored sub-sections. It should be noted that optimal land use is a key aspect of the 15-Minute City, as it promotes the efficient use of available land resources. By integrating residential, commercial, and recreational areas, a harmonious urban fabric can be achieved, fostering strong community bonds and facilitating the local economy. This mixed-use development strategy also helps to minimize urban sprawl, preserving green spaces and enhancing the overall quality of life for residents. Optimal land use is exemplified by cities such as Montevideo, Paris, and Rome, which have effectively integrated residential, commercial, and recreational areas. This mixed-use development strategy can be seen in the

use of real estate for multiple purposes and the regeneration of urban spaces. Notably, Paris has been a pioneer in the 15-Minute City concept, with a focus on mixed-use development and urban regeneration to enhance community life and reduce urban sprawl.

In addition to the primary goals illustrated in Figure 4, it is crucial to address the issue of crime and residents' perceptions of safety, which are essential components of urban planning policy within the 15-Minute City framework. The concept of crime prevention through environmental design (CPTED) provides valuable insights into how the physical environment can be designed or modified to reduce crime and enhance residents' sense of security. Integrating CPTED principles, such as natural surveillance, access control, and territorial reinforcement, can significantly contribute to creating safer urban spaces. For instance, Matlovičová et al. [50] highlight how environmental modifications can prevent crime and improve the quality of life in urban estates. By considering these aspects, the 15-Minute City model can not only promote accessibility and sustainability but also ensure that neighborhoods are safe and secure for all residents.

4. Conclusions

This study highlights the growing global interest in the 15-Minute City concept and its various incarnations. The diverse range of terminologies, administrative levels of implementation, and time-based urban planning approaches demonstrates the adaptability and relevance of the concept in addressing the challenges and opportunities presented by different urban settings. The 15-Minute City's emphasis on accessibility, proximity, and sustainability has resonated with urban planners, policymakers, and residents alike, as it strives to enhance the quality of life and promote more sustainable, inclusive, and resilient urban environments.

Our analysis reveals several key findings. First, the geographic distribution of 15-Minute City initiatives is predominantly concentrated in Western Europe, North America, and Oceania, with notable examples from Slovakia and the Czech Republic demonstrating the model's broader applicability. The flexible nature of the concept allows it to be adapted across different urban contexts, addressing unique local challenges and opportunities. Second, the thematic clusters identified through our bibliometric analysis—accessibility, walkability, sustainability, and proximity—underscore the core principles that underpin the 15-Minute City model. These clusters highlight the importance of designing urban environments that prioritize ease of access to essential services, promote active transportation, and support sustainable development goals. Furthermore, our study emphasizes the need for comprehensive urban planning that incorporates not only physical infrastructure but also social equity and community well-being. Third, our findings suggest that the implementation of the 15-Minute City concept is often driven by public sector initiatives, with varying degrees of involvement from private developers and public-private partnerships. The success of these initiatives hinges on the establishment of robust measurement structures to evaluate their impact on residents' quality of life, as evidenced by cities like Greater Melbourne and Copenhagen.

In terms of practice, it is crucial to consider the implications of such planning on residents' quality of life, particularly in terms of safety and crime prevention. Integrating principles from crime prevention through environmental design (CPTED) can enhance the overall effectiveness of the 15-Minute City model by fostering safer and more secure environments. As Matlovičová et al. [50] demonstrate, environmental modifications can prevent crime and improve the quality of life in urban estates. Moving forward, our recommendations for further research include exploring the long-term sustainability and resilience of 15-Minute City initiatives, particularly in underrepresented regions like Africa and Central and Eastern Europe. Additionally, future studies should investigate the impact of geographic determinism on the construction of essential public infrastructure and its sustainability. Understanding the socio-economic and environmental factors that influence the successful implementation of the 15-Minute City model will provide valuable insights for policymakers and urban planners.

The ongoing evolution and implementation of this concept and its variations underscore the need for further research and practice in this field, as we strive to shape the urban landscapes of the future.

Author Contributions: Conceptualization, D.C. and C.M.; methodology, U.L. and A.R.K.-G.; formal analysis, Z.A. and A.R.K.-G.; data curation, U.L. and A.R.K.-G.; writing—original draft preparation, Z.A. and A.R.K.-G.; writing—review and editing, Z.A., U.L., A.R.K.-G., D.C. and C.M. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Data Availability Statement: Data to be shared upon request.

Conflicts of Interest: The authors declare no conflicts of interest.

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