*Review*

# From Garden City to 15-Minute City: A Historical Perspective and Critical Assessment

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**Abstract:** The 15-minute city concept was introduced as a post-COVID strategy to support more sustainable recovery from the pandemic and develop complete, climate-sensitive, and resilient neighborhoods. This review examines key neighborhood planning movements to identify the origins of the 15-minute city concept. These include the garden city, neighborhood unit plan, modernist urbanism, post-modern urbanism, and eco-urbanism, which have emerged since the late 19th century. The results of the study show that the concept of the 15-minute city has ten basic characteristics: proximity, density, diversity, mixed-use, modularity, adaptability, flexibility, human-scale design, connectivity, and digitalization. The concept has been successful in advancing theoretical debates on sustainable urbanism. However, some criticisms of past planning movements also apply to the 15-minute city. Similar to the neighborhood unit and modernist urbanism, the concept follows a philosophy of physical determinism, setting goals without specifying how or by what means they will be achieved. At this point, one can only speculate about the future of the concept. A more detailed study of the real-world applications of the concept is needed before one can thoroughly discuss its strengths and weaknesses.

## 1. Introduction

Human settlements were traditionally built on a compact and neighborhood-oriented basis, where activities and services are fairly well distributed, and residents can meet their daily needs locally [1]. However, the invention of the automobile transformed the structure of cities by facilitating access to remote locations, and consequently, the need for nearly self-contained neighborhoods decreased [2]. Such urban form and structural transformations led to externalities such as urban sprawl, biodiversity loss, traffic congestion and pollution. In addition to challenges linked with urban form, cities are also grappling with socio-economic and poverty related issues, including social injustice, racism, transportation poverty, and affordable housing [3].

These issues have prompted urban planners and policymakers to reconsider the ideal form and structure of cities, make efforts to revive traditional urbanism and advocate for more sustainable urban designs [4]. Planning movements, such as post-modern urbanism and eco-urbanism, are examples of such efforts that emerged in the late twentieth century to address contemporary urban problems and promote sustainable urban planning and design. To protect the environment and enhance the well-being of residents, these movements emphasized the neighborhood level and decentralized services and activities to decrease car use and foster the use of public transportation [5]. The COVID-19 pandemic and associated movement restrictions and quarantine measures imposed by local governments to curb

virus transmission led to severe challenges for cities, making it necessary to revisit their role and structure [6]. The functional subdivision in many cities affected the supply chain and resident access to essential food and hygiene services and to open and green spaces [7,8].

Introduced by Carlos Moreno, the 15-minute city concept seeks to redesign and transform cities in the face of pandemics and the effects of climate change [9]. It aims to create self-sufficient neighborhoods with the essential functions of housing, work, commerce, health, education, and entertainment by decentralizing urban functions and services [10,11]. This concept places a specific emphasis on proximity and digitalization as strategies to promote active transportation, reduce carbon emissions, and create windows of opportunity for residents to increase their quality of life by reducing their daily commute [12,13]. Moreno also suggests developing dense and connected socially and functionally mixed neighborhoods. The flexible design of public and semi-public spaces based on human-scale principles encourages walking and cycling [14–16].

Despite the successes of the 15-minute city concept in gaining the attention of researchers and planners, there are still ambiguities about the historical roots of this concept. This review explains the five major neighborhood planning movements of the garden city, the neighborhood units, modernism, post-modernism, and eco-urbanism to provide a historical context for the emergence of the 15-minute city concept.

The following section discusses the methodological approach used in the literature review. Section 3 sheds light on the five principal neighborhood planning movements that have arisen since the late 19th century to give the reader an understanding of the antecedent concepts that the 15-minute city concept builds on. Section 4 explains the basic features of the 15-minute city rooted in past planning movements. Section 5 concludes with a summary of key findings, provides the theoretical and practical barriers to the implementation of the concept, and presents directions for future research.

## 2. Materials and Methods

Figure 1 depicts the literature search and selection methods. To find relevant literature, we created a broad-based search string that included the keywords '15-minute', 'neighborhood', 'city', and 'cities'. To include a broad spectrum of relevant data, we reviewed various sources, including scientific publications and reports, book chapters, grey literature, online pages, and newspapers. We included the grey literature due to its relevance to planners, policymakers, public agencies, and individuals who have shown a growing tendency to seek further information about the 15-minute city's underlying principles. Websites and online newspapers were also included since mass media has made significant efforts to introduce the concept and its contributions to the quality of life and disaster resilience.

In April 2021, a preliminary search of the Scopus and Google Scholar databases yielded 29 peer-reviewed articles. In October 2021, we conducted a second search, and seven additional peer-reviewed papers were found. Furthermore, we investigated 71 records yielded by a Google News search and popular media sources such as BBC News, CNN, *The Guardian*, *The New York Times*, *The Telegraph*, and *The Economist*. These media outlets are a source of insightful information to understand the new trends and approaches adopted by local governments [17]. To include other potentially relevant sources, we also checked the reference sections of the retrieved records (i.e., the snowballing method). As a result, ten more entries were added to the database, bringing the total number of items to 111. The abstracts of these articles were then evaluated to determine their relevance, and three items were excluded. Then, we screened full-text articles and excluded five further documents. Documents dealing with the history and genealogy, underlying features, and critics of the 15-minute city concept were considered relevant and chosen for in-depth analysis. Finally, 108 documents were selected for review.

We used an inductive method for qualitative content analysis. The inductive content analysis combines data collection/extraction and analysis and gradually builds discussion [18]. While reading each document, any information related to the 15-minute city was recorded in a Microsoft Word document with different sub-sections (i.e., genealogy,

principles, and sustainability benefits). As the article was reviewed, any new information was added to the previously recorded information whenever it was deemed relevant. We continued this process until all documents in the database were investigated. We then synthesized the collected information related to each section of the review, as reported in the following sections.
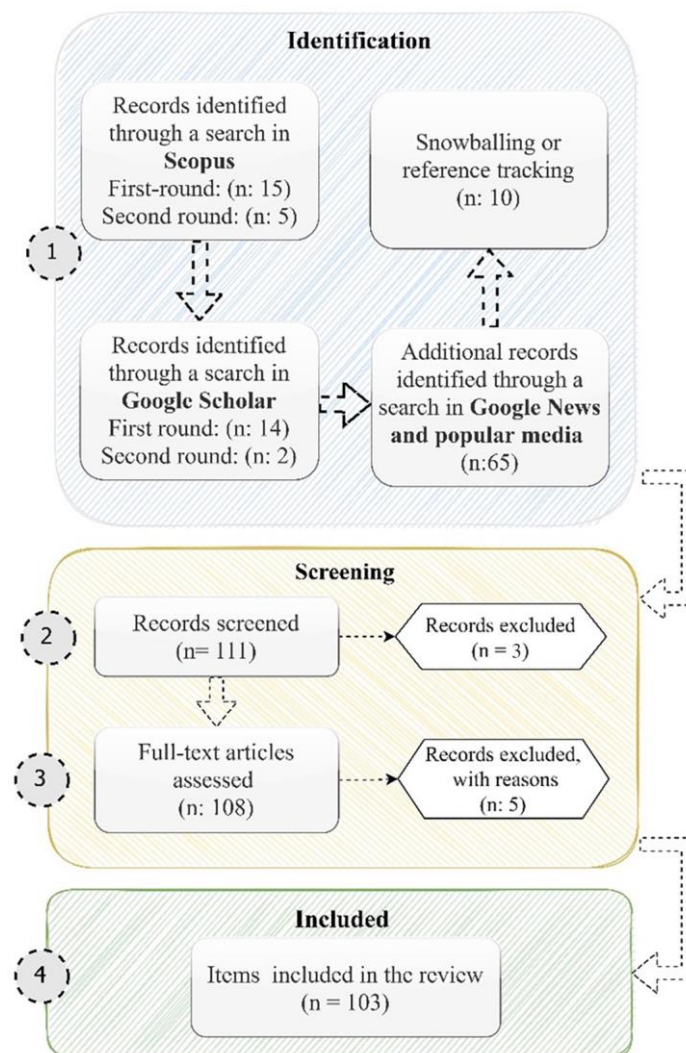


**Figure 1.** Literature search and selection process.

## 3. History/Genealogy of the Concept

### 3.1. Origin

Neighborhood planning has often been the subject of debate among planners [19]. It has been practiced since the industrial revolution, particularly throughout the twentieth century, when the inefficiency of large cities in addressing their inhabitants' daily needs became evident [20]. Figure 2 shows the historical sequence of neighborhood planning movements since the late 19th century. We can identify two types of planning movements, namely the (1) proximity-centric and (2) mobility-centric [21]. The former seeks to improve the functionality of cities through better distribution of urban services and amenities across cities, and the latter focuses on the centralization of urban functions and mainly emphasizes motorized transportation [15].
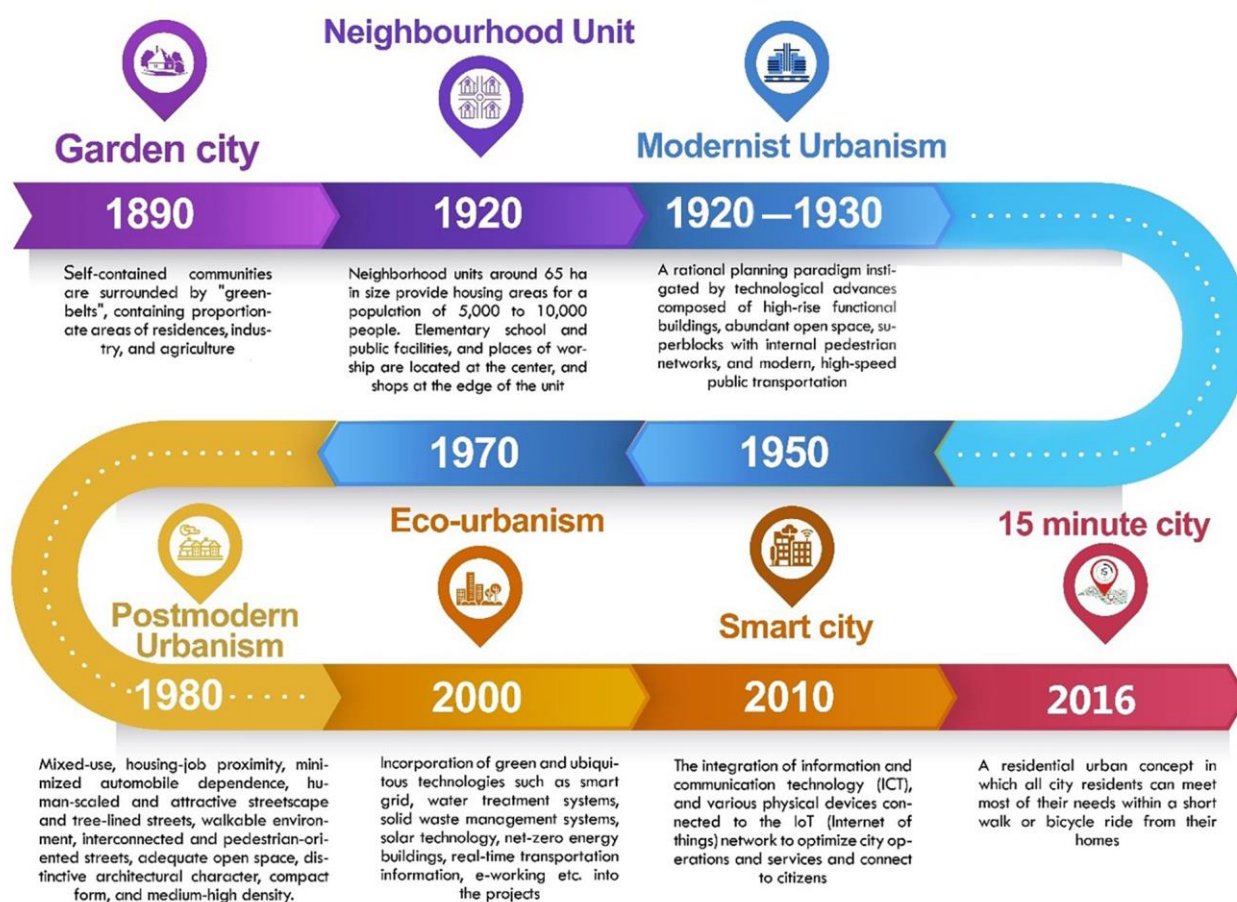
**Figure 2.** The historical sequence of neighborhood planning movements. Source: the authors.

During the industrial revolution, planners sought to increase urban efficiency by centralizing urban amenities, services, and activities in city centers [15]. However, the centralized urban form resulted in various issues, such as environmental degradation, physical deformities, and health emergencies [22]. In response to this urban crisis, a wave of utopian thinking emerged that sought solutions beyond urban areas [23]. Ebenezer Howard introduced the utopian garden city approach (1898) as the first deliberate attempt to address social and health issues through physical design [23]. He envisioned a network of interconnected and self-contained satellite towns surrounding a large central city encircled by a greenbelt. Howard also split the garden city into seven wards, each with a population of 5000 people, which was among the earliest attempts to include neighborhoods in city planning. He also emphasized commercial activities and employment and located them near the major thoroughfares [23].

In 1923, Clarence Perry introduced the neighborhood unit concept, as an urban planning approach that focused on the neighborhood as the basic planning unit [24]. This plan was presented in the early 20th century when American cities were confronted with issues such as unplanned growth based on private sector development, overcrowding, segregation, alienation, delinquency, and a lack of participation [19]. Inspired by Howard, Perry envisioned neighborhoods where inhabitants live near elementary schools, parks, meeting places, places of worship, and retail complexes. His plan was for a neighborhood with a population of 5000 to 9000 people to be built on 160 acres at a density of 10 people per acre. The neighborhood's street system was designed in a manner that discouraged driving, creating a safe environment for pedestrians [25]. Urban amenities and shopping centers were placed within a 400 m walking distance of the residents. In Perry's opinion, a neighborhood should function beyond a residential unit and provide opportunities to increase social encounters [5,26].

Throughout the first half of the twentieth century, the garden city and neighborhood unit approach attracted a lot of attention. Howard and Perry were even involved in the development of several pilot cities. The garden city was, however, criticized for flaws in integrating production functions, a lack of self-sufficiency, fostering single-family units, encouraging sprawl, and unsustainable environmental practices [5,27]. This plan failed to meet its social objectives, and the green belts that surrounded garden cities were ignored due to a lack of available land. Similarly, Perry's neighborhood unit plan has been criticized for promoting functional segregation and strict zoning [24]. Inspired by Jacobs [28], Mehaffy et al. [24] criticized the plan for its lack of walkability, limited social interactions, car dependency, and GHG emissions intensity [29].

### 3.2. Evolution

Technological advancements that revolutionized the construction and transportation industries inspired a group of modernist planners and architects, including Le Corbusier and Frank Lloyd Wright, to create modern neighborhoods in the 1920s and 1930s. These were characterized by functional high-rise buildings, ample open spaces, superblocks with walking networks, and high-speed transportation [30,31]. While Howard and Perry concentrated on the human scale and limits to urban expansion, modernist planners emphasized high-rise buildings, higher density, and high-speed transportation [32]. The central premise of modernist planners was that if cities provide sufficient parking and driving lanes, residents could have appropriate access to urban services and facilities via private cars regardless of their location [31]. However, the approach resulted in fragmented cities characterized by functional subdivisions and separation of working and living environments [9,21].

Despite the optimism of modernist proponents that technological advances can solve urban issues, this approach did not enhance residents' quality of life, and instead reduced cities' sustainability [33]. For example, it separated residential areas from working environments to keep cities safe from polluting factories. Nevertheless, cities were still suffering from some degree of air and noise pollution caused by traffic congestion, and socio-spatial inequalities widened. The construction of new highways increased the number of cars and the total vehicle miles traveled, while adequate and equitable access to services and amenities was still a major issue [34].

These issues redirected planners' attention to the neighborhood scale and localized communities in the late twentieth century, creating post-modern urbanism [21]. It evolved into an umbrella term encompassing many popular concepts in recent decades, including traditional neighborhood development, transit-oriented development, new urbanism, and smart growth [35]. Due to the emphasis of post-modern planners such as Duany, Plater-Zyberk, and Calthorpe on traditional neighborhoods characterized by walkability, human scale, and compactness, the term post-modern urbanism has been used interchangeably with neo-traditionalism [5]. Post-modern urbanists adhere to Howard and Perry's main principles, including mixed-use development, housing-job proximity, human scale, ample green space, walkability, and compactness [32]. From the perspective of new urbanism and traditional neighborhood development, neighborhoods should contain a network of well-connected blocks and streets and should create an environment that promotes walking and cycling and combines work and leisure. Diversity is an essential component of post-modern urbanism, which implies a mix of residential uses, income groups, employment opportunities, shops, parks, and civic institutions [34].

Post-modern urbanism initiatives were used in the design of various neighborhoods in the late twentieth and early twenty-first centuries. Post-modernists expected to increase social contacts, change unsustainable travel behaviors, and reduce the total VMT by designing walkable, compact, and diverse communities [36]. There is, however, evidence that these objectives are not always realized [37,38]. Sharifi [5] suggests that post-modern neighborhoods suffer from physical determinism because they use similar and generalizable physical solutions to address urban challenges. He pointed out that cities have distinct

geographic characteristics, and their problems are multifaceted and numerous. As a result, the post-modern urbanists' physical interventions were insufficient to address all urban issues, some of which required answers outside the scope of interventions in urban form.

Thus, previous challenges such as traffic, air pollution, poverty, and inequality were not adequately addressed at the turn of the century. Meanwhile, new issues such as climate change and resource scarcity emerged, highlighting the need to rethink urban planning and design models and concepts. As a result, the 2000s saw the emergence of eco-urbanism as the dominant urban planning paradigm based on sustainable development principles. Eco-urbanism advocates concepts such as sustainable neighborhoods, the eco-city, eco-town, ubiquitous city, digital city, green city, and the resilient city. Its ultimate objective is to address the pressing issues of climate change and environmental sustainability, in addition to the challenges that cities have traditionally faced. In other words, apart from adhering to the fundamental principles of previous models and concepts, eco-urbanism emphasized environmental goals such as facilitating low-carbon cities with a lower ecological footprint and focused on increasing resource productivity by transforming cities toward knowledge production, education, and innovation [39,40].

However, eco-urbanism projects have been criticized for limited real-world success and encouraging exclusion despite their worthwhile goals. In some cases, the projects failed to strike a balance between sustainability pillars, and the social goals were neglected [41]. For example, while eco-urbanism theoretically advocates for affordable housing, some scholars argue that its projects are costly in practice and have excluded disadvantaged social groups [41]. The speculative activities and deployments of high-tech companies only allow high-skilled and high-income individuals to live in eco-urban neighborhoods [42]. In this regard, Caprotti [43] criticized eco-urbanism projects for intensifying social inequalities and exclusion, and noted that the projects have created 'islands of wealth in an ocean of poverty'. Furthermore, Sharifi [5] believes that proponents of eco-urbanism overemphasize the role of technology and physical design while ignoring citizens' agency in the transition to sustainable development. Nonetheless, communities cannot exploit technology and physical design benefits unless social changes are made [42]. Finally, several primary eco-urbanism goals, such as zero carbon and zero waste, were deemed unattainable and replaced with alternative concepts such as low carbon and low waste in practice [5,44].

In the 2000s and 2010s, some scholars introduced the smart city concept as a governance-centric approach that leverages social capital to improve the quality of life of urban residents [45]. A smart city considers the six main dimensions of people, mobility, living, environment, economy, and governance to achieve balanced development. It utilizes cutting-edge technology to reduce waste and carbon emissions and manage air pollution. In the past decade or so, local governments have made significant investments in information and communication technologies (ICT) infrastructures as a part of their social and technological transition and have launched various smart city projects. These projects aim to eliminate physical barriers to access to urban services and functions by leveraging information and communication technologies and smart transportation modes [46]. However, such smart solutions may not facilitate access to all services, and the need for some form of physical access remains [47].

In the late 2010s, the COVID-19 outbreak led to an unexpected global crisis. Many governments imposed unprecedented movement restrictions and quarantine measures [8,15]. Physical contact was reduced to a minimum, and public transit environments were identified as COVID-19 risk zones. Walking, cycling, and micro-mobility gained widespread popularity because they allowed people to meet their daily needs while maintaining a physical distance [8]. Some local governments redesigned streets to allocate more space for walking and cycling [48]. Urban health, which had been a secondary concern to urban planners and municipal authorities before the pandemic, became a primary goal, and proximity to urban services and amenities became a focal point of debate among planners and policymakers [49].

The COVID-19 pandemic confirmed the efficacy of complete neighborhoods during health emergencies, showing that car-dependent neighborhoods and cities based on modernist ideas and principles are not resilient during adverse events such as pandemics [49]. Indeed, when local governments implemented widespread movement restrictions to curb the virus chain, motorized transportation ridership drastically decreased, while active transportation modes had the lowest decline in demand [50]. The pandemic reminded planners that cities require a more sustainable urban form and that urban planning and design principles must be revisited [7]. Accordingly, the 15-minute city concept, originally introduced by Carlos Moreno in 2016, was later employed by him as a means of combating greenhouse gas emissions and as a strategy for post-COVID recovery [9].

## 4. The Basic Features of the 15-Minute City Concept

The original architecture of the 15-minute concept is laid on the key components of proximity, diversity, and density. However, the concept has not been limited to these components and other elements can also be found in Moreno's view. For example, he places much emphasis on human-scale urban design and multiple uses of public and semi-public spaces in the Paris en Commun's strategy. Overall, this review identified ten inherent features of the 15-minute City: (1) proximity, (2) density, (3) diversity, (4) mixed-use, (5) modularity, (6) adaptability, (7) flexibility, (8) human-scale design, (9) connectivity, and (10) digitalization. Table 1 compares the 15-minute city with past planning movements based on these features.

**Table 1.** Comparing neighborhood planning movements. Absence of the principles is indicated by × and presence is shown by ✓.

| Neighborhood Planning Movements | Proximity | Density | Diversity | Mixed-Use | Modularity | Adaptability | Flexibility | Human-Scale Design | Connectivity | Digitalization |
|---|---|---|---|---|---|---|---|---|---|---|
| Garden city | × | × | ✓ | × | × | × | × | × | ✓ | × |
| Neighborhood unit | ✓ | × | × | × | × | × | × | ✓ | × | × |
| Modernism | × | × | × | × | × | × | × | × | × | × |
| Post-modernism | ✓ | ✓ | ✓ | ✓ | × | × | × | ✓ | ✓ | × |
| Eco-urbanism | ✓ | ✓ | ✓ | ✓ | × | ✓ | × | ✓ | ✓ | ✓ |
| 15-minute city | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

**Proximity:** Jacobs believes proximity is an essential principle of urban vitality [28]. It provides numerous advantages, including less infrastructure per capita, better access to educational, economic, social, and cultural opportunities, the promotion of active transportation, and safer streets [51]. Proximity has been stressed since the earliest planning movements, such as the neighborhood unit plan, in which Clarence Perry advocated for self-sufficient residential neighborhoods centered on the school to enable children to walk a quarter- to half-mile to school [25]. [NO_PRINTED_FORM] Post-modern urbanism approaches, such as traditional neighborhood development, also envision amenities such as stores, schools, and worship places within walking distance of residences [52].

According to Moreno's chrono-urbanism philosophy, proximity is a strategy for improving people's quality of life in 15-minute cities [53]. Chrono-urbanism suggests that residents of centralized cities waste a lot of time on their everyday commutes, lowering their overall quality of life. As a result, Moreno implemented proximity as a strategy to give households more free time to engage in leisure activities. [16,53]. The 15-minute city considers proximity from both a temporal and spatial standpoint, with a focus on the redistribution and relocation of urban resources and services to be close to residential neighborhoods [9]. It is designed to allow residents to access the six core functions of (1) living, (2) working, (3) commercial (including food), (4) health care, (5) education, and (6) entertainment with a 15-minute walk or bike ride [54].

**Density:** The benefits of density and the drawbacks of sprawling growth are widely acknowledged [55]. Jane Jacobs defined density as one of the four important criteria for thriving and diverse cities in her book, *The Death and Life of Great American Cities* [28]. According to Lehmann [56], cities with higher densities benefit from reduced commute times, more effective urban infrastructure, and closer proximity of urban facilities to residential areas.

Historically, the overcrowding of industrial cities in the 19th century prompted Ebenezer Howard to propose a low-density garden city with ample green spaces and single-family residential units [5]. However, it encouraged a problematic suburban development pattern characterized by sprawling, single-use, and low-density in the post-Second World War period. Thus, post-modernist and ecological planning movements recommended high-density neighborhoods with a variety of amenities within walking distance to address these problems [57]. For example, in transit-oriented development (TOD), Peter Calthorpe proposed high-density mixed-use areas where residential, business, and leisure spaces are located within a 10-min walk distance of a transit station [30,31].

Similar to post-modern urbanism and eco-urbanism, the 15-minute city leverages density to ensure that locals have adequate access to their everyday requirements without depending on private vehicles [21]. Indeed, adequate levels of density can provide a critical mass for the operation of local services and businesses within walking distance, as well as for the creation of local job opportunities [9,58].

**Diversity:** Diversity is a major urban development strategy that addresses social and spatial inequalities [9]. This principle is also critical for long-term economic sustainability and increasing innovation and creativity [59]. It aims to create neighborhoods with various cultures, ethnicities, and social and economic groups.

The necessity of building a diverse community has been recognized since Howard's garden city. He imagined a city with a mix of social classes, mixed-tenure homes, and housing options that are relatively affordable [23]. However, this component was overlooked by modernist urbanism and the unit neighborhood, and it was once again highlighted in urban planning by the post-modern and eco-urbanism movements.

Accordingly, the 15-minute city seeks to create a diverse community as a step toward incorporating cultural pluralism into planning and response to decades of modernist urbanism, which has sometimes resulted in deprived and isolated urban districts [60]. Carlos Moreno believes that a neighborhood should be affordable and accessible to all residents, regardless of social and economic class, race, nationality, age, or gender [61]. As a result, the 15-minute city envisions affordable housing, job opportunities, and social services for vulnerable groups [58]. Furthermore, stakeholder participation is critical in neighborhood planning and development. Local community groups, including low-income individuals and small- and medium-sized businesses, are also involved in the various planning stages, from visioning to project design and implementation [48].

**Mixed-use:** The 15-minute city creates a polycentric city with multi-use neighborhoods, encompassing residential, commercial, recreational, health care, education, and entertainment uses [9,21]. As the physical representation of diversity, mixed-use neighborhoods can reduce the distance and number of daily trips by allowing individuals to get more out of a trip. This can result in reduced daily private vehicle use, energy consumption, carbon emissions, and noise and air pollution [62]. Moreover, the mixed-use development also reduces the number of hours that citizens spend on daily commutes, resulting in an improvement in their overall quality of life [63].

Historically, planning movements of the twentieth century, including the garden city, neighborhood unit plans, and modernist urbanism, supported single-use zoning to safeguard citizens from polluting industries. As a result, they encouraged single-use zoning to separate residential areas from commercial and industrial developments. However, zoning has been criticized as a discriminatory policy tool used to prevent minority residents from moving to majority districts by imposing density restrictions (exclusionary zoning) and putting manufacturing activities in minority communities (environmental racism) [64].

Moreover, Jacobs criticized single-use zoning as the main reason for regeneration plans' failure in the United States. She preferred mixed-use developments, in which a wide range of uses are included in urban spaces [65] The advocates of post-modern urbanism acknowledged the importance of mixed-use zoning and promoted it as one of the main principles of the new urbanism movement [57]. New urbanism proposed pedestrian-oriented communities comprised of cafes, restaurants, offices, and residential areas, allowing people to live, work, and socialize in a small geographic area [36,66]. Similarly, eco-urbanism considers mixed-use development as a tool for encouraging walking and reducing reliance on personal cars, which can contribute to climate change mitigation and adaptation [52,67,68].

**Modularity:** Modularity refers to the ability of a system to be divided into groups of communities and the degree of interconnectedness within the system [69]. Decentralization is a representation of modularity in which cities develop based on a polycentric pattern, and facilities and services are dispersed in several centers. This modular organization of cities can reduce spatial inequalities by improving an individual's chances of finding a job close to home [70]. It also helps diffuse risk and avoid large-scale disruptions when faced with adverse events. The 15-minute city is expected to promote the decentralization of urban services and create multiple sub-centers that provide necessary services to urban citizens.

**Adaptability**: Cities face uncertainties that make the future uncertain and changing. Adaptation to these changing conditions is therefore of great importance. A city with a strong adaptive capacity is less vulnerable because it is able to learn from disasters and adapt to changing conditions. It recognizes the fragility of its basic components, develops appropriate knowledge, and has the authority to prioritize tasks to create a fail-safe or soft-fail urban system [70].

The increasing number of hazards in recent decades has drawn the attention of planning movements on increasing the adaptive capacity of cities [5]. Eco-urbanism, for example, not only addresses the old challenges of urbanization that were the focus of earlier movements but also has a particular focus on climate change and resource constraints experienced in recent decades [40,43]. Similarly, the 15-minute city draws lessons from climate change and the COVID-19 pandemic and proposes a sustainable urban design that is less vulnerable to similar uncertainties in the future [53].

**Flexibility:** One of the COVID-19 pandemic's lessons for city dwellers was the need for greater flexibility in work and living [71]. It forced many people to make changes in their lives, both at work and in their private life, and localize their daily activities [49]. To maximize urban efficiency, the 15-minute city calls for the transformation of single-function public spaces into multi-purpose spaces [9,15]. It gives different uses to urban environments that were formerly used exclusively for a particular purpose at specific times of the day or on certain weekdays. Residents of a 15-minute city use public and semi-public spaces throughout the day and seven days a week [72,73]. Overall, flexibility can facilitate decentralization. Cities can reap the benefits of decentralization while also increasing the efficiency of urban services through multiple uses of single-function public spaces. This strategy may also increase the capacity of the neighborhoods to absorb sudden shocks caused by crises such as the COVID-19 pandemic and the like [48].

**Human-scale urban design:** Suburban development encouraged by modernist urbanism after World War II resulted in a car-oriented urban structure with sprawling growth, increased transportation costs, segregation, and pollution. Jacobs believed that the only logic governing the city is that people make it, that it is for them, and urban plans should fit them. As a result, the post-modern and eco-urbanism movements designed a walkable and bikeable city optimized for human use, where energy consumption is low and pollution and congestion are reduced. Maintenance costs in this city are low, and all people, regardless of age and ability, can move around easily. In recent years, the COVID-19 pandemic has once again revealed the inefficiency of modernist cities due to their car-oriented and fragmented urban design. This pandemic underscored the importance of reimagining cities based on a more humane design [74]. Accordingly, the 15-minute city centers on human concerns and desires in determining the size and shape of a city [9]. In designing streets and roads, this

concept prioritizes citizens over cars, develops pedestrian and bicycle paths, and creates attractive streets and roads to encourage active mobility [75].

**Connectivity:** Connectivity prevents the creation of isolated neighborhoods. It can help the urban system to better withstand and recover from shocks and stresses by connecting urban sub-districts [76]. To ensure a complete connection of urban sub-districts to the larger urban structure, 15-minute neighborhoods are connected by public transportation [21]. In a 15-minute city, active mobility modes, such as walking and cycling, are combined with public transportation to enhance the efficiency of public transportation and reduce car dependency for first/last mile connections [21,75].

**Digitalization:** The potentials and capabilities of smart technologies, such as AI, big data, and IoT, to access real-time data and encourage more active participation in planning and decision-making processes led Moreno et al. [9] to include digitalization as a main component of the 15-minute city [77]. Local governments can engage with citizens more closely through smart dashboards, interactive maps, transparent governance methods, and meetings streamed online. This can improve connectivity and address concerns about neighborhood isolation in the 15-minute city concept [9]. Smart city solutions can also facilitate multimodal transportation by contributing to novel transportation ideas such as mobility as a service (MaaS) [78]. New communication and information technologies can also help 15-minute cities create new job opportunities and help local businesses increase their competitiveness and make better-informed decisions [79].

## 5. Discussion and Conclusions

Climate change and the COVID-19 pandemic are two significant urban challenges that have encouraged planners and policymakers to reconsider and remodel city structures in recent years [78]. It appears that neighborhood planning movements have broadened their underlying principles over time. The most current movement, the 15-minute City, has a broad scope. It emphasizes the critical role of neighborhoods in a city's resilience against climate change and pandemics. This review showed that the 15-minute city concept has ten important characteristics: (1) proximity, (2) density, (3) diversity, (4) mixed-use, (5) modularity, (6) adaptability, (7) flexibility, (8) human-scale design, (9) connectivity, and (10) digitalization. The 15-minute city decentralizes urban functions to ensure fair access to urban amenities. It reimagines public places on a human scale to foster social interactions. It also develops walkable environments that promote active mobility to improve public health and quality of life. Paris is not the only city that has implemented an x-minute city strategy, and similar initiatives have been implemented in Europe (for example, Barcelona's superblocks and the United Kingdom's high streets), Asia (for example, Shanghai's 20-minute Town and Singapore's 45-minute city), Australia (for example, Melbourne's 20-minute neighborhoods), and the United States (for example, Portland's 20-minute neighborhoods and Houston's walkable places) [21].

Table 2 compares the 15-minute city concept with past neighborhood planning movements based on a group of neighborhood sustainability criteria proposed by Sharifi [5]. It indicates that the 15-minute city concept disregards some neighborhood sustainability criteria, including environmental protection, biodiversity, energy-efficient structures, and local vernacular, culture, heritage, and identity. The energy-related strategies of the 15-minute city are primarily focused on the city and district levels, and smaller scales, including buildings, are neglected. In comparison to eco-cities, the 15-minute city does not focus on how to create energy-efficient residential spaces, despite the fact that buildings consume around 40% of global energy [78]. Table 2 compares different planning movements in terms of incorporating sustainability-related criteria.

**Table 2.** Comparing different planning movements in terms of incorporating sustainability-related criteria.

| | Sustainability Aspect and Criteria | Garden City | Neighborhood Unit | Modernism | Post-Modernism | Eco-Urbanism | 15-Minute City |
|---|---|---|---|---|---|---|---|
| Environment | Development in existing urban areas | × | ✓ | × | ✓ | ✓ | ✓ |
| | Agricultural and rural lands protection | ✓ | ✓ | × | ✓ | ✓ | ✓ |
| | Green infrastructure provision | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | Environmental protection (ecology, biodiversity, etc.) | × | × | × | × | ✓ | × |
| | Lowering transport-related energy use | × | ✓ | × | ✓ | ✓ | ✓ |
| | Shorter commuting time | ✓ | ✓ | × | ✓ | ✓ | ✓ |
| | Reducing energy waste | ✓ | ✓ | × | ✓ | ✓ | ✓ |
| | Energy-efficient buildings | × | × | × | × | ✓ | × |
| | Clean and green energies | × | × | × | × | ✓ | ✓ |
| | Higher physical activity | ✓ | ✓ | × | ✓ | ✓ | ✓ |
| | Decentralization of urban services | ✓ | × | × | ✓ | ✓ | ✓ |
| | Addressing spatial and temporal gaps in access to urban services | × | × | × | × | × | ✓ |
| | Complementing public transportation | × | × | × | ✓ | ✓ | ✓ |
| | Walkability | ✓ | × | × | ✓ | ✓ | ✓ |
| | Accessibility | ✓ | ✓ | × | ✓ | ✓ | ✓ |
| | Reduced car dependency | M | ✓ | × | ✓ | ✓ | ✓ |
| Economic | Distribution of business activities | × | × | × | ✓ | × | ✓ |
| | Providing the required density to support businesses | × | ✓ | × | ✓ | ✓ | ✓ |
| | Job–housing proximity | ✓ | ✓ | × | ✓ | ✓ | ✓ |
| | Addressing spatial mismatch | ✓ | ✓ | × | ✓ | × | ✓ |
| | Job–skill mismatch | ✓ | ✓ | × | ✓ | ✓ | ✓ |
| | Minimum transportation costs | ✓ | ✓ | × | ✓ | ✓ | ✓ |
| | Population threshold to support businesses | × | × | × | ✓ | ✓ | ✓ |
| | Minimum infrastructures costs | ✓ | ✓ | × | ✓ | ✓ | ✓ |
| | Reducing parking demand | M | ✓ | × | ✓ | ✓ | ✓ |
| Social | Inclusive and equitable community | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | Affordable housing | ✓ | × | ✓ | ✓ | ✓ | ✓ |
| | Increasing safety | × | ✓ | × | ✓ | ✓ | ✓ |
| | Community facilities and civic spaces | ✓ | ✓ | × | ✓ | ✓ | ✓ |
| | Resident participation | × | × | × | ✓ | ✓ | ✓ |
| | Promotion of social encounters | ✓ | × | × | ✓ | ✓ | ✓ |
| | Shorter daily commuting | ✓ | ✓ | × | ✓ | ✓ | ✓ |
| | Reducing road accident | ✓ | ✓ | × | ✓ | ✓ | ✓ |
| | Local vernacular, culture, heritage, and identity | × | × | × | ✓ | ✓ | × |

✓ indicates compliance; × indicates non-compliance; M indicates mixed evidence.

The results of this review uncovered several conceptual and practical barriers to putting the concept into practice. First, similar to earlier planning movements such as the neighborhood units plan and modernist urbanism, the 15-minute city appears to promote physical determinism. It seeks to solve existing problems, such as public health, climate change, economic prosperity, and social inclusion through a physical design and modification of the physical structure [21]. However, it is unrealistic to expect the 15-minute city to instigate a sustainable transition based solely on physical interventions to address the complex and multidimensional issues mentioned earlier. This is because such issues are affected not only by physical factors but also by social, cultural, and economic factors. Inclusiveness and social equity are examples of critical issues that were similarly

incorporated in the eco-urbanism and neo-traditionalism planning movements, but they failed to establish an inclusive society that embraces historically marginalized social groups inside neighborhoods [5]. Second, some cities, such as Paris, have a long history and have already taken significant strides toward sustainable mobility. Therefore, developing mixed-use developments and decentralizing urban services and functions is not a difficult task [26]. However, applying this strategy in fragmented cities with a car-dependent and sprawling urban structure, such as cities in North America and Australia, is a challenge [26]. They suffer from rigid land use planning and zoning regulations that are based on functional separation and have resulted in structural lock-in. Therefore, in such cities, the concept requires a thorough reorganization and retrofitting of the urban structure, which is difficult to achieve in practice [8,48].

Third, the history of urban planning movements shows that concepts such as the 15-minute city are introduced to address specific issues such as congestion, pandemics, and energy consumption. However, each community requires a neighborhood development plan that takes into account geographic specificities and unique issues [21]. Fourth, it cannot be assumed that a goal will be achieved merely because it is envisioned in a concept. It is unclear how and by what means the 15-minute city will achieve goals such as affordable housing, ethnic diversity, and job–housing proximity. This criticism has also been made about planning movements that came before, such as neighborhood planning units, which had some goals but did not reach them. Fifth, concerns have been raised that the idea overlooks the complexities of urban environments. For instance, a neighborhood resident may not be able to find a job within walking distance of their home. Certain jobs should be concentrated in a particular location to take advantage of agglomeration economies (for example, high-tech, pharmaceutical, and auto industries). Because not everyone working in these jobs can be accommodated in the area, they must inevitably commute between work and home.

Despite being new and informative, this review and its findings have some limitations. Other methods, such as expert and resident surveys, could be used to complement this study by integrating the perspectives of different stakeholders. While the reviewed works primarily focused on the theoretical considerations of the 15-minute city, empirical evidence from specific cities was not reported. This is perhaps because the concept is still in its infancy and has not been fully implemented in the real world. Future studies can provide empirical evidence of the concept's application in the real world [79].

**Author Contributions:** Conceptualization, A.R.K.-G. and A.S.; methodology, A.R.K.-G. and A.S.; formal analysis A.R.K.-G. and M.H.H.A.; investigation, A.R.K.-G. and Z.M.; resources, A.R.K.-G., M.H.H.A. and Z.M.; writing—original draft preparation, A.R.K.-G., A.S. and M.H.H.A.; writing—review and editing, A.R.K.-G., A.S., M.H.H.A. and Z.M. visualization, A.R.K.-G. and Z.M.; supervision, A.S. and A.R.K.-G. All authors have read and agreed to the published version of the manuscript.

**Institutional Review Board Statement:** Not applicable.

**Informed Consent Statement:** Not applicable.

**Data Availability Statement:** Not applicable.

**Conflicts of Interest:** The authors declare no conflict of interest.

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