Driving Urban Transitions

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Summary

Urban sprawl is a major issue worldwide, leading to increased urban population and various adverse effects like pollution, traffic congestion, and high energy consumption. Consequently, in order to tackle these issues, the development of sustainable cities has garnered widespread recognition worldwide. As a result, various new urban planning concepts have emerged, with one of the most crucial and innovative being the 15-Minute City (15mCity) concept based on chrono-urbanism. The 15-minute city concept aims to enhance residents' quality of life by thoughtfully integrating six key urban functions: living, working, commerce, healthcare, education, and entertainment (Moreno et al., 2021). In this vision, the ideal scenario is for residents to have convenient access to these essential services through active transportation options. This vision encourages the adoption of sustainable transportation options to enhance connectivity to more distant areas, ultimately fostering a more integrated and environmentally responsible urban environment. Moreover, the 15mCity concept aims to transition from cars to micromobility in order to eliminate carbon emissions and create more pedestrian-friendly cities. Additionally, this concept includes four core pillars: proximity, density, diversity, and digitalization, each aiming to address current urban problems. Currently, the 15mCity concept is being implemented in several cities worldwide, with different priorities. Within the FORTHCOMING project, data-driven and user-centric 15mCity models will be developed and tested from learning these best the 15mCity implementations in order to foster successful transfer of central city strategies to the suburbs. The Forthcoming project focuses on the urban outskirts, where definitions, challenges and research gaps could vary. Hence, this study aims to understand the current status of the 15mCity concept and its background, where definitions, challenges and best practices are explored.

1. Introduction

Due to increasing urban populations and rapid city expansion, urban sprawl is a global challenge prioritized in urban policy agendas. It is linked to higher energy use, pollution, and traffic congestion, leading to decreased community cohesiveness. Compactness, density, diversity, mixed land use, sustainable transportation, and green space are core strategies for achieving sustainability goals (Bibri et al., 2020; C40 Knowledge Community, 2021). Compact urban forms that promote walkability and mixed-use spaces remain widely accepted and UN-Habitat recommends in the "Spatial Planning Guidelines during COVID-19" to focus on mixed land uses as a spatial planning strategy for resilient neighborhoods and cities after the pandemic (UN Habitat, 2020). The concept of a "compact city" is recognized as a promising approach to sustainable urban development. One of the strategies to create compact cities that has been gaining popularity is the novel urban concept called the **"15 Minute City" (15mCity)** introduced by Carlos Moreno. This concept aims to create sustainable neighborhoods by giving people easy access to essential services and facilities within a 15-minute walk or bike ride from their homes. Moreover, the 15mCity concept is based on chrono-urbanism, which suggests that the quality of urban life decreases as the time and money spent on transportation increases (Moreno, 2016; Moreno et al., 2021; Staricco, 2022).

This approach aims to create mixed land-use, dense, pedestrian-friendly neighborhoods, and it was developed by Professor Carlos Moreno in 2016, where six essential social functions are identified. In the current 15mCity concept, Moreno argues that residents can experience an improved quality of life by efficiently fulfilling these essential urban social functions necessary for sustaining a decent urban lifestyle. These functions encompass (a) living, (b) working, (c) commerce, (d) healthcare, (e) education, and (f) entertainment (Moreno et al., 2021). Furthermore, the fundamental four pillars namely, ***proximity***, ***diversity***, ***density***, and ***digitalization*** are defined in order to address improvements in both human well-being and urban resilience.

With the 15mCity concept, it is expected to improve transportation efficiency, decrease pollution caused by cars, and reshape urban environments that will allow access to services and facilities in a given time (Olivari et al., 2023). The 15mCity concept, also helps to mitigate climate change adverse impacts in urban areas. This is because vehicular transportation is a significant contributor to emissions in urban areas, accounting for over 78% of emissions and up to 70-80% of NO2 emissions (Wiggins,2020). By exploring the potential benefits of a 15mCity planning model, we can work towards creating sustainable and environmentally-friendly urban areas (Allam, Nieuwenhuijsen, Chabaud, et al., 2022).

FORTHCOMING project aims to develop and test data-driven and user-centric 15mCity models for suburban contexts, learning from central city best practices. Within the FORTHCOMING project, an evaluation of the current adequation to the 15mCity concept is carried out to development of the Urban Living Labs (ULLs), since there is a lack of proper evaluation methods to benchmark the implementation of X-minute city (Staricco, 2022). Furthermore, cities apply the model in different ways and assessment of it varies greatly, especially in terms of trip origins and destinations, transport modes and speed considered, time thresholds, methods, etc. (Papadopoulos et al., 2023). Therefore, we aim to develop an assessment framework to be used in our ULLs. To our knowledge, there is still work to be done to define a holistic method to measure the 15-minute city. Prior assessments have followed different approaches or focused on one aspect of the

15-minute city, particularly regarding accessibility and have even assessed it from a sustainability point of view rather than in relation to the 15mC goals (Papadopoulos et al., 2023).

Within this report, it is aimed to understand the current status of the 15mCity concept, its theoretical background, the implementations in worldwide, and obtaining indicators as a measuring unit for 15mCity which is a goal of the FORTHCOMING project. In Section 2, the theoretical background of the 15mCity concept is discussed, along with the key areas of action that are characteristic of 15mCity strategies. In Section 3, challenges and research gaps are briefly introduced. Furthermore, in Section 4, the 15mCity concept in urban outskirts are introduced. In Section 5, the 15mCity implementations in worldwide with best practices are described.

2. Background

2.1. 15-Minute City Concept

The concept of the 15-minute city promotes the notion that urban residents should ideally have access to the majority of their daily needs within a 15-minute walk or bike ride. This vision supports the use of sustainable transportation options for reaching more distant areas, thereby fostering a more connected and environmentally friendly urban environment. The concept gained significant attention on the agenda of decision-makers during the COVID-19 pandemic. The outbreak of this pandemic has revealed the vulnerability of cities in their current structure and underscored the necessity for a fundamental reevaluation. In response to the need for it, the concept of the **15-Minute City (15mCity)** has gained momentum, prioritizing human needs and aiming to improve people's well-being while ensuring environmental preservation in both immediate and long-term contexts (Allam et al., 2022; Olivari et al., 2023). In the 15mCity concept, residents are expected to experience an improved quality of life by effectively integrating six essential urban functions: living, working, commerce, healthcare, education, and entertainment. (Moreno et al., 2021).

The 15mCity concept presents a new urban model where essential needs for residents are located within a 15-minute travel distance, thus redefining traditional urban planning strategies. (Duany & Steuteville, 2021) In this new concept, cities are defined with multiple centers based on ***proximity*** instead of one center, and they are named as ***polycentric cities*** where all the facilities and services humans need daily (Ferrer-Ortiz et al., 2022). According to the 15mCity concept, urban areas should consist of complete neighborhoods that are ***accessible*** by walking or cycling in order to meet human needs (Guzman et al., 2024). Hence, ***accessibility*** that is defined as the degree of reaching destinations easily has a vital role in the 15mCity concept with proximity (Da Silva et al., 2019). Furthermore, accessibility could be evaluated based on various factors, including the spatial distribution of places, the degree of ease in reaching places, and the properties of activities in the places (Olivari et al., 2023). Hence, both proximity and accessibility are vital for encouraging resident activities in urban areas. Additionally, ***mobility*** which is defined as travel ability has a critical role for 15mCity concept (Da Silva et al., 2019). There are several practical applications of the proximity, accessibility, and mobility concepts in 15mCity concept, showcasing how they contribute to creating more sustainable, inclusive, and vibrant urban communities. Hence, within the context of this report proximity, accessibility and mobility are considered under the umbrella term “15mCity”. The concept heavily depends upon the spatial characteristics, environmental, social, and economic aspects of the urban area and several new concepts depending upon a specified-minute radius of a person's location have emerged. Thus, all of these concepts are referred to as **XmCity** (Logan et al., 2022; Staricco, 2022; Wolański, 2023). Some examples of such implementations with different proximities are illustrated in Table 1. Within the context of this report, **"15mCity"** will be used to represent X-minute cities.

As it could be clearly recognized from above examples, adopting the 15mCity approach could bring numerous benefits where some of them are listed below;

- Reducing carbon emissions and traffic congestion with the shifting mobility cars to walking or cycling, lowering heart-related health disorders, reducing psychological problems, and strengthening community ties (Gaglione et al., 2022).

- Promoting social equality through equitable access to urban services and decentralized infrastructures. It allows residents from different social classes to participate in city planning and provides affordable housing and career opportunities for those with low incomes. According to Lydon and Garcia (2022), providing equal access to health, education, and recreational facilities within a 15-minute distance could significantly reduce the socioeconomic divide that is prevalent in many urban areas. This democratization of access is key to creating more inclusive urban communities.

Table 1. Some implementations of the 15mCity concept worldwide

Europe		
BELGIUM	Brussels City	Bruxelles ville de 10 minutes
DENMARK	Copenhagen	5-minute district
FRANCE	Paris	Paris en commun/ ville du quart d'heure
NETHERLANDS	Utrecht	The 10-minute city of Utrecht/ Spatial strategy 2040
NORWAY	Oslo	10-minute city
SPAIN	Barcelona	Superblocks
SWEDEN	Stockholm	Streets Move/ 1-minute city
UK	Edinburgh	20-minute Neighbourhoods
UK	Hailsham	10-minute neighbourhood town
International		
ARGENTINA	Buenos Aires	Ciudad de 15 minutos
AUSTRALIA	Melbourne	20-min neighborhoods
AUSTRALIA	Sydney	30-minute city
CANADA	Ottawa	15-Minute Neighbourhoods
CANADA	Vancouver	5-minute city
CHINA	Shanghai	15 min cities
COLOMBIA	Bogota	Ciudad de proximidad
NEW ZEALAND	Auckland	20-minute city
SINGAPORE	Singapore	45-minute city
USA	Eugene	20-minute neighborhood
USA	Kirkland	10-minute neighbourhoods
USA	Portland	The Portland Plan/ 20-minute neighborhoods

- Fostering strong community bonds and has been linked to improved public health and reduced crime rates (Khavarian-Garmsir et al., 2023).
- Localizing proximity-based job opportunities. This is achieved by dispersing businesses within neighborhoods and prioritizing their proximity to workplaces. By doing so, the concept could sustain economic viability while reducing energy consumption. Also, the new idea of producing and shopping locally emerging from a pandemic could support local shops (Sdoukopoulos et al., 2024).
- Enhancing pedestrian and cycling routes, promoting the development of green paths, and protecting agricultural lands from uncontrolled urban sprawl (Khavarian-Garmsir et al., 2023). Hence, the novel concept could be understood as shifting transportation options to green transportation, reducing the carbon footprint, combating climate change more effectively, and helping people with their health disorders and relations with communities.

2.2. Four Pillars of 15mCity Concept

The core pillars of the 15mCity concept are ***proximity***, ***diversity***, ***density***, and ***digitalization***. With these four fundamental pillars in place, it is anticipated that these issues will be addressed, leading to improvements in both human well-being and urban resilience (Moreno et al., 2021), where core pillars of 15mCity are shown in Figure 1. Each of these pillars plays a pivotal role in shaping urban environments to be not only

more sustainable but also in enhancing the quality of life for residents. Among the four pillars of 15mCity, proximity emphasizes the need for close physical access to essential services and amenities, while the diversity focuses on creating inclusive spaces that cater to a wide array of cultural, social, and economic needs. The concept of density refers to the efficient use of space to accommodate a diverse range of facilities within a compact area, while the integration of technology to improve city functions and accessibility is facilitated via digitalization. Hence, together, these principles aim to reshape urban living, making it more efficient, sustainable, and equitable (Moreno et al., 2021; Murgante et al., 2024).

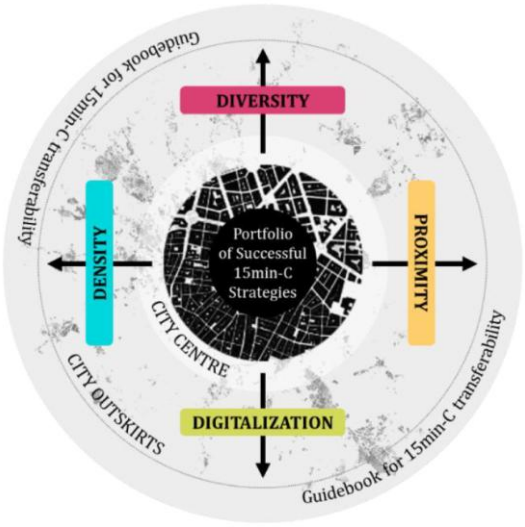

Figure 1. The illustration of core pillars for 15mCity

Fostering the development of more efficient and sustainable cities, ***urban data*** and ***urban services*** are pivotal in advancing the pillars of the 15mCity concept. Urban data term gained importance with transformation urban areas to smart cities and recently digital twins. This transformation results in the generation of vast amounts of geospatial data, referred to as ***urban data***, from various sources such as satellites, sensor systems, traditional sources, and others (Anejionu et al., 2019). Urban service has also a critical role for 15mCity concept. Zhu et al. (2022) states that establishing service systems that facilitate access to fundamental urban services like food, transportation, medical care, and education is crucial especially in public emergencies such as COVID-19 pandemic. In summary, urban data and urban services are pivotal in realizing the objectives of the 15mCity concept, contributing to the development of more efficient and sustainable cities.

As stated before, the 15mCity is based upon 4 pillars (proximity, density, diversity and digitalization) which are defined below (Moreno, 2016; Moreno et al., 2021).

- Proximity: Proximity is perceived as both temporal and spatial. That is, within the 15-minute quickly accessible radial nodes, inhabitants in a specific neighborhood can easily get basic services.
- Density: In the 15mCity concept, density is measured in terms of persons per square kilometers. That is, when planning for a sustainable city, it is important to examine the ideal number of people that a given region can easily sustain in terms of urban service delivery and resource consumption.

- **Diversity**: Diversity in the context of the 15mCity concept is twofold: (i) the need for mixed use neighborhoods which are primary in providing a healthy mix of residential, commercial and entertainment components and (ii) diversity in culture and people.
- **Digitalization**: This dimension is critical to the modified 15mCity concept, particularly in assuring the implementation of the other three aspects. This dimension, in particular, is strongly related to the Smart City concept, which can be considered to have served as inspiration for the 15mCity concept. For example, like in Moreno's suggested design, the Smart City concept promotes diversity, resident participation, and real-time service delivery across various platforms, including digital.

2.3. Key Areas of Actions (KAs)

2.3.1. Definitions of KAs

15mCity concept has been implemented in several cities worldwide, each has different context and interpretation regarding urban planning, transport planning, policymaking, community engagement, etc. In 2020, Driving Urban Transitions (DUT) conducted studies to guide their activities for the urban mobility transitions. To achieve this, DUT held three digital workshops attended by numerous representatives and stakeholders from national and local urban policy sectors. At the conclusion of these studies, DUT identified four Key Areas of Action (KAs), which form the thematic scope for the 15-Minute City Transition Pathway (L'hostis et al., 2024). These KA classes are Sustainable Urban Mobility (KA1), People-Centered Urban Spaces and Planning (KA2), Smart Urban Logistics, Production, and Services (KA3), and Urban Governance for Mobility Transition (KA4). The definition and the attributes of key areas of action are summarized in the **Error! Not a valid bookmark self-reference.** (Büttner et al., 2024).

Table 2. Definitions and attributes of KAs

Key Areas of Action (KA)	Definition	Attributes
Sustainable Urban Mobility (KA1)	To develop eco-friendly and efficient transportation alternatives such as enhancing public transportation or micromobility solutions to decrease usage of cars	▪ Active mobility solutions should be prioritized and public spaces should be reorganized, ▪ Sustainable solutions should be provided for longer trips, ▪ New transportation technologies should be integrated, ▪ Sustainable mobility options should be accessible
People-Centered Urban Spaces and Planning (KA2)	To organize urban environments to prioritize residents' well-being and needs, integrating mixed-use developments, and fostering community-oriented public spaces	▪ Supporting sustainable lifestyles, ▪ Focusing on people-centered public space, ▪ Deploying traffic management for people centered policies, ▪ Following planning principles regarding sustainability and diversity

Smart Urban Logistics, Production, and Services (KA3)	To improve the efficiency and sustainability of urban logistics and production through technology, optimizing supply chains, and supporting local production to reduce transportation demands	▪ Supporting striving neighborhood economies, ▪ Promoting sustainable supply chains and last-mile logistics, ▪ Test and diffuse innovative approaches to logistics and delivery
Urban Governance for Mobility Transition (KA4)	To establish policies and governance frameworks that facilitate sustainable urban mobility and planning, involving various stakeholders in collaborative decision-making and policy implementation	▪ Promoting innovative urban governance and creating evidence through experiments, ▪ Building on participation and empowerment of civil society, ▪ Fostering partnership that last and engage with stakeholders.

2.3.2. Key Pathways to Achieve KAs

To achieve the Key Actions (KAs), it is important to consider specific measures for success. For instance, KA1 focuses on sustainable urban mobility and transition. This includes practices such as door-to-door and on-demand services to improve **accessibility** and promote **micromobility** vehicles. Implementing **traffic calming strategies** like lane narrowing, corner radii, and gateway treatments could effectively address traffic congestion (Global Designing Cities Initiative, 2022). In addition, implementing **affordability and economic/social incentives**, such as pricing schemes, could significantly reduce carbon emissions and traffic congestion (World Economic Forum, 2021). Furthermore, **Mobility as a Service (MaaS)** solutions could be used to create an easily accessible platform that integrates multiple transportation modes for users (Maas, 2022). **Urban nodes** also play a significant role in sustainable urban mobility as they are crucial hubs that facilitate the movement of people and goods (European Regions Research and Innovation Network, 2020). Lastly, there are several multi-modal solutions to promote sustainable urban mobility, such as using **mobility hubs** to integrate shared transport, public transport, and active travel to enhance public spaces for everyone (CoMoUK, 2024). Moreover, **Sustainable Urban Mobility Plans (SUMPs)** that have a variety of benefits for cities and residents are crucial for car-dependent to active transportation shifting. For instance, with the SUMPs, traffic congestion, air pollution, carbon emission, noise pollution and parking problems could be reduced (European Commission, 2023). Lastly, **digital twins** could be used for mobility transition to effectively manage urban mobility. They could enable the virtual testing of different scenarios and solutions to reduce congestion, identify needed infrastructures, analyze the effects of active transportation modes (Papyshev & Yarime, 2021). Therefore, using digital twins are useful for both mobility transition and implementing the 15mCity concept. In summary, KA1 aims to create sustainable urban transportation.

The traditional urban planning concept is heavily reliant on cars, leading to various negative impacts on people and cities. KA2 aims to address these issues and organize urban environments to mitigate these negative impacts. It involves several key measures of success, such as the **redesign of urban areas**, which is integral to both the 15mCity concept and KA2. Additionally, **tactical urbanism**, an approach that revitalizes neighborhoods through short-term, low-cost, and scalable interventions and policies, plays a crucial role in

urban redesign (Lydon & Garcia, 2015). Furthermore, Wood et al. (2010) investigates the impact of urban green spaces on **social cohesion**. According to the major results of this study, green spaces provide ecological benefits and serve as shared spaces that encourage social interaction and community participation.

The other crucial subject in the 15mCity concept is smart urban logistics. Hence, KA3 aims to improve sustainable urban logistics, and it consisted of several key measures. As known, **urban logistics**, also known as **city logistics**, pertains to the transportation of goods within urban environments, driven by logistical choices closely tied to prevailing demand and the behaviors of economic entities (Correia et al., 2022). The main goal of city logistics is to improve efficiency and effectiveness for shippers, service providers, and customers while considering sustainable development (Pan et al., 2021). **Last-mile delivery** plays a key role in the efficiency and sustainability of smart cities within the paradigm of urban logistics (Kmiecik & Wierzbicka, 2024). Last-mile transport is a complementary concept to 15mCity, since goods and services are delivered to consumers via e-commerce (Hillyer, 2020). Moreover, logistics services refer to the management of goods movement from one point to another in an efficient manner, where **Logistics as a Service (LaaS)** is a type of digital supply chain solution. The overall goal of introducing a LaaS system is integrating the consumer into the last-mile system (Beckers et al, 2023). The inclusion of the consumer in a logistics system is likely to yield numerous benefits such as enhanced logistics services, heightened awareness leading to more equitable pricing, and opportunities for incentivization. Hence, LaaS is a framework designed to facilitate connection between logistics service providers, shippers, and consumers to address concerns related to integrating various last-mile distribution schemes (Lim et al., 2018).

Lastly, KA4 focuses on establishing policies and governance frameworks that facilitate sustainable urban mobility and planning. There are several key measures for this area of action. Achieving shifting from car-dependent transportation to active modes of transport, such as micromobility vehicles requires strong support and action from urban governance such as **policy interventions**. For example, **mobility & traffic management strategies** are one of the usable methods for mobility transition such as transit improvements, walking and cycling improvements, car sharing, congestion pricing, parking pricing, traffic calming, etc. (Litman, 2008). Furthermore, **citizen engagement and participation** are essential for achieving a transition towards mobility. Additionally, **urban space strategies** such as redesigning cities to maintain residents' desired activities while shifting the locations where these activities occur could encourage more active transportation modes among residents (Eurocities, 2024).

3. Challenges and Research Gaps

The 15mCity concept and policies are being implemented in various countries worldwide. However, several challenges still remain that could hinder the rapid implementation of this concept. Moreover, there are still certain research gaps that, if addressed, could enhance the effectiveness of the process. Therefore, it is essential to address these challenges and research gaps to enhance the potential impact and successful implementation of the 15mCity concept. These challenges could be categorized as economic, social, technological, and political. Furthermore, there are some debated ideas that may offer potential solutions with beneficial outcomes, and these ideas are also briefly discussed in this section.

3.1. Economic

One of the primary challenges associated with the implementation of the 15mCity concept relates to the economic conditions of the cities involved. The successful realization of this concept, which is fundamentally linked to the availability of investments, requires substantial and reliable funding sources. According to Allam, Bibri, Jones, et al. (2022), strategies similar to Special Economic Zones (SEZs) which would facilitate urban regeneration, provide tax incentives for the private sector, improve overall quality of life, and generate employment opportunities could be developed for the effective implementation of the 15mCity projects. Furthermore, logistics and the urban economy are frequently ignored in the implementations of the 15mCity concept. It is essential to identify and evaluate effective strategies that will mitigate traffic congestion and encourage local employment, thereby fostering the development of sustainable and livable urban environments (Büttner et al., 2024).

From a real estate investment standpoint, the concept of the 15-minute neighborhood offers promising and resilient investment opportunities. Another consideration is that large-scale institutional investors may benefit from the high rents in a 15-minute neighborhood, which could pose challenges for individual low- and middle-income households striving to afford housing in these areas (Zakariasson, 2022). This will also generate inequalities within the implementation area. Moreover, there is a potential challenge regarding regional and inter-city connections, as the concept currently does not outline a comprehensive plan for interconnected development.

3.2. Social

According to recent studies, 15mCity strategies may disproportionately benefit wealthier residents and neighborhoods, while having negative effects on lower-income residents and disabled individuals (C40 Knowledge Community, 2023). However, the primary goal of the 15mCity concept is to break down barriers between people by promoting social justice and equity. To address these issues within the community, lessons highlighting the benefits of the 15mCity concept for residents are necessary. Consequently, people will become aware of the potential benefits of the 15mCity concept, and they will want its implementation in their neighborhoods. Furthermore, according to some studies the 15mCity implementation will bring gentrification of the areas that will be lead the displacement of economically disadvantaged groups (Elldér,

2024). To prevent such scenarios in 15mCity concept implementations, actions that may cause division among people should be thoroughly considered.

The practical implementation of the 15mCity concept is closely tied to various criteria that reflect the characteristics of the area in question, including demographics, socio-economic structures, and other relevant parameters (Teixeira et al., 2024). Therefore, the analysis of the 15mCity concept should include not only quantitative assessments but also qualitative evaluations. Furthermore, sufficiency, capacity and quality are the other important research areas in the 15mCity concept. The goal of this concept is to ensure that all essential daily needs, such as grocery stores, schools, and supermarkets, are within a 15-minute distance from people's homes. In this context, the parameters of sufficiency, capacity, and quality raise critical questions for the implementation process, including: How many facilities are necessary? What qualifies as essential? What is the capacity of each facility within the implementation area? How will quality be assessed in the analyses of the 15mCity? (Mouratidis, 2024). Hence, these parameters should be considered in the further studies. Urban inequality represents a critical challenge facing cities today. According to the United Nations World Social Report, more than two-thirds of the global population resides in countries where urban inequalities have intensified over the past three decades. These escalating inequalities have significant implications for the social and spatial organization of urban areas (Büttner & Zucaro, 2024). Therefore, urban inequalities constitute a critical challenge and research gap within the 15mCity concept, necessitating thorough and comprehensive analysis.

3.3. Technological

The 15mCity concept emphasizes the importance of technology and digital solutions such as digital twins, Internet of Things (IoT), smart cities in creating successful, sustainable, and livable cities. However, it faces challenges related to technology, including data and data analytics, smart city technologies, and mobility solutions. According to Moreno (2024), cities must invest in smart technologies to effectively collect and analyze data for urban planning. Furthermore, cities implementing the 15mCity concept could assist other cities that have not yet adopted it by helping establish technological systems and training technical staff. Hence, it is clear that the issues related to technology need to be addressed through the implementation of the 15mCity concept.

Digitalization is a cornerstone of the 15mCity concept, serving a critical function in the enhancement of the other three pillars through the application of digital technologies. As noted by (Allam, Bibri, Jones, et al., 2022), this innovative framework could be advanced through the adoption of technologies associated with smart cities. Specifically, the incorporation of digital twins, the Internet of Things (IoT), and 6G technology could facilitate the collection of comprehensive data. By leveraging the data generated from these technologies, machine learning algorithms could be employed to extract novel urban insights, thereby providing valuable information that informs the implementation of the concept.

3.4. Policy

The theoretical framework of the 15mCity concept underscores the importance of sustainable transportation modes, particularly walking, as critical elements for its effective implementation. It is

essential to establish policies aimed at promoting sustainable transportation while minimizing its adverse effects. For example, there should be a concentrated effort to decrease automobile use, alongside the enhancement of cycling infrastructure (Papadopoulos et al., 2023). Also, a recent study indicates that numerous case studies on the 15mCity initiative exhibit deficiencies in comprehensive policy frameworks. The findings underscore a pressing need for policy transfer and enhanced cooperation between cities to facilitate the successful implementation of 15mCity projects (Büttner et al., 2024). Lastly, implementing the 15mCity concept and its strategies requires strong support from policymakers. However, due to insufficient guidebooks, information, and technology, policymakers may hesitate to implement the 15mCity concept in their respective areas. Hence, it is needed that policymakers are supported through the development of comprehensive guides, effective tools, dashboards, IT tools, advanced technological systems, and additional resources.

The 15mCity concept emphasizes the use of active transportation modes, such as walking, cycling, and scootering to create sustainable environments. Although, public transportation is a crucial component in achieving sustainability goals in cities, many theoretical and empirical studies have not included public transportation in their analyses. Hence, the role of public transportation should be taken into account and emphasized strongly in the further studies (Mouratidis, 2024).

The identified challenges and research gaps are summarized as below;

Table 3. Challenges and research gaps.

Name	Challenges	Research Gaps
Economic	▪ Economic conditions ▪ Logistics ▪ Urban economy	▪ Developing effective strategies ▪ Funding instruments for small communities
Social	▪ Social justice ▪ Inequality ▪ Gentrification	▪ Qualitative analyses ▪ Sufficiency, capacity, quality ▪ Morphological properties of sub-urban areas varies significantly
Technological	▪ Investments ▪ Lessons learned ▪ Data & Data analytics	▪ Smart city applications (Digital twins, IoT, 6G) ▪ Machine learning ▪ Collaborative services
Policy	▪ Policies for transition ▪ Comprehensive policy frameworks ▪ Insufficient number of guidebooks, technology, tools, etc. for policymakers	▪ Role of public transportation in centre/outskirts ▪ A change in the urban planning ▪ Shared spaces ▪ Infrastructure requirements ▪ Micromobility tools and usage

3.5. Controversial Ideas

While there are various potential positive impacts of implementing the 15mCity concept, there exists some controversial ideas. Some of them are listed below:

- According to Moreno (2024), the concentration of services may not be sustainable for some businesses, and that reducing traffic could negatively affect industries reliant on long-distance transportation.
- According to Meltzer (2024), creating a city with 15-minute walk could worsen existing economic and resource disparities in cities, creating privilege based on access and convenience as policy.
- The 15mCity concept has faced criticism due to its approach to distributing facilities. Critics argue that within these 15mCity areas, the unequal distribution of power and the challenge of matching skilled workers with local job opportunities could lead to the creation of "15-minute ghettos." These urban areas with low income may house the most vulnerable populations, including individuals with limited skills and poor access to quality education. Consequently, residents of these ghettos might only have access to specific jobs located within their immediate vicinity (Caprotti et al., 2024).
- Some politicians have expressed concerns that the implementation of the 15mCity initiative may restrict individual freedom of movement, particularly regarding the use of private vehicles and the ability to travel between neighborhoods (Keidar et al., 2023).
- Some protests took place against 15mCity because of belief that the 15mCity implementations will limit their freedom and control them in these areas (Baker & Weedon, 2023; Zuidijk & Rudgard, 2023).

4. The 15mCity Concept in Urban Outskirts

The 15mCity concept has mainly been discussed in the context of urban areas. However, studies should also be conducted on the applicability of this concept in urban outskirts. Urban outskirts present distinct challenges compared to urban areas, such as lower density, inadequate connectivity, and difficulty in accessing daily necessities through active transportation. Consequently, it is crucial to have a deep understanding of the state of the urban outskirts and the potential challenges for implementing the 15mCity concept.

Introducing 15mCity concepts in rural areas presents unique challenges when compared to urban areas. Rural communities often face obstacles such as limited access to digital communication, inadequate public transportation, and insufficient infrastructure for cycling, walking, and driving. Additionally, these areas may have limited employment opportunities. According to a working paper published by the National Bureau of Economic Research, the median resident of a US city makes 12 percent of their trips within a 15-minute walk from their home (Abbiasov et al., 2022). The study analyzed data from the 418 most populated urban areas in the country. The researchers suggest that if municipalities aim to expand this radius to 20 to 30-minute neighborhoods, the number of trips made on foot could increase (DUSP MIT, 2023). Additionally, the study found a causal link between improved access to amenities and the willingness of residents to walk within a 15-minute radius. In a recent study conducted by Büttner et al. (2022), the challenges associated with the implementation of the 15mCity concept in suburban areas were categorized into three distinct classes: land-use implications, territorial jurisdiction implications, and morphological implications. The results of this study states that a change in urban planning approach is necessary for successfully integrating the 15mCity concept within suburban contexts. Also, the car usage should be decreased, and funding of 15mCity modifications of small suburban communities should be considered. Furthermore, according to results of this study, the one of the crucial challenges in the 15mCity applications in the urban outskirts is aligning interests and objectives among different territorial units. Lastly, the morphological properties of suburban areas present another challenge in the implementation of the 15mCity concept due to their different non-urban characters.

The limitations that rural communities face present opportunities for creative and collaborative service and infrastructure delivery. These efforts could help to support social cohesion and reduce health inequalities. Innovative ideas such as establishing connections and networks between rural areas and better sharing of road space could facilitate new ways to build health and wealth (Town & Country Planning Association, 2023).

The application of the 15mCity concept in rural contexts revolves around the establishment of community centers, which may include various activities, local markets, and health clinics (Pascalobservatory, 2023). Multi-purpose facilities could reduce travel needs, where concepts that encourage walking and cycling in rural areas is important. Promoting local food is vital for 15mCity, reducing reliance on distant markets and giving access to locally grown food. Furthermore, improving digital connectivity and infrastructure services increases access to services and information that are essential for job opportunities, especially in regions with limited employment options. Community involvement and collaboration are vital since

implementation strategies vary, and these should be tailored to the unique characteristics and challenges of each rural area.

Implementing the 15mCity concept in rural areas could present several challenges that need to be thoroughly addressed. In rural areas, people usually have to travel longer distances to meet their daily needs, as the population is lower and the infrastructure is inadequate. This could lead to a decline in living standards in rural regions, and encourage people to move to urban areas. Therefore, the main goals of the 15mCity concept, which are accessibility, sustainability, and community focus, are applicable to both urban and rural areas. Moreover, public transportation systems are more limited in rural areas due to lower population density and greater distances between places. Hence, there are studies that redesign the concepts of 15mCity to rural areas, where the focus is on developing self-sufficient communities with localized services. An example is from USA. In the United States, there is a significant number of people who are either unable or should not drive. This creates a demand for alternative modes of transportation for seniors, youths, individuals without a driver's license, and community visitors and tourists. By providing more options for walking and biking, we could meet the specific needs of these populations, reduce emissions, and improve the health of residents by lowering air pollution levels. Furthermore, investments such as bike infrastructure and sidewalks could create more jobs compared to traditional transportation investments (Funk & Glickman, 2023). Hence, neighborhoods within a 15 to 30-minute radius could bring positive results for municipalities interested in equity, health, climate and economic development.

The goal of the FORTHCOMING is to apply the concept in urban outskirts by drawing upon experiences from urban areas. The definitions developed by Carlos Moreno primarily emphasize urban areas, which may limit their applicability in urban outskirts. Therefore, it is essential to formulate specific definitions for urban outskirts in order to effectively achieve the objectives of the FORTHCOMING project. According to this aim, a meeting was conducted by FORTHCOMING Consortium Members on April 4, 2024. For this purpose, a Miro exercise that contains definitions of 15mCity core pillars (https://miro.com/app/board/uXjVNggP_Mo=/) was created. That exercise lasted approximately 2 hours, and 19 participants from the FORTHCOMING Consortium joined the meeting. Before the Miro exercise, the definitions of 15mCity pillars are further developed, where challenges and opportunities of urban transport is incorporated. Afterwards, the definitions of the 15mCity were provided to the participants. Finally, all participants were asked to provide feedback on the definitions and rethink about them. According to comments about proximity, inclusiveness, density and digitalization, the following definitions have been developed:

> ***Proximity*** *refers to the spatial and temporal accessibility to opportunities related to transportation, employment, healthcare, education, entertainment, access to green spaces, and retail for every resident through active or sustainable transportation modes. These opportunities are associated with various catchment areas, which include various types of amenities, each with a hierarchy and a level of relevance based on the user's preferences, and the scale can vary, encompassing neighborhood, city, or metropolitan levels.*
>
> ***Inclusiveness*** *refers to addressing everyone's needs and experiences in relation to the opportunities offered by the 15mC, regardless of economic means, age, gender, disability, diversity, race, or ethnicity. Mobility justice, accessibility, social cohesion, and participatory decision-making are at the heart of inclusiveness as well as assessing cautiously the risks of exclusion and gentrification.*

Density is viewed in terms of mixed land use in a built environment (e.g., retail, residential, offices, leisure & green spaces, etc.), where the number of people in a given area can comfortably sustain the urban service delivery, opportunities, and resources. In the context of FORTHCOMING which focuses on urban outskirts, density is the most difficult pillar to achieve and leverage.

Digitalization refers to the enabling of the proximity, diversity, and density's dimensions using digital technology (such as smart city management tools, digital twins, end-user applications). Digitalization should facilitate and ensure equal access for all individuals while considering privacy concerns.

5. Best Practices

The 15mCity concept has been implemented in various cities around the world. To thoroughly assess the characteristics of these implementations, several studies have been conducted. One such study, carried out by Teixeira et al. (2024), aims to identify the 15mCity implementations globally and their associated practices. This was achieved by combining a comprehensive analysis of both academic and gray literature with an expert survey. Teixeira et al. (2024) identified 98 case cities and 414 associated practices worldwide. The results of this study indicate that 38% of the case studies are classified as related to KA2, 33% to KA1, 22% to KA4, and 7% to KA3. In the subsequent sections, a detailed explanation of the 15mCity projects will be provided, drawing upon relevant existing, international and EU projects.

5.1. Existing Projects

There are several renowned 15mCity projects across the globe that could serve as good examples for FORTHCOMING cities. These cities have been evaluated based on several factors including accessibility to services, transport options, mixed land use, ecological sustainability, housing practices, population density, affordability, and inclusivity. In Table 4 and Table 5, global and European cities are compared, respectively. These cities are examined in detail in the following sub-section.

Table 4. Cities in International in the aspect of State of the art

Criteria		Portland	Bogota	New York City	Mexico City	Melbourne	Singapore
Proximity to services, health, cultural, food		X		X	X	X	X
Transport	Infrastructure			X	X		
	Public Transport	X	X	X		X	X
	Cyclability	X	X		X	X	X
	Walkability	X	X			X	X
	MaaS						
	Multi- modal		X				
Mixed Land Use		X		X	X	X	X
Environmental Sustainability	The use of renewable fuels						
Housing				X			
Place - making	Green Space			X			
	Urban Space		X				
Density		X			X	X	
Ubiquity/Affordability		X					
Inclusiveness, Citizen Participation		X	X	X			X

Table 5. Cities in Europe in the aspect of State of the art

Criteria		Paris	Copenhagen	Barcelona	Madrid	Berlin	Milan	Lisbon
Proximity to services, health, cultural, food		X	X	X	X	X	X	X
Transport	Infrastructure	X	X	X	X	X	X	
	Public Transport	X	X		X	X	X	
	Cyclability	X	X	X		X	X	X
	Walkability	X	X	X	X	X	X	X
	MaaS							
	Multi- modal							
Mixed Land Use		X						
Environmental Sustainability	The use of renewable fuels							
Housing			X					
Place - making	Green Space	X	X				X	
	Urban Space	X	X				X	
Density		X	X					X
Ubiquity/Affordability		X	X	X				
Inclusiveness, Citizen Participation		X	X		X	X	X	

5.2. International Projects

At the Second United Nations Habitat Assembly, a significant initiative, the Global Observatory of Sustainable Proximities, was launched to support the implementation of proximity approaches in cities worldwide. The Global Observatory of Sustainable Proximities (C40 Knowledge Community, 2024) aims to facilitate sustainable urban development and contribute towards achieving the UN's sustainable development goals. It functions as a platform for capacity-building, collecting information about local initiatives while promoting and supporting urban proximities globally, where cities world-wide are classified by topic including land use, mobility, social aspects and others. Cities performing well in suitable proximities in Europe and Africa are illustrated in Figure 2.

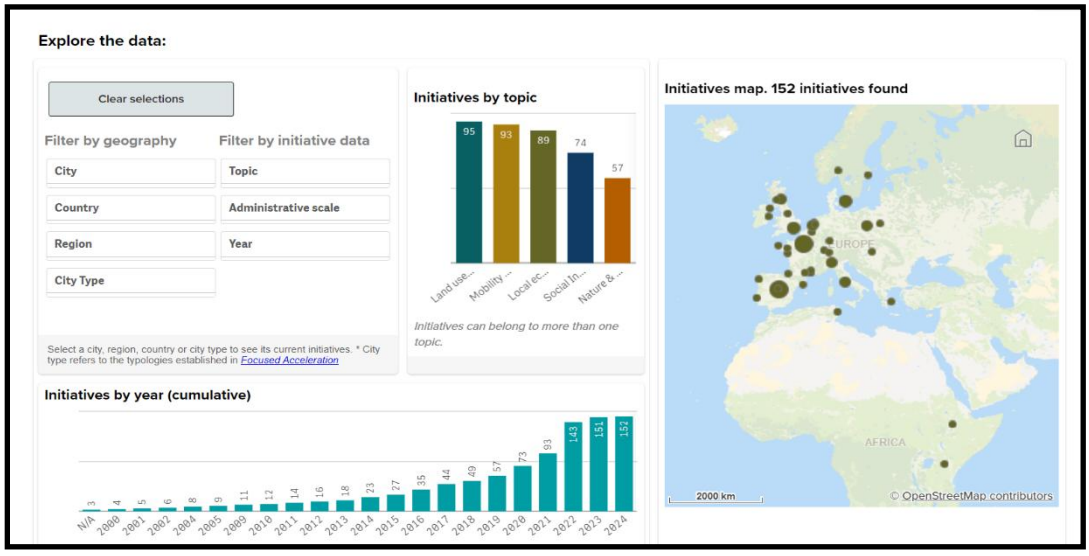

Figure 2. The web interface of the Global Observatory of Sustainable Proximities

Sustainable Urban Mobility Plans (SUMPS) for shifting mobility towards low-carbon patterns, also include actions for 15-minute-cities. There exists several initiatives and programs to support SUMPS, where REFORM (https://projects2014-2020.interregeurope.eu/reform/), SUMPs-Up (https://civitas.eu/projects/sumps-up), POLIS (https://www.polisnetwork.eu/topic/sustainable-urban-mobility-plans-2/) are some of them.

In Asia, several countries are implementing proximity based urban planning concepts. For example, the China Sustainable Cities Integrated Approach Pilot Project, funded by a Global Environment Facility grant of $32.73 million and implemented by the World Bank, supports transit-oriented development (TOD) in China (World Bank Group, 2023). Seven major cities, namely Beijing, Tianjin, Shijiazhuang, Ningbo, Nanchang, Guiyang, and Shenzhen, are supported to develop and implement transit-oriented development (TOD) approaches. Furthermore, it also supports the Chinese Ministry of Housing and Urban-Rural Development in creating a national TOD platform to help guide cities and strengthen their ability to develop relevant guidelines and policies. More details regarding the project could be achieved under: https://projects.worldbank.org/en/projects-operations/project-detail/P156507?lang=en

Some other important projects of metropolitan areas are listed below:

a) The project named Innovation QNS is a significant step towards implementing the 15 Minute City concept in New York City's Queens neighborhood of Astoria (CTBUH, 2022). This project envisions an urban environment where residents could access most of their daily needs within a 15-minute walk or public transit ride. The master plan is ambitious and includes various elements. This ambitious master plan incorporates a diverse range of housing options to accommodate various income levels, ensuring inclusivity and accessibility. Retail spaces are strategically located to meet the everyday needs of residents, promoting a local economy and convenience. The plan also includes the integration of offices and cultural centers, fostering local employment opportunities and cultural activities within the community. A central feature of this project is the 40,000-square-foot public park, envisioned as a vibrant communal space for recreation and social interaction. The overarching goal of Innovation QNS

is to cultivate a neighborhood centered on walkability and sustainability, significantly reducing the need for lengthy commutes and enhancing the overall urban living experience. Innovation QNS requires a large financial commitment from prominent real estate companies. With a roughly $2 billion budget, prominent developers Silverstein Properties, Kaufman Astoria Studios, and Bedrock Real Estate Partners collaborated on the project (Morris, 2022). This investment is indicative of the project's scope and aspirations, which include converting a sizable section of the Queens neighborhood into a model urban area.

Public Opinion: The 15 Minute City concept in New York's Innovation QNS initiative in Queens has mixed reactions. Urban planners and environmentalists support it as a progressive method of urban life, while others are skeptical, concerned about mobility and autonomy. Misunderstandings have led to anxieties, emphasizing the need for open communication and community participation during planning.

b) In India, the concept of the 15mCity is garnering increasing attention, particularly in major urban centers such as Bengaluru, Chennai, Delhi NCT, Jaipur, and Kolkata (Urban Resilience Hub, 2024). These metropolises, which are members of the C40 Cities network, are actively investigating the integration of this paradigm into their urban planning methodologies. The essence of 15mCity concept is highly compatible with the historical urban designs of these cities, notably Jaipur, where vital services and facilities are already situated within a brief distance from residential localities. In the Indian context, the emphasis may be placed on augmenting existing infrastructure and urban configurations to further diminish commuting durations and enhance the accessibility to essential daily services.

Public Opinion: The level of acceptance towards the 15mCity concept in India is influenced by cultural norms, urban challenges, and the rate of development. In areas where the existing layout aligns with the principles of the 15mCity, such as Jaipur, there may be more enthusiasm. In expansive and densely populated metropolises, inhabitants may be concerned about the practicality of such initiatives. These concerns relate to space utilization and cultural preservation.

c) Shanghai's "15-minute community living circles" is a direction of urban redevelopment that involves renovating existing urban areas into mixed-use structures, thus combining residential, commercial, and recreational areas for greater proximity and convenience (UN Habitat, 2023). Complementing this is a focus on improving transport and infrastructure, particularly the development of public transport and cycling facilities to encourage non-motorized modes of transport. The plan also includes the integration of more green spaces and parks, aiming to enrich the living environment and contribute to a healthier, more sustainable urban ecosystem.

Public Opinion: The 15 Minute City aligns with China's urban modernization and sustainability goals, which may foster a favorable public opinion. Younger urban residents view it positively, as it improves quality of life and reduces pollution and traffic. However, public opinion may differ, and concerns may arise regarding the pace of change, loss of historic neighborhoods, or impact on nearby towns and businesses.

d) The UK's strategy for 15 Minute City is in line with more general government directives about sustainable urban growth. Local government initiatives might include particular projects or comprehensive programs in different cities. These projects are probably supported by the UK

government's emphasis on encouraging sustainable urban living and making natural places more accessible.
Public Opinion: The concept aligns with the growing public demand for more sustainable, accessible urban living spaces.

e) The implementation of Melbourne's 20-minute neighborhood concept is a pivotal aspect of the city's urban planning strategy, as outlined in Plan Melbourne 2017-2050 (Victoria, 2024). This initiative is geared towards establishing self-sufficient communities, where residents have easy access to their daily necessities within a 20-minute radius by walking, cycling, or using public transport. The approach encompasses several key components that could be listed: enhancing neighborhood accessibility and safety, provision of affordable housing, fostering local employment, improving public transport, and incorporating green spaces.
Public Opinion: The Melbourne public's reaction to the idea of 20-minute neighborhoods has been largely positive, reflecting the community's desire for more livable and sustainable urban surroundings. The emphasis on open spaces, accessibility, and local jobs is valued by the locals since these factors improve the general standard of living.

f) Portland's Comprehensive Plan 2035 aims to create 'complete neighborhoods' across the city with a visionary approach to urban living (Portland, 2020). This plan aims to ensure that by 2035, 90% of Portland residents will be able to easily walk or bike to meet basic daily needs outside of work. The concept of a complete neighborhood revolves around the idea of making basic amenities easily accessible and promoting a walkable and bike-friendly urban environment. Implementation of this plan includes the development of mixed-use areas, enhancing neighborhood connectivity and urban design focused on walkability and cycling.
Public Opinion: In Portland, the idea of entire neighborhoods is often favorably regarded because it fits in with the city's progressive views on urban quality of life and environmental sustainability. The idea is probably supported by locals who appreciate being able to walk to local amenities, not needing to drive as much, and being close to walkable areas.

g) A revolutionary approach to urban development, the construction of 15-minute neighborhoods is the main goal of Ottawa's new official plan (City of Ottowa, 2021). The goal of this project is to plan a city where most everyday necessities could be easily accessed by citizens within a 15-minute bike ride or walk from their residences.
Public Opinion: It's expected that Ottawa's 15-minute communities will be warmly received by the general public, especially by individuals who support sustainable living and a decrease in reliance on cars. The focus on mixed-use projects and easily accessible public transportation is consistent with modern urban planning ideas that prioritize environmental sustainability and convenience.

The examples from various parts of the globe that you provided demonstrate the versatility and global appeal of the 15mCity concept. Each city has adapted the principle to their unique urban context, showcasing its potential to create more sustainable, efficient, and livable urban environments.

5.3. EU Projects

Pioneered by cities like Paris, Milan, Barcelona, Copenhagen, and Berlin, the 15mCity approach aims to enhance urban living by reducing reliance on cars, promoting local amenities, and improving environmental sustainability. Each city, with its unique character and challenges, has embarked on this journey, implementing innovative strategies and allocating significant resources to realize this vision. Below, EU projects that have been or will be carried out are given in order.

a) Paris's transformation under Mayor Anne Hidalgo is a testament to the city's commitment to the 15 Minute City concept (C40 Knowledge Community, 2024). The project includes reducing car lanes in favor of expanding bike lanes, promoting electric bike usage, and converting streets into pedestrian-friendly zones. This initiative is part of a broader "Plan Vélo" aimed at doubling bike lanes and reducing car traffic by 2024. The city also focuses on decentralizing amenities, ensuring that essential services like schools, parks, and shops are evenly distributed and accessible. The transformation includes increasing the number of cycle lanes, and creating public spaces like the transformation of Champs-Elysées, and the Caserne des Minimes project, which involved converting a site into apartments, offices, a daycare, and a public green space for €12.3 million. Additionally, the city focuses on the reuse of existing facilities in different ways, like schools opening as green 'oasis yards' outside school hours.
Public Opinion: Parisians have shown a mix of enthusiasm and skepticism. Many residents appreciate the environmental benefits and the newfound ease of accessing services. However, critics argue that the reduction in car lanes has led to traffic congestion and challenges for outer-city commuters. The project is a bold step, though, in transforming Paris into a more livable and sustainable city.

b) Milan's "Strade Aperte" (Open Streets) initiative, spearheaded by the COVID-19 crisis, focused on expanding outdoor spaces for pedestrians and cyclists (Chueca, 2024). The city rapidly implemented temporary bike lanes and widened sidewalks. The goal was to provide safer, socially-distanced ways for residents to move around and support local businesses, which were severely impacted by the pandemic. The "Strade Aperte" initiative, accelerated due to COVID-19, includes temporary pedestrianization of roads, widening of sidewalks, connections with existing cycle paths, and tactical urban planning interventions.
Public Opinion: The project was generally well-received, especially for encouraging healthier, eco-friendly modes of transport. However, concerns were raised by some local businesses about the potential impact on commercial activities, particularly regarding logistics and customer accessibility.

c) Barcelona's unique approach involves creating "superblocks" (Superilles), where traffic is rerouted around large, pedestrian-prioritized zones (Eggimann, 2022). Within these superblocks, the speed limit is lowered, and through traffic is minimized, making space for green areas, playgrounds, and community activities. This initiative aims to reduce pollution, noise, and create a more community-centric urban environment. The superblocks model involves reshaping urban design by creating blocks with limited traffic and prioritizing pedestrian areas, low-speed zones, and green spaces. The European Investment Bank (EIB) is financing around 40 projects in Barcelona, including the superblocks, with €95 million allocated for urban regeneration. Up to 25% of this EIB funding is directed towards superblocks (Postaria, 2021).
Public Opinion: Residents within the superblocks generally enjoy quieter, safer, and more pleasant living spaces. However, there's a divide in opinion, with some locals and businesses outside the superblocks feeling inconvenienced by the altered traffic flows and parking restrictions.

d) Copenhagen has long been a leader in urban cycling infrastructure. The city's extensive network of bike lanes and bridges, coupled with policies that promote cycling over driving, aligns closely with the 15mCity concept. Copenhagen aims to become the world's first carbon-neutral capital by 2025, with cycling playing a key role in this vision. Over the past 10 years, Copenhagen has invested over $200 million in cycling infrastructure. The 2022 budget included $10 million for maintaining and improving Copenhagen's position as a bike-friendly city. The Danish Ministry of Transportation announced a large infrastructure plan, investing $458 million in new cycling infrastructure, with the first $64 million used in 2022 (Nordregio, 2024).

Public Opinion: The city's efforts are widely celebrated, as they contribute to a high quality of life and a strong commitment to environmental sustainability. Copenhagen serves as a global model for integrating cycling seamlessly into urban planning.

e) Berlin is at the initial stages of exploring the 15mCity model (C40 Knowledge Community, 2024). Current initiatives focus on expanding pedestrian zones, introducing new bike lanes, and considering the redistribution of public spaces. The aim is to enhance neighborhood living and reduce the city's carbon footprint

Public Opinion: As Berlin's journey towards a 15mCity is relatively new, public opinion is varied. Some residents express excitement about the potential for greener, less congested living spaces. In contrast, others question the practicality of implementing such a model in a sprawling metropolis like Berlin.

In conclusion, these European cities are at the forefront of reimagining urban living in the 21st century. While the approaches and stages of implementation vary, the overarching goal is the same: to create urban environments where residents could access all their needs within a short, sustainable commute. The journey towards these sustainable urban models is an ongoing process, adapting to the unique challenges and needs of each city. As these initiatives progress, they offer valuable lessons and inspiration for cities worldwide aiming to foster more sustainable, community-focused living environments.

It is worth noting that there are EU-funded research projects that focus on transportation and mobility solutions. These projects align *well* with the 15mCity concept and aim to improve proximity, accessibility, sustainability, and development. Therefore, analyzing them in detail might provide valuable insights. The projects are listed in Annex 1.

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Annex

Annex A. EU Funded projects

Name	Type of Funding	Date	For further Information
COMPACTABILITY	FP-7	2014 - 2016	https://cordis.europa.eu/article/id/198877-social-sustainability-in-compact-neighbourhoods
Aim: to examine how a compact urban form can promote the social sustainability of intermediate neighbourhood areas in cities facing socio-cultural challenges. The results look set to help enhance policy related to the design of neighbourhood spaces.			
Sharing Cities	Horizon 2020	2016 - 2021	https://sharingcities.eu/
Aim: to achieve scale in the European smart cities market by integrating smart city people-centred solutions in complex urban environments, that way adding to their social and environmental value; to connect existing infrastructure allowing for the creation of digital services, which will help citizens make informed choices regarding energy efficiency and mobility; to propose business, investment and governance models that enhance sustainability in communities; and to improve local governments' capacity for policymaking through collaboration and co-design.			
SUNRISE	Horizon 2020	2017 - 2021	https://civitas-sunrise.eu/
Aim: to develop, implement, assess and facilitate learning about new, collaborative ways to address common mobility challenges at the neighbourhood level.			
Cities-4-People	Horizon 2020	2017 - 2020	https://cities4people.eu/en/index.html
Aim: improve mobility and increase urban sustainability for the urban and peri-urban areas of five EU cities			
HiReach	Horizon 2020	2017 - 2020	https://www.trt.it/en/PROGETTI/progetto-hireach/
Aim: to demonstrate the role of informal groups and local associations to solve transport poverty issues.			
TInnGO	Horizon 2020	2018 - 2021	https://www.tinngo.eu/
Aim: to develope gender- and diversity-sensitive smart mobilities and solutions for sustainable European transport.			
PARK4SUMP	Horizon 2020	2018 - 2022	https://park4sump.eu/
Aim: to take the very best parking management examples, contexts and expertise in Europe, learn and profit from these, and transfer them on a large scale and in the best way possible to new cities.			
HANDSHAKE	Horizon 2020	2018 - 2022	https://handshakecycling.eu/
Aim: brought together experts and local authorities to implement over 60 solutions to drive the performance of 13 of Europe's top cycling cities.			
DIAMOND	Horizon 2020	2018 - 2022	https://diamond-project.eu/
Aim: to develop data-driven recommendations and tools for more equitable and sustainable mobility services.			
TRIPS	Horizon 2020	2020 - 2023	https://trips-project.eu/
Aim: to address the challenge of social exclusion faced by disabled people and the elderly by involving them in the design of future transport solutions in seven European pilot cities.			
INDIMO	Horizon 2020	2020 - 2022	https://cordis.europa.eu/article/id/445590-transforming-digital-mobility-from-a-privilege-into-a-right

Aim: to design a toolbox that effectively facilitates the design of user-friendly digital mobility services.			
REBALANCE	Horizon 2020	2020 - 2022	https://rebalancemobility.eu/
Aim: to examine four models of mobility culture – strength, justice, connection and speed – to take a close look at the needs and values of our contemporary society, where legislators, industry players and ordinary citizens joined together for this purpose.			
AI4Cities	Horizon 2020	2020 - 2022	https://ai4cities.eu/about/project
Aim: to provide with AI solutions for mobility and energy challenges, that will ultimately contribute to reduce CO2 emissions and meet their climate commitments.			
DIGNITY	Horizon 2020	2020 - 2022	https://www.dignity-project.eu/
Aim: to support public and private mobility providers in conceiving mainstream digital products or services that are accessible to and usable by as many people as possible, regardless of their income, social background, health situation or age			
URBANIZED	Horizon 2020	2021 - 2024	https://urbanized.eu/
Aim: to future-proof cities with sustainable last-mile delivery by solving the trade-offs between 'one size fits all' and 'design for purpose' in the conception of adaptable and modular all-electric light commercial vehicles.			
RESISTIRÉ	Horizon 2020	2021 - 2024	https://resistire-project.eu/
Aim: to find sustainable solutions to gender inequalities and to strengthen societal resilience to outbreaks such as COVID-19.			
RAIL4CITIES	Horizon Europe	2023 - 2025	https://cordis.europa.eu/project/id/101121703
Aim: to develop a new operational, readily available and highly applicable model of railway stations (SCP model), combined with a common European methodology and tool for its effective implementation.			