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The 15-minute city: assumptions, opportunities and limitations

Daniela Szymańska[1, CDFMR], Ewa Szafrańska[2, CDMR], Michał Korolko[3, DFMR]

[1]*Nicolaus Copernicus University in Toruń,* Faculty of Earth Sciences and Spatial Management, Department of Urban Studies and Sustainable Development, Toruń, Poland, e-mail: dani@umk.pl, https://orcid.org/0000-0001-6079-6838; [2]*University of Lodz,* Faculty of Geographical Sciences, Institute of Urban Geography, Tourism Studies and Geoinformation, Lodz, Poland, e-mail: ewa.szafranska@geo.uni.lodz.pl (*corresponding author*), https://orcid.org/0000-0002-6779-3100; [3]*Toruń Regional Development Agency,* Toruń, Poland, e-mail: een@tarr.org.pl, https://orcid.org/0009-0006-2525-7891

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Abstract. The concept of the 15-minute city (FMC), though created relatively recently, has quickly become one of the most popular concepts in urban planning. The paper discusses the FMC concept, presenting its evolution from an idea in the public debate to a research concept. The FMC is also presented in relation to other urban planning concepts. The article discusses the assumptions, opportunities and limitations of the FMC.
Despite the growing popularity of the concept, it should be remembered that cities are spatial and functional structures that are shaped over a long period of time and show surprising durability (it often being difficult to change or rebuild existing structures); the implementation of this concept is often associated with numerous varied challenges, which are highlighted in this article. Although the assumptions of the concept are very good, it still remains more in the sphere of a concept than of widespread concrete implementation in planning practice

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Contents:

1. Introduction

The concept of the 15-minute city, though created only recently, has quickly become one of the most popular concepts in urban planning around the world (Teixeira et al., 2024). Its creator, Colombian–French scholar Carlos Moreno, postulates an urban environment that allows residents to sufficiently satisfy their most important needs of work, trade, healthcare, education and entertainment within a 15-minute walk or bike ride from their place of residence, allowing them a better quality of life (Moreno et al., 2021).

The concept of a city in which all basic activities of residents can be carried out in close proximity to their place of residence thus stands in opposition to the idea of modernism, which is a key urban concept of the 20th century that has shaped modern cities and involves the spatial separation of major urban functions (Pozoukidou & Chatziyiannaki, 2021). The 15-minute city concept is also a response to the rapid development of private car transport, which causes air and noise pollution and the need for heavy expansion of road and parking infrastructure, which is occupying ever larger areas in cities (Ibraeva et al., 2020). The growing wealth of urban dwellers and related consumerism of recent decades have led people to seek new living spaces, caused cities to expand, and increased the distance of workplaces from places of residence and services (Teixeira et al., 2024). Moreover, the decline in population density and the associated drop in profitability of public transport have consistently increased dependence on private vehicles, resulting in greater individualism and weakened or reduced the number of the direct social relationships born of face-to-face contact. All this has caused many cities to lose their "human scale" and become less liveable (Allam et al., 2022).

These phenomena drove the search for new princiles by which to organise space and new directions of urban development, and the concept of the fifteen-minute city (FMC) to which this article is devoted is one such set of principles. Originally proposed in the press in 2016 (Moreno, 2016) and presented more broadly in the 2020 re-election campaign of the Paris authorities (Allam et al., 2022), it was only further specified in a 2021 article in the context of the new challenges created by the COVID-19 pandemic (Moreno et al., 2021). Since then, it has inspired both practitioners, as a framework for urban planning and policy, and urban researchers, as a tool for analysing spatial accessibility in cities (Willberg, Fink & Toivonen 2023; Mouratidis, 2024). Recently, the 15-minute city concept has also featured in lively public debate about the modern post-pandemic city. It is discussed in the context of urban resilience and as a response to the challenges of sustainable development, in particular climate change, but also in the context of achieving societal goals such as improving interpersonal relations, reducing inequalities and increasing social justice (Allam et al., 2022).

The 15-minute city concept is often considered an urban planning idea that can effectively contribute to improving quality of life in a city, as evidenced by the number of works enthusiastically referring to its potential (see Allam et al., 2022; Khavarian-Garmsir, et al., 2023b) and the number of cities that are trying to implement its principles (see Jasion, 2023; Jaroszewicz et al., 2023; Jeon & Jung, 2024; Teixeira et al., 2024) Nevertheless, the vagueness of the concept is increasingly being emphasised (Beim, 2021), it is being critically analysed and its pitfalls are being identified (Mouratidis, 2024), difficulties in implementation are being indicated (Khavarian-Garmsir et al., 2023a, 2023b), and it has attracted controversy nature, even leading even to urban protests (Caprotti et al., 2024).

The aim of this article is to present the concept of the 15-minute city by showing its relationship with other planning concepts and its weaknesses, especially in the context of its potential for real-world implementation. The direct inspirations for writing this article were the huge number of works devoted to the concept, its great popularity, and the increasingly frequent critical voices in the literature. Thus, the article contributes to the broad debate on this concept, and in particular to its practical and analytical dimension.

2. Methods and data sources

The data sources were scientific publications found in bibliographic records in the Scopus database. As of 11 September 2024. On this basis, a bibliometric analysis was carried out based on the results of a query on the search term "15-minute city" or "15-minute cities". The query yielded 162 records, most being articles (113), then conference proceedings (25), book chapters (15), reviews (7) and one book. The vast majority were in the field of social sciences (116).

The above bibliometric data found in Scopus were the starting point for creating networks and clusters of co-occurring keywords and co-occurring citations. This task was accomplished with the application of VOSviewer (Van Eck & Waltman, 2014).

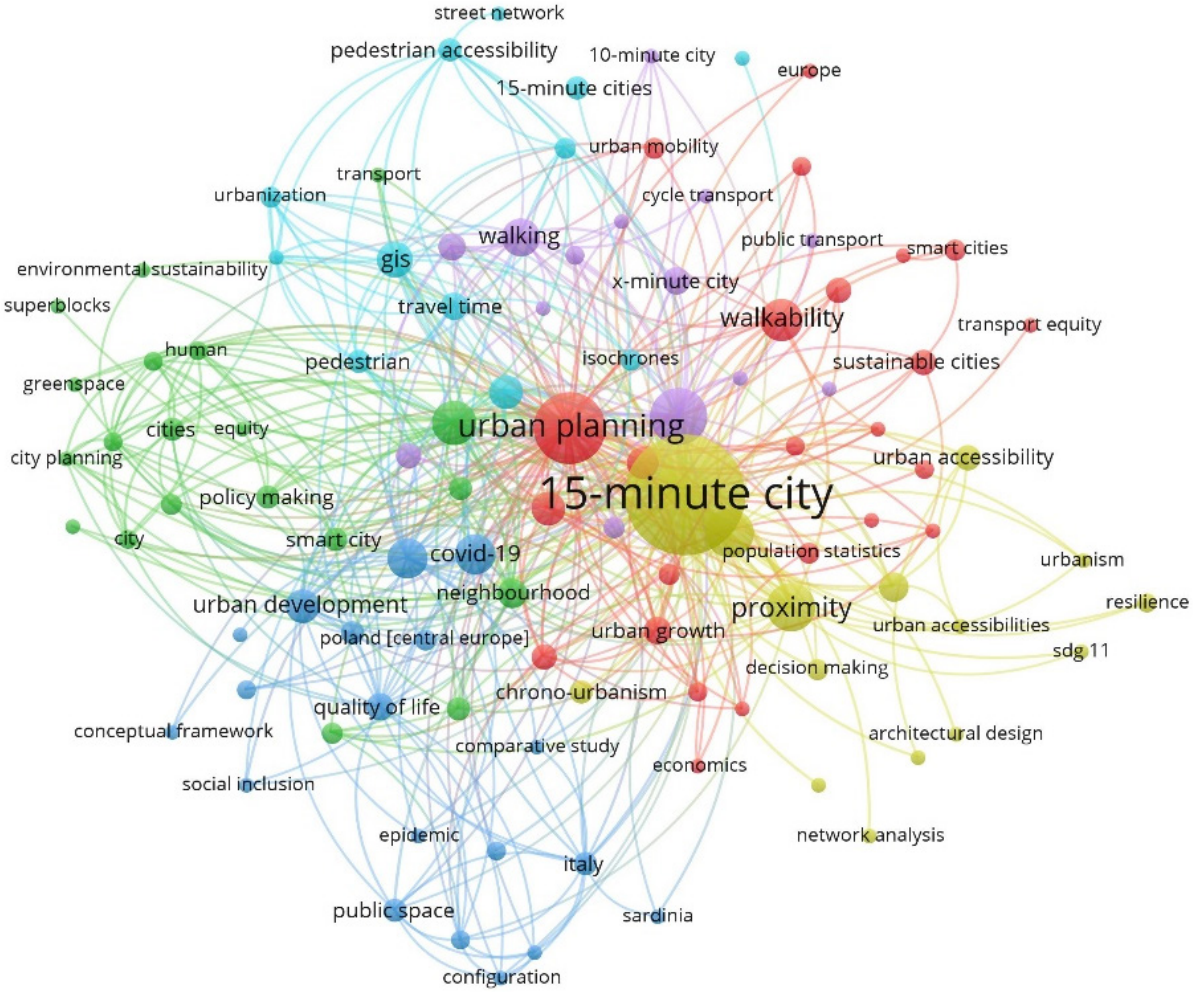

Fig. 1. The output of the term co-occurrence analysis for the whole 15-minute city topic, performed in VOSviewer. Network visualization. The figure shows the physical distances among terms present in titles and abstracts of the literature analyzed, providing clusters of networks of co-occurring terms
Source: own study based on data retrieved from Scopus (access on 11 September 2024)

The analysis of co-occurrence of keywords with the threshold of minimum number of co-occurrences set for two results in 104 co-occurring words and six different clusters. This means that, out of the total number of co-occurring keywords (1,056), only 104 co-occur with other keywords at least three times. They can be grouped in the six clusters shown in different colours on the map. The overall map also shows peripheral terms that are the most distantly related to "15-minute city", such as "street network" or "active travel".

A closer look at the map leads to the final conclusion that the concept of 15-minute city appears most often in the context of urban planning, accessibility, sustainability, urban area and proximity. However, the issue of Covid-19 is still high on the agenda and reveals a close relation to the 15-minute city.

Visualisations focus on network relations (Fig. 1, Fig. 2). In general terms, the closer two keywords are to one another, the more strongly they are interrelated. The links present the relations between individual keywords.

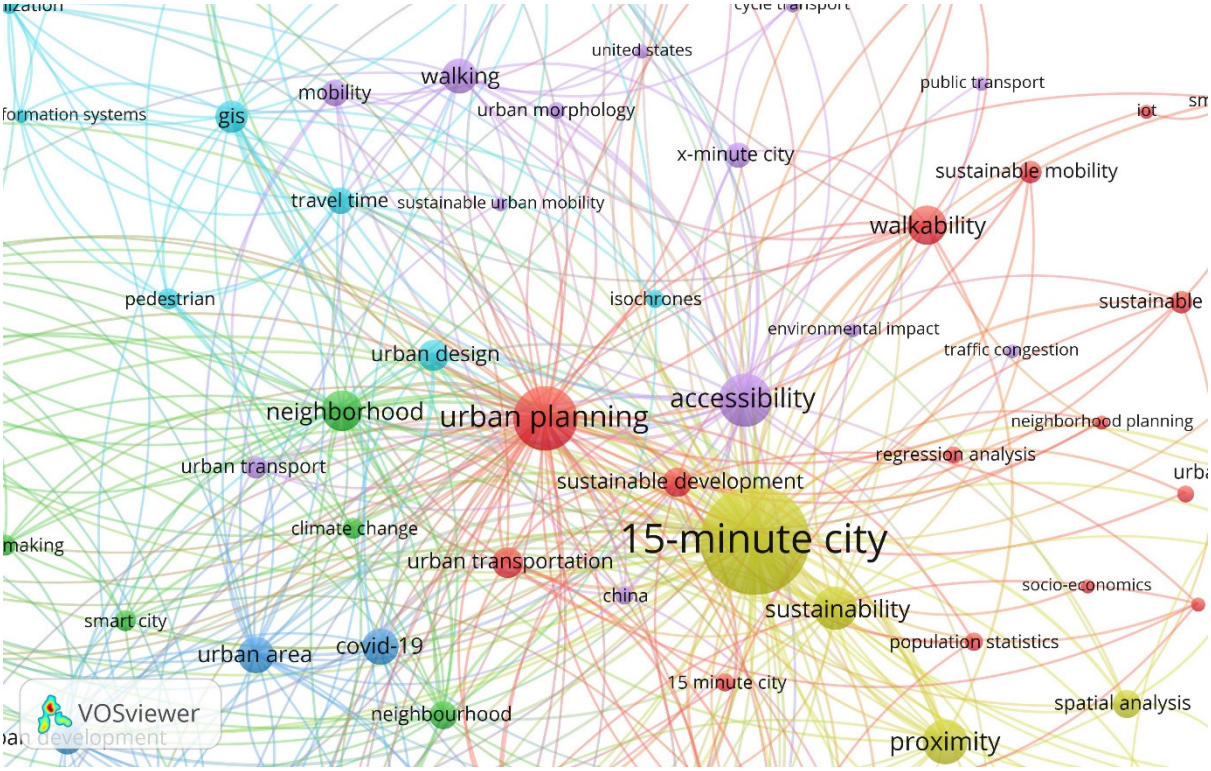

Fig. 2. Network visualization. The output of the term co-occurrence analysis for the whole 15-minute city,, performed in VOSviewer. The figure shows the physical distances among terms present in titles and abstracts of the literature analyzed, providing clusters of networks of co-occurring terms
Source: own study based on data retrieved from Scopus (access on 11 September 2024)

The visualisation below is an "overlay visualisation" (Fig. 3). It is very similar to a network visualisation, but the colours of items have a different meaning. The colours are user-defined and are represented in a colour bar in the bottom right corner of the visualisation. The example below presents colours that indicate average year of publication.

The analysis indicates that the idea of the 15-minute city is an emerging topic in urban planning. Most of the keywords related to this concept and the titular keyword itself presented in the visualization have been used in articles or conference papers published since 2021.

The same conclusion can be drawn from the overlay visualisation of citations of particular documents (Fig. 4). For this, the minimum number of citations of a document is set at three. Of the 162 documents analysed by VOSviewer, 80 meet this criterion. That means that 80 articles are cited at least three times by other documents.

As shown in the visualisation above, the documents – that is articles and conference papers including the keyword "15-minute city" – generally date from 2021 onwards (Fig. 4). The greatest item indicates that Carlos Moreno, whose texts have a total 713 citations, is by far the most-cited author in the literature on 15-minute cities. His article, co-authored by Zaheer Allam, Didier Chabaud, Catherine Gall and Florent Pratlong "Introducing the '15-Minute City': Sustainability, Resilience and Place Identity in Future Post-Pandemic Cities" appears as a cornerstone of the literature, being the most-cited text.

The data collected thus reflect the state and intensity of research on the 15-minute city concept and the main related research areas.

3. The 15-minute city concept: main assumptions

The 15-minute city has been defined by C. Moreno and his colleagues as a city in which "locals are able to access all of their basic essentials at distances that would not take them more than 15 min by foot or by bicycle" (Moreno et al. 2021: 100). As these

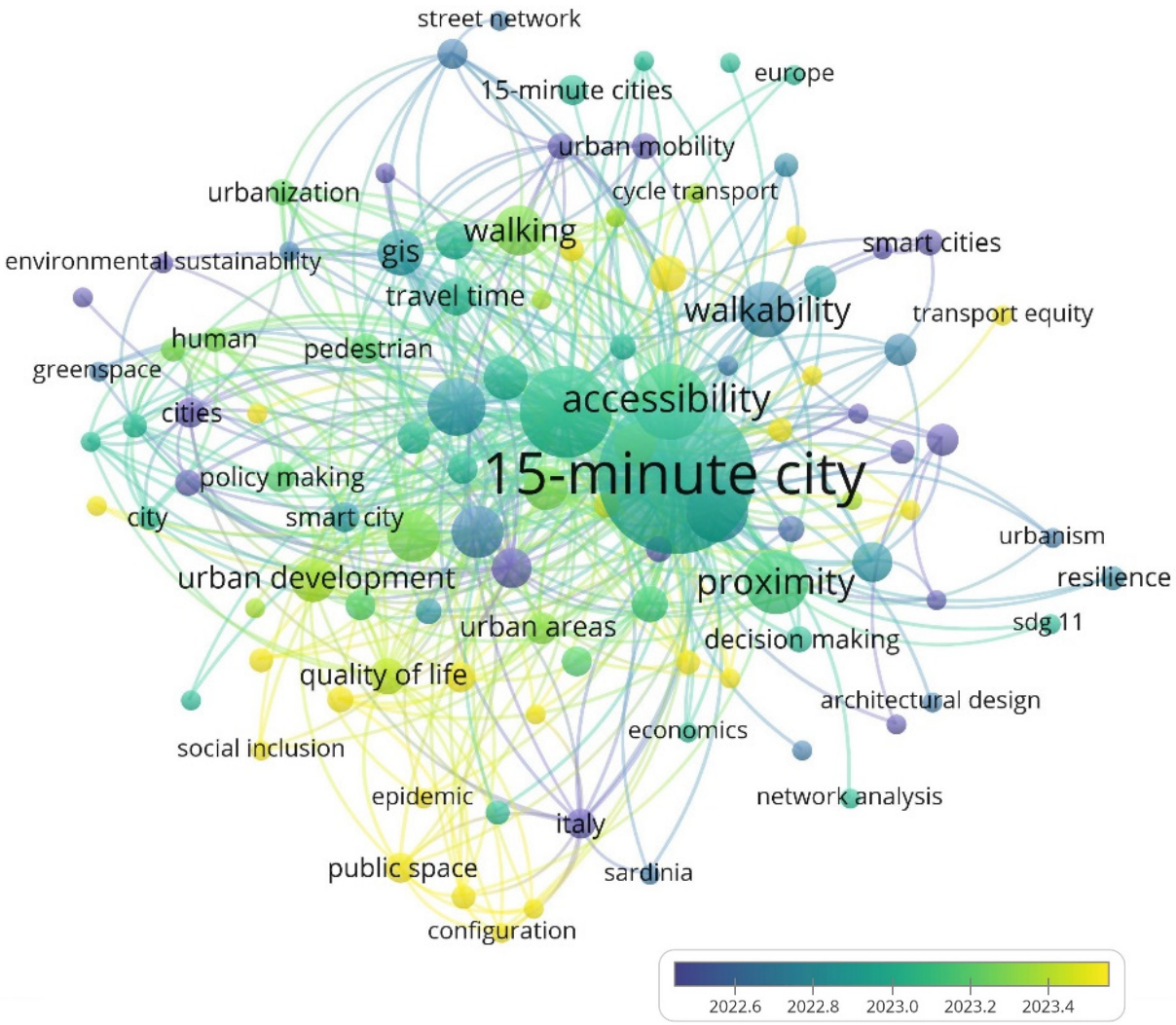

Fig. 3. Overal visualization. The output of the term co-occurrence analysis for the whole 15-minute city topic, performed in VOSviewer. Source: own study based on data retrieved from Scopus (access on 11 September 2024)

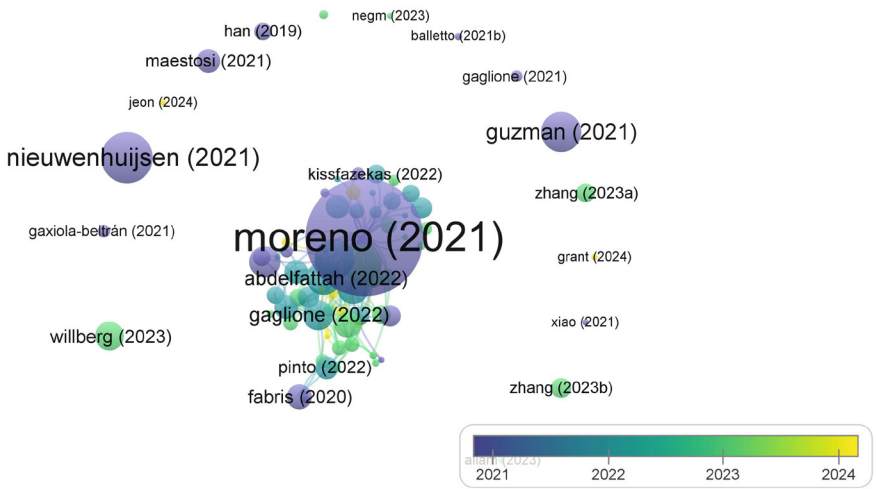

Fig. 4. Item density visualization of core references direct citation analysis
Source: own study based on data retrieved from Scopus (access on 11 September 2024) and analysed with VOSviewer

authors further state, it offers a new perspective on chronourbanism, complementing existing ideas about building more humane urban structures and safer, more resilient, sustainable and inclusive cities (Moreno et al., 2021). Central to the concept are people – their needs and their quality of life. And it is based on the theory of chronourbanism, which Osman et al. (2020) understand as being concerned with the primacy, in urban environments, of temporal distance over distance in space. Basing the 15-minute city concept on the idea of chronourbanism involves reformulating the relationship between space and time in everyday human life, where space is only important when it is linked to the temporal dimension (Moreno et al., 2021). As Mocák et al. (2021) note, the concept of chronourbanism is directly based on the ideas of T. Hägerstrand and his geography of time, which talks about the different ways in which individuals and different groups use space during the day. As Abdelfattah et al. (2022: 331) note, this implies the need to move from urban planning to urban-life planning.

To achieve this, according to Moreno et al. (2021) city planning should take into account four key dimensions: (a) density, (b) proximity, (c) diversity and (d) digitalisation, with this last having been added after cities experienced the COVID-19 pandemic. According to Allam et al. (2021), three were developed based on principles that had been formulated by, among others, such famous urban planners and architects as J. Jacobs in *The Death and Life of Great American Cities* (Jacobs 1961), C. Alexander in, e.g. *A Pattern Language: Towns, Buildings, Construction* (Alexander et al. 1977) and later works Lehmann (2019) and L. Krier in "*The city within the city*" (1984). A common feature of their works was the need to change the approach to city planning from a car-oriented city to a human-centred city, in order to restore its human scale. It was also about recognising the relationship between urban planning and quality of life.

The first of these dimensions – density – is the crucial dimension of the city and its built environment. It includes maintaining population density at a level that provides residents with adequate access to basic facilities without the need for private vehicles. At the same time, it will provide a critical density for the viability of local services and businesses located within walking distance, and thus also for the creation of local jobs (Moreno et al. 2021, Allam et al. 2022).

The next dimension, proximity, is considered in this concept from both a temporal and spatial point of view, with an emphasis on relocating urban resources and services to bring them closer to places of residence. In accordance with the philosophy of chronourbanism adopted by Moreno, it will not only save commuting time but also strengthen social contacts between residents, encourage lifestyle changes, improve health and, consequently, raise the quality of life in cities. The key nature of the proximity dimension stems from the fact that it has a positive impact not only on reducing demand for transport but also on building social relationships and strengthening bonds (Allam et al. 2021).

Diversity, on the other hand, aims to create socially diverse districts characterised by cultural pluralism and at the same time create conditions of accessibility, not only spatial but also economic, for all groups of residents, regardless of social class, wealth, race, nationality, age or gender. It also creates employment opportunities and provides social services to groups particularly vulnerable to exclusion. Moreover, the 15-minute city envisages the creation of communities whose members have an influence on key decisions in the planning and development of the district (Moreno et al., 2021).

The last of the proposed dimensions, i.e. digitalisation, similarly to the Smart City idea, proposes the use of digital tools and solutions to improve quality of life in cities (Szymańska, 2023; Szymańska, Lewandowska & Korolko, 2019). The use of modern technologies reduces the use of transport, saves time and reduces costs. This dimension became especially important during the COVID 19 pandemic because it allowed many needs to be met without leaving home and thus allow social contacts to be temporarily limited for significantly improved health safety. The post-pandemic reality has perpetuated many of these behaviours, e.g. remote work, online shopping, cashless transactions, virtual communication and interactions, which is why digitalisation is considered essential to implementing the other three dimensions, none more so than proximity, which is key to the 15-minute city concept (Moreno et al. 2021).

The main goal as outlined by the framework of the 15-minute city concept is, as already mentioned, related to improving quality of life at both individual and societal levels. However, as Allam et al. (2022) states, there are also claims in the literature (e.g., Kasraian et al. 2017) that cities following these principles have greater economic potential than conventional ones created to facilitate vehicular flow rather than human interaction. Therefore, the benefits predicted by the authors of the 15-minute city concept are multidimensional.

4. The 15-minute city concept: its relation to other concepts of urban development

The concept of the 15-minute city has brought new value to considerations on urban planning in terms of addressing climate challenges and situations caused by the Covid-19 pandemic in cities, as well as the digitalisation of many aspects of modern life, but it is based on principles established by many earlier concepts of organising urban space. These relationships can be considered both historically, taking into account the evolution of the concept of urban planning, and contemporarily, taking into account planning ideas that are similar but either go by different names or focus on selected aspects of urban planning, such as the "compact city" (Dantzig & Saaty, 1973) the "Walkable Neighborhood" (Moudon et al., 2006), or "Cities for People" (Gehl, 2013).

The most prominent of the origins of the 15-minute city concept is undoubtedly the "garden city" (Khavarian-Garmsir et al., 2023a) developed at the turn of the 20th century by the British planner Ebenezer Howard in response to rapid urbanisation and excessive population density in London at that time. Even though this concept was created in completely different conditions and at a different stage of urban development, it exhibits certain analogies. Howard's concept was the first deliberate attempt to solve social and health problems through urban design (Howard at al., 2013). Also, the dividing of a city into self-contained satellite towns of strictly defined numbers of inhabitants was among the earliest attempts to include neighbourhoods in city planning. Howard also emphasised the appropriate provision of commercial functions and workplaces and, similarly to the 15-minute city (FMC) concept, equal access to green areas located around the central city.

Proximity and access to all basic services near the place of residence was also a planning principle adopted by another planner, this time in the USA, C. Perry. His neighbourhood unit concept was focused on the neighbourhood as the basic planning unit (Perry, 1929). Inspired by E. Howard's concept (Howard's 1898 book *To-morrow a Peaceful Path of Real Reform*, reprinted in 1902 under the new title *Garden Cities of To-morrow*, contains such a vision of cities), he proposed the separation of units of specific population size and density that would be equipped with primary schools, parks, meeting places, churches and other necessary services. They were to be based on pedestrian access to all these amenities close to places of residence, which would strengthen their social cohesion. Another important assumption was to move car traffic outside, which would increase safety of movement.

The concept of the "neighbourhood unit" can broadly be considered one of the inspirations for the emergence of the FMC concept, because it was the concept of a neighbourhood unit (planned for 5,000–10,000 people) with full socio-technical infrastructure (schools, shops, cinemas, playgrounds, parks, etc.) that played an important role in shaping the layout of the residential district (estate/neighbourhood) to be relatively self-sufficient. In Poland, one example of a city planned this way is Nowe Tychy, which began life with the construction of the first residential neighbourhood in 1950 (assigned the letter "A"), with subsequent housing estates being assigned letters in alphabetical order. The general designers of the city (excluding neighbourhood A) are Kazimierz and Hanna Wejchert. An example of a city with neighbourhood units is Chandigarh, the capital of Punjab in India. Chandigarh was built as "a city unburdened by tradition, a symbol of the nation's future". Many of the buildings and layouts of individual neighbourhood units in Chandigarh were designed by the French urban planner and architect (born in Switzerland) Le Corbusier in the 1950s. However, it is worth emphasising here that Le Corbusier was the city's second architect, as the initial city plan was developed by American architect-planner Albert Mayer, who worked with Polish-born architect Matthew Nowicki. After Nowicki's death, Le Corbusier and his team of architects were included in the project in 1950 (Szymańska, 2007, 2013)

However, going back further, it should be remembered that the type of spatial organisation promoted by FMC – a concept based on proximity and pedestrian accessibility of the most important facilities, with a dense street grid and compact development – was characteristic of cities from ancient times to industrial times. This long-standing scheme of spatial organisation was revolutionised by the development and popularisation of road transport beginning in the 1920s in the USA and the 1950s in European countries and most countries around the world. Interestingly, this did not escape the attention of H. Hoyt, who in the late 1930s revised E. Burgess's earlier model of the concentric city, developed within the Chicago School, by developing a sector model that included the development of road transport in cities. However, it was not a planning concept, but rather a demonstration of the influence that the new phenomenon was having on the city's socio-spatial structure.

As already mentioned, the FMC concept is based on a critique of modernism and its assumptions, i.e. the separating-out of the main functions of work, transport, housing and recreation, and of basing city planning on road transport, which entails high social, economic and environmental costs. Therefore, in its genesis it fits perfectly into the trend of post-modern urbanism, whose principles are largely consistent with the concept of the 15-minute city (Allam et al., 2022). The ideas of modernism, as C. Jencks (1973) states, collapsed along with the tower blocks of the modernist Pruit Igoe housing estate in the USA. This trend was born in the mid-20th century and developed in its final two decades. An important element of this trend was new urbanism, whose main theorists were the aforementioned L. Krier (1984) and C. Aleksander (1977), but also the icon of post-modernism J. Jacobs. Therefore, the inspirations for this trend had already been expressed by the authors of the 15-minute city concept (see Moreno et al., 2021; Alam et al., 2022).

The growing importance of climatic challenges and awareness of the finiteness of natural resources led to the emergence in the 2000s of a new paradigm of urban planning based on the principles of sustainable development and referred to as "eco-urbanism" (Khavarian-Garmsir et al., 2023a). These challenges were also a priority for the creators of the 15-minute city idea and, like those mentioned earlier, significantly shaped the final concept. According to Szymańska (2007, 2013, 2023) and Khavarian-Garmsir et al. (2023a), eco-urbanism includes the eco-city, smart city, green city and resilient city, which is why these models are seen as influencing the 15-minute city concept.

The latest concept that has influenced the shape of the FMC concept is that of the smart city, which is defined in the literature as a management-focused approach that uses social capital to improve the quality of life of city-dwellers. Smart city principles contributed directly to one of the key dimensions of the FMC concept, which is digitalisation. The use of information and communication technologies (ICT) as a tool for urban digital transformation, as assumed in this concept, is intended in the 15-minute city primarily to serve the implementation of the three remaining dimensions and to improve the quality of life in cities (Allam et al., 2022).

The planning ideas described above were present in public discourse before the creation of Carlos Moreno's FMC concept, and many almost directly inspired the concept and contributed to its final shape. And as Allam et al. (2022) report, having such broad references allowed for a synergistic effect.

5. The 15-minute city concept: the criticisms

The undoubted success of C. Moreno and his colleagues is attested by the multitude of works referring enthusiastically to the potential of the 15-minute concept and by the number of cities whose authorities are implementing its principles, even treating it as a key issue in election campaigns or as a showcase of their management. They managed to include in one catchily named, seemingly simple idea many ideas that combine the principles of earlier proximity-based planning models based on the neighbourhood as the basic spatial unit of the city.

The concept, although it has gained enormous popularity in recent years, has its weaknesses, especially in terms of its potential for practical implementation. It also has limitations in its (frequent) use as an analytical tool in studies of the spatial accessibility of urban facilities (see, e.g., Gaglione et al., 2022, Zakariasson, 2022). Criticisms of this theory, attempts to revise it and identify its conceptual weaknesses, and related controversies have all been the subject of works by, among others, Beim (2021), Khavarian Garmirmsir et al. (2023a, 2023b), Cprotti et al. (2024) and Mouratidis (2024).

Although there is no doubt that the principles of the 15-minute city can help improve quality of life in a city, it should be remembered that, although seemingly based on fairly easy-to-implement assumptions, the concept has multiple dimensions and aspects, and its implementation must take into account many conditions (Kozar et al., 2024). This is all the more important because the FMC concept is not about creating new urban areas but about redesigning existing ones to make them consistent with its four main dimensions.

In this regard, attention should be given to Moutartidis (2024), who, based on an extensive literature review, critically (though, as he himself emphasised, not unappreciatively) analysed the FMC concept, both as a theory and as a tool for spatial analysis and identified seven challenges, describing them as the "pitfalls" of the concept. They relate to the originality of this concept, the unreality of some of its provisions (e.g., strong decentralisation or self-sufficiency), inconsistencies in proposed forms of movement, the under-valuing of nature in the city, and a range of poorly expressed or imprecise assumptions, all of which limit its usefulness for urban spatial analyses. The objections formulated by Moutartidis are of varying importance, and they are not exhaustive because the FMC concept is a

work in progress that is still the subject of scientific research and interpretation, and attempts are still being made to implement it. Therefore, in this part of the work, the authors will present these and other of the concept's weaknesses and pitfalls and even certain myths that have arisen around it, whether from the literature or from our own research into cities.

Undoubtedly, one such myth regarding the 15-minute city concept, and identified by K. Moutartidis (2024) as a "pitfall", is that it is an original concept. In fact, on the contrary, and as shown earlier in this article, the concept is not particularly innovative, in light of other solutions having appeared earlier or having been developed almost in parallel. Referring to the idea of proximity as a basis for urban planning, it draws on the assumptions of E. Howard's garden cities, C.A. Perry's neighbourhood unit, and, in the trend of building social cohesion and human scale, on post-modernism and new urbanism (from the previously cited works of L. Krier, 1984, J. Jacobs, 1961 and C. Alexander, 1977 referring to chrono-urbanism). The global climate crisis and the experience of the pandemic have meant that it has been treated almost as a panacea (e.g., Pinto & Akhavan, 2021, Geropanta & Porreca, 2024), although in this respect it does not offer much more than has been proposed so far in other concepts of proximity, e.g. the compact city, the resilient city, the sustainable city, the principles of eco-urbanism and, in particular, the green city. Meanwhile, in the dimension of digitalisation, FMC has incorporated the principles of the Smart City concept.

The still-popular myth of originality identified by Moutartidis (2024) as a pitfall of the concept is relatively easy to debunk if one knows even the basic history of urban planning concepts since the end of the 19th century. Interestingly, according to the concept's apologists (Allam et al., 2022), the originality of the FMC concept lies in its combining various urban paradigms and in their synergistically increasing the benefits that such broad concepts and approaches provide. At the same time, as those authors state, the 15-minute city concept, although similar in its assumptions to many previous planning models, differs from them in having gained importance through strong political branding and pragmatic implementation both politically and in terms of compliance with the SDGs of the Agenda 2030 and the Paris Agreement.

However, what is original in the FMC concept, as noted by Moutartidis (2024), is its strong move towards decentralisation with the emphasis that all the most important needs, including work, should be met in close proximity. By contrast, many of the concepts cited above only mentioned selected services. Moutartidis believes this to constitute another pitfall because, while this can be expected of trade, recreation and basic healthcare, it is unrealistic (especially in this era of the high specialization of work) to expect it of workplaces. Although remote working (part of the "digitalisation" dimension of FMC) gained importance after the pandemic, it is still limited to a certain group of professions. Moreover, some companies have been withdrawing from full remote working, opting for a hybrid model or even a complete return to onsite working (as written about by, e.g., Rowley, 2023 and Tahlyan et al., 2024).

The need to redistribute not only jobs but also other basic services, especially commercial services, seems to be, according to those authors, a serious impediment to implementing the FMC concept. Within the important density dimension of the 15-minute city, it appears very difficult, and sometimes impossible, to achieve a level that would support the profitable operation of local businesses. It is difficult to design this in a top-down manner if it is not based on a market analysis of the actual business owners operating or planning to operate in a specific location. Moreover, given the variability of both demand and supply for specific goods and services in a market economy, it seems impossible to rigidly design it in a way that would achieve this critical density. This is only possible for public services, e.g. education, basic healthcare or recreational areas. For the same reason, it is impossible to achieve the assumed saturation of districts with an appropriate number of jobs, which are largely created by entrepreneurs. This weakness, highlighted by Khavarian-Garmsir et al. (2023), is, according to Moutitidas (2024), a source of problems in implementing another important assumption of FMC. It makes it impossible to achieve the self-sufficient neighbourhoods required to eliminate the use of transport; this thus undermines the main assumption of FMC.

Another weakness of this concept, identified by Kavarian Garmishir et al. (2023a), is its physical determinism. This involves addressing existing challenges such as public health, climate change, economic prosperity and social inclusion by designing and modifying the physical structure of the city. According to those authors, it is unrealistic to expect that physical intervention in urban planning can solve such complex and multidimensional problems, as these are influenced not only by physical factors but also by social, cultural and economic factors. Kavarian Garmishir et al. (2023a)

also criticise the lack of consideration of housing issues and possible implications for gentrification of areas deemed more attractive to live in because the concept has been implemented. Such gentrification would not, of course, reduce inequalities but might even increase them. An increase in housing prices in areas considered to have a higher quality of life may have a similar impact, obviously making them less widely available to the less-affluent and thus working in opposition to certain intended benefits of the 15-minute city. These concerns are justified, but they can only be verified ex post, while implementing the concept.

Another impediment to the implementation of the 15-minute concept is, according to Khavarian-Garmsir et al. (2023a), its failure to cope with existing rigid urban spatial structures or with non-compact cities with a car-dependent, expansive layout. This applies mainly to cities in North America and Australia, where implementing the 15-minute city would require a thorough reorganisation and modernisation of the urban structure, which is difficult to achieve in practice. Following this line of thought, it should be added that, since the FMC concept supposes the reconstruction of central areas, it will be very difficult to implement in suburban areas. Thus, implementing it in city centres may widen the gap between functionally diversified centres well-supplied with services and jobs and suburban service deserts. This applies particularly to those built during times of intensive suburbanisation; such cities are particularly prevalent in post-socialist countries, where suburbanisation was relatively fast and characterised by a service provision policy that failed to keep up with the construction of new residences.

Furthermore, the FMC concept is made ambiguous and difficult to interpret by its disregarding of public transport, which Mouratidis (2024) identified as another of its pitfalls. Accessibility in FMC is considered only in terms of pedestrian traffic and cycling. However, there are authors who, both when analysing this concept and discussing examples of its implementation, include public transport in its principles (e.g., Di Marino et al., 2023). This significantly changes and complicates the interpretation of the principles of FMC due to the difficulty in taking into account speed of movement (including frequency of service and location of stops). This pitfall is related to another identified by the same author, namely the ignoring of interpersonal differences in walking and cycling. Apart from individual differences in age, gender and level of mobility, it should be added that the authors of FMC did not take into account the significant difference between travel time by bicycle and on foot. The benefit of cycling is that it provides a wider geographical radius of activity than walking. Moreover, as Beim (2021) notes, the authors of the FMC mention the fifteen-minute journey sporadically in the context of cycling, focusing instead on walking. Considering that the average speed of a bicycle can easily be four times that of a pedestrian, the surface areas available to these two means of locomotion can differ by a factor of sixteen. A weakness of the concept is therefore that it conflates these two forms of movement without distinguishing the spatial ranges they provide access to.

The weaknesses of FMC as an analytical tool raised by Mouratidis (2024) include its imprecision in determining how to measure access to services (number of facilities versus their capacity) and in the level of aggregation of specific facilities of various levels (e.g., schools and kindergartens, pharmacies and doctors), which is a genuine barrier to its being used to measure accessibility. Baim (2021) has a similar opinion and believes that there are difficulties in using the tool due to the lack of specificity of the concepts used (e.g., how to precisely determine the range of a quarter of an hour, what average pedestrian speed to adopt, or what population density is optimal for the operation of specific services). However, the identified barriers do not prevent the use of FMC as a tool for urban spatial analysis, as evidenced by the functioning of applications facilitating this task (Pajares et al., 2021, after Baim, 2021). And the connections between concept and practice, though far from perfect, can be considered a strength and a motivator for development, both theoretical and practical (research, planning and commercial). To sum up the above considerations, it is hard to disagree with Baim (2021) that the concept of the 15-minute city is an unfinished theory that requires the parameterisation of individual components and their skilful adaptation to the socio-economic conditions of individual cities.

6. Discussion and summary

Will the 15-minute city concept become a new paradigm for urban development and gain popularity around the world? It is probably too early to answer this question in the affirmative. Although the assumptions of the concept are very good, we believe that it remains more a concept than a common, real-world planning practice.

It is highly desirable to draw attention to the issue of urban development in the context of sustainable urban development and quick access to basic services (shops, schools, kindergartens and nurseries, workplaces, healthcare centres, rest areas, etc.) without the need to use a car. The idea and concepts of the smart city align with this challenge, and the concept of the 15-minute city is a component of the smart city (Carlos Moreno, smart city specialist, Szymańska & Korolko, 2015; Szymańska, 2023). Reducing daily journeys to fifteen minutes on foot, by bicycle or by public transport (residents can often use free public transport) helps reduce congestion in the city, reduces air pollution, improves quality of life, improves the capacity for basic needs to be met locally, promotes a healthy lifestyle, and can help create more integrated communities. This was important during the COVID-19 pandemic, when, due to the prevailing sanitary regime and longer journeys being recommended against or restricted, residents met their basic needs in their immediate locale "within a stone's throw". It can be said that the concept of the 15-minute city took on a different, tangible human dimension. Thanks to the concept of the 15-minute city, which is part of the broader concept of smart cities, the ecological awareness of the inhabitants of our planet is growing.

The advantages of introducing the 15-minute city model include reducing private transport and providing quick access on foot or by bicycle to basic services, workplaces, etc. located nearby. This in turn reduces air pollution, improves the environment and improves the health of residents (increasing exercise and physical activity while reducing pollution). In addition, residents of such "fast" districts and housing estates are more likely to benefit from local trade and services, contributing to the development of the local economy. Reducing car traffic will entail a reduction in the city's expenditure on maintaining the communication infrastructure. And the city will win back spaces previously reserved for car transport (parking lots) that it can revitalise by transforming into public spaces (parks, squares, playgrounds, etc.). "Cities should be for people, not for cars," say many smart-city leaders. Such principles have been implemented by, among others, the mayor of Curitiba, making that city one of the world's first examples of a smart city, which has been implementing the idea of sustainable development in every sphere of activity and has become a model for many cities around the world (Szymańska, 2007; Szymańska, 2013; Szymańska, 2023: 167–180).

However, it should not be forgotten that the 15-minute city concept may also have some limitations or disadvantages. One of them is the addiction to cars and car culture often referred to as "autoholism". And here the implementation of the 15-minute city model may encounter resistance (Núñez, et al., 2024). The car is so deeply embedded in our private and social lives, and we know how much it often harms us (lack of exercise, air pollution, etc.), that it continues to rule us (e.g. from research on Poles, see Dybalski, 2019). As Marta Żakowska (2023) writes, the car is a symbol of prosperity and success, and motorisation is a major feature of contemporary culture; our cities are ruled by automotive populism, and its catchy slogans seep into our hearts like exhaust fumes into our lungs. Cars are present in all areas of private and social life, although we have evidence that they destroy our lives and health (Żakowska, 2023: 272).

Moreover, the attractiveness of the 15-minute city space may push up real-estate prices in these places, making them unavailable to less-affluent social groups, whose social inclusion is thereby limited.

Moreover, adapting an existing city (or its housing estates or districts) to the 15-minute city model may involve huge costs for cities to revitalise these spaces, and not every city has the appropriate budget to implement this model in its urban plan. Of course, implementing 15-minute city solutions is by its nature highly advisable and brings enormous social and environmental benefits, but in the initial phase it may encounter some resistance for financial reasons.

We should also ask ourselves about larger companies: can they find places to invest and develop their businesses in a 15-minute city close to the homes of potential employees?

A 15-minute city cannot be an island, it must continue to develop its external connections (economic and communication) and function as one of the cogs in the socio-economic development of the city and region.

Many cities recognise the benefits of the 15-minute city concept and are starting to introduce (where possible) elements of this concept in their urban planning strategies. Both city authorities and residents recognise its significant development potential and the importance of compact, integrated, multifunctional residential estates and districts (with basic services and amenities) that will help reduce the need for long commutes and improve the quality of life and the natural environment. Broadly, implementing the FMC concept may affect the sustainable and integrated development of cities.

Despite the growing popularity of the concept of 15-minute cities, it should be remembered that cities

are spatio-temporal structures shaped by a long-term process and exhibiting surprising resilience; existing structures are often difficult to change or rebuild, and implementing this concept thus often involves numerous and various challenges. Firstly, most cities, when introducing the principles of the 15-minute city, must rebuild and adapt the urban infrastructure (which has usually thus-far been car-oriented) and orient it towards walking, cycling and public transport. Secondly, the lack of the appropriate public spaces and green areas that are integral to 15-minute cities is a further challenge.

However, it should be remembered that implementing the concept of 15-minute cities, which is part of the broader concept of smart cities, requires time, financial outlay and cooperation among entities, including city authorities, residents and entrepreneurs. Urban planners should apply the basic principle that what counts is not only what is today but also what will be tomorrow. For example, instead of trying to bring back to life often dysfunctional structures of cities (districts, housing estates), problems can be solved in the construction of new parts of cities.

Of course, it is important to remember that the idea of creating smart cities, including 15-minute cities, is of great import to modern urbanism, but it is also important to understand that we can contribute to their creation ourselves. Success, sustainability and integrated development require not only the latest (often very expensive) technologies but also innovative and creative communities and the vision of city leaders and social activists. The game of the city requires out-of-the-box thinking and an integrated approach that takes into account all aspects of life in the city. It should be played not with one finger, but with many, so that all the chords (the matters demanding attention) ring out (Szymańska, 2023: 251). At the same time, it should be remembered that a lot can be achieved by directing urban policy and improving what already exists, for example by shaping ecological awareness, as well as amending the urban planning and construction code.

The biggest task that awaits residents and city authorities is therefore to improve the fabric of existing cities. The concept of the 15-minute city (as one of the components of the smart city concept) represents an opportunity and a challenge that the 21st century is posing to humanity and our entire planet. This is all the more important since the number of urban dwellers is constantly growing. It has been estimated that, by 2030, almost 60% of the world's population will live in cities, and 68% by 2050, and if we do not implement various development programmes that include sustainable and integrated development, including the concept of smart cities and the 15-minute city concept that is integral to it, , this state of affairs may significantly worsen the condition of the natural environment and the comfort of life (Szymańska, 2023).

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