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# The benefits of the 15-minute city – a logistical approach

## Korzyści 15-minutowego miasta – ujęcie logistyczne

**Abstract.** The human desire to increase one's comfort while traveling has become one of the guidelines for designing transport networks in cities. Space in cities is limited, and city authorities, residents, entrepreneurs, and other users compete for it. Contemporary urban development concepts assume the pursuit of sustainable development, which is not easy as it often requires reconstructing the existing urban structure. The aim of the article is to present the benefits of the concept of a 15-minute city in terms of logistics (i.e., transport infrastructure solutions). Among the main benefits – from the city's perspective – from the implementation of the model the following can be distinguished: fair planning decisions, reduction of traffic, improvement of air quality, increase in car-free space, and stimulation of the local economy. The benefits directly noticeable by the residents are also important: greater availability of goods and services, reduced dependence on cars, better health and well-being, a stronger sense of belonging to the local community, and an increase in the value of real estate. Implementing the 15-minute city model requires careful planning, investment, and time, but given the benefits listed above, it is an investment that will start to pay off almost immediately.

**Key words:** FMC, 15mc, sustainable development, transport, urban area

**Synopsis.** Dążenie człowieka do zwiększenia własnego komfortu podczas podróżowania stało się jedną ze swoistych wytycznych przy projektowaniu sieci transportowych w miastach. Przestrzeń w miastach jest ograniczona i konkurują o nią władze miasta, mieszkańcy, przedsiębiorcy oraz pozostali użytkownicy. Współczesne koncepcje rozwoju miast zakładają dążenie do rozwoju zrównoważonego, co nie jest łatwe, gdyż wymaga w wielu przypadkach przebudowy istniejącej struktury miejskiej. Celem artykułu jest przedstawienie korzyści koncepcji 15-minutowego miasta w ujęciu logistycznym, tj. w odniesieniu do rozwiązań infrastruktury transportowej. Wśród głównych korzyści – z perspektywy miasta – z wprowadzenia modelu można wyróżnić następujące: sprawiedliwe decyzje planistyczne, zmniejszenie ruchu ulicznego, poprawę jakości powietrza, zwiększenie przestrzeni wolnej od samochodów oraz pobudzenie lokalnej gospodarki. Ważne są również korzyści za-

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uważalne w sposób bezpośredni przez mieszkańców: większa dostępność towarów i usług, zmniejszenie zależności od samochodu, lepsze zdrowie i samopoczucie, silniejsze poczucie przynależności do lokalnej społeczności oraz wzrost wartości nieruchomości. Wprowadzenie w życie modelu 15-minutowego miasta wymaga starannego planowania, inwestycji i czasu, lecz wobec wymienionych korzyści – jest to inwestycja, która będzie przynosić pierwsze efekty niemal natychmiast.

**Słowa kluczowe:** FMC, 15mc, rozwój zrównoważony, transport, obszar miejski

**JEL codes:** R41, R58

## Introduction

People have been traveling for centuries, but even short-distance travel (e.g., between villages or cities) took much time, required significant effort, and was both inconvenient and dangerous. Before the first car was created, many engineers tried to create a machine for transporting people and goods. The first examples were self-propelled vehicles, which were designed to enable transportation without the need for horses. In 1769, Nicolas Joseph Cugnot built a steam vehicle with a speed of 3.6 km/h. The first car was built by Carl Benz in 1885, with a top speed of 16 km/h [Focus 2020]. Since then, the car industry has developed rapidly, and cars have improved in terms of comfort, safety, and speed. They have become increasingly desirable and accessible, regardless of the driver's financial situation. Along with the development of the automobile industry, the road network has also expanded, both within cities and between cities, regions, and countries. In cities, cars have changed the dynamics of urban planning, not only leading to a dense network of roads [Brown et al. 2009], but also opening the door to the detrimental consequences of urban sprawl [Moreno et al. 2021]. Roads, transit, and freeways were seen as potential tools for urban renewal, primarily aimed at revitalizing declining central business districts, facilitating slum clearance, and directing growth towards desired areas. In the mid-90s, many American planners expressed the belief that suburban commercial development was primarily a response to the lack of accessibility to downtown, a problem that highways would solve [MacDonald 1947]. At that time, the focus was on improving road accessibility in different city zones, without anticipating the flood of cars that would come to congest cities at the end of the 20th century. The large number of vehicles and traffic have a negative impact not only on the environment (e.g., biodiversity, air quality), but also on the quality of life (traffic jams, tolls, parking fees, difficulty finding parking spaces, wasted time, increasing energy demands); [Gössling 2020].

The COVID-19 pandemic has made accessing public transport in cities more challenging. Restrictions on passenger numbers, the requirement to maintain distance and wear masks, and the fear of infection have discouraged many people from commuting to work or universities using public transport [Tylkowska and Klepacki 2022]. Research conducted in Poland in June 2020 shows that the percentage of drivers who go shopping by car has almost doubled – from 22 to 50%. Interestingly, 80% of the respondents said they would not give up having car – even if they worked remotely [Szubański 2020]. And yet, research from 2018 presented very optimistic forecasts for the increasing use

of public transport buses, metropolitan railways, or carpooling in the Tri-City area, one of the largest metropolitan areas in Poland [Brancewicz 2018]. According to Statista's Global Consumer Survey, more than half of the users surveyed reported using their car for commuting to work (or school/university). While the private vehicle is often indispensable in rural areas, its use is increasingly challenged in cities, where more than half of the world's population now lives. By 2050, this number will increase to two-thirds of the world's population. In the USA, the share of personal cars in the commuting population amounted to 75%, and the automobile still plays a central role in infrastructure financing. On the contrary, in South Korea, public transport (subways, buses, and trains) is the most popular alternative to the car (40% of respondents) compared to 53% of respondents using their cars [Armstrong 2022].

In the Netherlands, Great Britain, and the United States, the number of cities with a carpooling system is constantly growing. This means creating separate lanes for vehicles with more passengers, which allows you to avoid traffic jams. Such a system encourages car sharing and simultaneously enables you to reduce the time and costs required to cover the distance [Kauf 2013]. In Poland, carpooling is not very popular. It is more of a bottom-up individual initiative supported by employers, as is the case in the Tri-City [Carpooling… 2017]. It is less commonly supported by local governments, as in Kraków [Kraków… 2013, No to… 2017].

People move to cities because they believe they can achieve better economic and social opportunities compared to rural areas. However, impact of urbanization is primarily negative. The increasing population density, unplanned growth, and demands of urban environments create several problems. Almost every city and town suffers from transportation issues, including traffic congestion caused by the increased number of vehicles and the inefficiency of public transport systems. This, in turn, leads to an increase in road accidents. Another adverse effect of urbanization is the degradation of the natural environment, resulting in poor air and water quality, pollution, and noise [List of…]. Furthermore, the intensive urban development and lack of green spaces, such as forests, parks, trees, or areas for relaxation from the fast-paced urban life, contribute to the deterioration of the residents' health. Since the invention of the first car, the human desire for comfortable and fast mobility has continued to grow. However, the limited area of cities makes it challenging to accommodate the constant increase in the number of cars through wider streets, more parking spaces, or expressway construction connecting the city center and outskirts. But what if it were possible to live without constantly moving around the city?

## Material and methods

The article aims to present the benefits of using the 15-minute city model and the role of transport infrastructure in implementing this model in selected European cities. To achieve this research objective, the method of a literature review was used. The sources of information were scientific articles and chapters from scientific monographs available in the Google Scholar and Elsevier databases. Articles from internet portals, mainly magazines and specialist portals in the field of real estate and urban planning, constituted a supplementary source.

## Results

### 15-minute city concept

The need to create "cities within a city" has been discussed for a long time [le Clercq and de Vries 2000, Salingaros 2006, McNeil 2011, Daneshpour and Shakibamanesh 2011], but the COVID-19 pandemic undoubtedly had the most significant impact on the development of this concept. At that time, city dwellers strongly felt the lack of access to infrastructure and amenities that would meet their daily needs, and at the same time, they were close to their place of living. Some scientists even emphasize the merits of the COVID-19 pandemic in terms of the technological development of cities. As Pinto and Akhavan [2022] noted, the COVID-19 catastrophe proved that social resilience and urban regeneration must be built starting from a new idea of living in urban spaces. According to Bocca [2021], the functioning of the contemporary city has exploded, showing its shortcomings and underlining the need to interpret it as a fragmentable and self-sufficient entity in an emergency. Kaczmarek [2022] notes that innovative city technologies, which were important in the fight against the pandemic, can also be crucial in ensuring a dynamic city future.

The concept of the 15-minute city was popularized by Carlos Moreno, the Colombian-French scientist. In 2016, he proposed an innovative approach to complex urban development challenges. According to Moreno [2016], the reconciliation of the requirements of a sustainable city and ways of living, working, and leisure requires the transformation of the still strongly monofunctional urban space from the city center and its various specializations towards a polycentric city, oriented towards four main components: proximity, diversity, density, and omnipresence. It is a city where, in less than 15 minutes of walking or cycling, a resident has access to satisfy their basic life needs. This opposes what urban planners have been creating in cities so far – apartments and houses were supposed to be separate zones, away from industry, trade, and entertainment. 15-minute cities should guarantee residents' proximity to six fundamental functions (Fig. 1).

Moreno and the co-authors of the White Paper [2023] indicate that the vision of the 15-minute city aims to improve the quality of life and lead to sustainable development in the city. A vital element of this approach is polycentrism. By introducing the concept of "acceptable" or "reasonable" access times for people (on foot or by bike from home) to reach essential services and activities, the 15-minute city represents a paradigm shift from traditional urban strategies. It questions how individuals use time and space in relation to the spatial and temporal organization of the city. To allow residents to reclaim their time and revitalize their neighborhoods, the "15-minute city" and "30-Minute Territory" (in urban areas) models provide them with the ability to meet their basic needs in hyper-proximity [15 minutes..., Poorthuis and Zook 2023]. Therefore, this approach is not a new urban transport plan, but a new urban vision of a polycentric territory.

Pozoukidou and Angelidou [2022] draw attention to the operation of city authorities and local government in the proper spatial arrangement of public services and various amenities. Numerous studies [Kauf 2013, Borowska-Stefańska and Wojtczak 2019, Pomianek 2020, Abdelfattah et al. 2022, Charnavalau et al. 2022, Domagała 2022, Mieszczak 2022, Gorrini et al. 2023, Lu and Diab 2023, Pawluk De-Toledo 2023, Poorthuis and Zook 2023, Rhoads et al. 2023, Willberg et al. 2023] show that improvements to


Figure 1. Six fundamental proximities of the 15-minute city concept
Rysunek 1. Sześć podstawowych bliskości koncepcji 15-minutowego miasta

Source: own elaboration.
Źródło: opracowanie własne.

transport networks encourage residents to move within their neighborhoods. It is essential to encourage the creation of pedestrian-friendly transport networks within city districts based on the concept of the 15-minute city model. Large cities are getting bigger because they offer many job opportunities. However, the mass relocation of the population in large cities has created huge transport problems. Implementing the 15-minute city model requires strengthening transport networks that promote sustainable solutions that can support the daily walks of residents [Papas et al. 2023]. The allocation of resources on a city-wide scale is a very complex process related to the catchment area for each facility, building density and the general spatial and functional order of the territory. The digitization of public services plays a significant role in simplifying such a complex procedure by providing the necessary online services, favoring equal access to them. On the other hand, allocating resources at the neighborhood level can create a locational advantage that will ultimately lead to spatial inequalities. Therefore, city-scale urban management is crucial in order to ensure city-wide resource allocation without creating spatial disparities.

## Benefits of the 15-minute city model

The primary benefit of having an extensive infrastructure in your housing estate, which significantly affects the quality and comfort of the life of residents, is the lack of need to move around the city. Residents can take care of the most necessary matters locally, saving time and energy. On the contrary to the fears voiced by skeptics, the idea of a 15-minute city – or a self-sufficient neighborhood – is not intended to isolate its inhabitants from the rest of the city or to create closed enclaves [Conspiracy… 2023,

Elledge 2023]. In addition to saving time and energy, creating self-sufficient 15-minute city neighborhoods creates opportunities for local businesses to grow, such as grocery stores, hairdressers, beauticians, restaurants, cafes, toy stores, and bookstores. Providing residents with access to libraries, health care services, nurseries, kindergartens, schools, outdoor sports fields and gyms, playgrounds, or parks (even the so-called "pocket parks") significantly improves the perception of the comfort of living in the area and enhances the quality of life. For this reason, people quite often look for a place of residence near their place of work so that everyday commuting takes as little time as possible. In the intense morning rush hours, a definite advantage of the short distance from home to work will be the ability to cover this route on foot, by bike, or by scooter in several minutes. Moreover, a 15-minute city is a more sustainable type of urban settlement than urban sprawl, as it is less car-dependent, requires less, and, in fact, is cheaper per capita infrastructure [Dempsey 2010, Gössling 2020, Allam et al. 2022, Kaczmarek 2022, Słomka 2022, Papas et al. 2023]. As emphasized by Hyła, the bicycle is a zero-emission vehicle, and with the supportive electric drive, its possible emissivity is negligible. Also, the space consumption of a bicycle in motion is low, and when parked, it takes up less than $1m^2$. Assuming a speed of about 15 km/h, it can take 15 minutes to reach points located almost four kilometers from the starting point. This is four times further than walking, and the available space is up to sixteen times larger. Of course, the condition is the lack of stops, steep climbs, good surface quality, and appropriate traffic conditions [Hyła 2023].

There are various benefits to the 15-minute city concept. Table 1 attempts to divide them into two groups:

- direct benefits to residents;
- benefits for the city as a whole, experienced by the inhabitants indirectly.

The concept of the 15-minute city is gaining popularity. The first city where this idea was implemented was Paris, France. This happened for a reason – the university where the author of the idea works is based in this city. For years, Paris has had an extensive public transport network and many green areas. The Mayor of Paris, Anne Hidalgo, who has been in charge of the city since 2014, announced that her priority is to make Paris, with its more than two million inhabitants, the best living space for its residents. In Paris, more than two-thirds of public space is devoted to public transport. The implementation of the 15-minute city concept involved numerous public investments in the transportation and sustainable development sectors to strengthen governance at the district level. The city banned the most polluting motor vehicles, turned the busy roads surrounding the Seine into a linear park, and expanded the network of public housing in the wealthier neighborhoods. The introduced changes have improved air quality, citizens' mental health, and reduced travel time [Dakouré et al. 2023].

Oxford (UK) is a city where a major change in the organization of car traffic is planned. Starting from 2024, drivers in Oxford will be encouraged to travel around the city using the ring road or public transport, rather than just driving through it. The city council will impose fines on those using city-center roads at certain times by using traffic filters. The new policy doesn't prevent anybody from traveling anywhere, but it does restrict when and where someone can use a car. However, some residents do not accept such solutions [Cunningham 2023, MacGregor 2023].

Table 1. Major benefits of implementation of 15-minute city model
Tabela 1. Główne korzyści z wdrożenia modelu 15-minutowego miasta

| **15-minute city** | |
|---|---|
| **Benefits to a city** | **Benefits for a resident** |
| **Equitable planning decisions.** The concept results in much more equitable planning decisions. Over time, it is likely to make transportation investments less costly, as pedestrians and cyclists are much cheaper to provide an infrastructure for. | **Greater accessibility.** The central advantage of this concept is enhancing accessibility to living, working, commerce, healthcare, education, childcare, and entertainment. This is the primary reason why people choose to live in cities. |
| **A decrease in overall traffic.** Reduced traffic leads to fewer car accidents, less intervention by the city guard regarding illegal parking, and less long-term damage to road surfaces. | **Reduce vehicle dependency.** By bringing neighborhoods closer, the approach aims to reduce car dependency. This also helps promote physical activity, such as walking and cycling |
| **An improvement in air quality.** Reduced transport leads to lower carbon emissions. Additionally, increased green spaces help mitigate the urban heat-island effect, lower flood risk, and enhance biodiversity. | **Better health and well-being.** There are numerous physical and mental health benefits of active travel, such as walking or cycling, including cleaner air, easy access to healthy food options, and quality green space. |
| **An increase in vehicle-free spaces.** Reducing the intensity of car traffic through the city allows for transforming part of the roadway and car parks into bicycle routes or using these areas for planting trees. One of the solutions used in this model is linear parks or pocket parks. | **A stronger sense of community.** A 15-minute city strategy creates, in close collaboration with local people, more public spaces to play, mingle, and socialize. This strategy supports neighborhood businesses and entrepreneurs, while also enabling people to spend more time with their loved ones, explore the local area, and engage in activities they enjoy. Social participation in the development of neighborhood spaces helps residents identify with the area and feel a part of the local community. |
| **A boost to the local economy.** A 15-minute city means more pedestrians on local high streets, more local and diverse employment opportunities, and more productive use of buildings and street space. | **A real-estate value increase.** Districts and neighborhoods that are organized according to the model and equipped with all amenities within reach of residents make them more attractive, thus increasing the value of real estate. |

Source: own elaboration based on: [Why… 2021, Papas et al. 2023, Verma 2023].
Źródło: opracowanie własne na podstawie: [Why… 2021, Papas et al. 2023, Verma 2023].

In Milan (Italy), the transformation into a 15-minute city started due to the COVID-19 pandemic. The 'Milan 2020 Adaptation Strategy', which refers to the "15-minute city", has the following objectives: redefining the use of streets and public spaces, increasing cycling and walking, rediscovering the neighborhood dimension, and experiencing the city differently without the fear of creating crowds. This program aims to create a city where all residents can meet most of their needs through services located within a short distance from their homes. The plan also includes giving back streets to the public by permanently reallocating more space for pedestrians and cyclists, as well as prioritizing green roofs and permeable pavements. It is worth noting that these strategies and projects were already examined and implemented in Milan even before the pandemic [Pinto

and Akhavan 2022]. Building locally self-sufficient housing estates has gained strength and importance among developers in Poland in recent years. These estates have a rich infrastructure and reduce the need for daily travel around the city. Additionally, friendly public transport solutions are being developed in many districts, such as the metro or tram network in Warsaw. Examples can be found in cities like Warsaw, Łódź, Poznań, and Wrocław [Niedźwiecka-Filipiak 2022, Miasto... 2023].

## Conclusions

Moreno points to the need to limit the role of the car in the city. However, the concept of a 15-minute city is much more comprehensive, as it contains several recommendations on how to use buildings more effectively, the role of greenery, and the principles of housing policy. Therefore, the idea of a 15-minute city is not about limiting residents' freedom of movement, but about allowing them to choose whether they will satisfy their needs in the close vicinity of the house or decide to go by public transport or car to another city district. The design and implementation of the 15-minute city concept require a multidisciplinary approach involving transport planning, urban planning, and policy-making. Applying such a model needs broader commitment than just urban planners or the government. An important role here is to be played by the cooperation of local authorities and the society represented by local leaders, non-profit organizations, entrepreneurs, investors, or business environment entities. Implementing the 15-minute city model requires careful planning, investment, and time, but it is an investment that will start to pay off almost immediately.

The article has some limitations. It focuses on presenting the benefits of implementing this idealistic concept in selected cities without delving into issues such as potential changes in the health and life satisfaction of residents of the 15-minute neighborhood or changes in the revenues and expenses of the city budget. While it shows the benefits, critical voices relating to this concept were not included.

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