

# Smart and Inclusive Built Environment: Is Remote Work the Key?

Cristina Caramelo Gomes<sup>1</sup> and Houria Ariane<sup>2</sup>

<sup>1</sup>CIAUD, Research Centre for Architecture, Urbanism and Design, Lisbon School of Architecture, Universidade de Lisboa, Portugal CITAD Research Centre for Territory, Architecture and Design, Lusíada University of Lisbon, Portugal

<sup>2</sup>LAUTES, Laboratoire Architecture Urbanisme Techniques Espace Société, University of Constantine3 Salah Boubnider, Constantine, Algeria

## ABSTRACT

This paper discusses the contribution of remote work to metropolitan areas' resilience, sustainability, inclusion, and equity. These premises are the support of smart and 15-minute city models. The traditional model of idealization, planning, and living in metropolitan areas is based on the automobile, in the commuting movements, and in a dependent relationship between city centre and suburbs. The pandemic context exposed, in practice, the choice and the need for a human centred design model for metropolitan areas planning. The disrupted reality experienced in the last two years exposed the need to change traditional practices to guarantee global, and local sustainability. Remote work impacts commuting as well as the interactions between individuals and their home environs. To support this statement, the case studies of Paris and Barcelona, are both examples of 15-minute city model implementation. In the end, some questions: Why insist on unsustainable commuting centred planning? If the remote work experience along the lockdown was positively perceived, why its adoption is so difficult, almost impossible?

**Keywords:** Remote work, Smart city, Sustainability, 15-minute city, Human centred design

## INTRODUCTION

The prolonged pandemic context of Covid-19 emphasised the fragilities of suburban metropolitan areas. The requirements of physical distance and restricted mobility uncovered the need of facilities to promote the human contact with nature and the access to essential services and products required by human's ordinary routines. At the same time, the disrupted reality, challenged the dynamics of human interactions with built environment boosting the implementation, development, and assessment of smart city concept. Repeatedly, the achieving of this goal is essentially based on policies related with decarbonization and the adoption of e-mobility, disregarding other features, such as remote work which impacts significantly to improve the balance between residential areas and the city centre, the connection between users and the residential area, all together towards individuals' quality of life. Throughout the pandemic context, the new forms of work enabled by ICT, such as remote work, allowed the performance of activities, the access to

services and the social interactions between individuals. Regardless of related (des)advantages statistical data shows that the workforce aims to adopt a hybrid working model. The imposed permanence within residential area, for health reasons, enhance new forms of interaction with home, neighbourhood, and the community. The experience with the residential area's facilities and community revealed a new way of living and interacting with an area (usually) almost unexplored. A new reality forward us to the importance of the smart city concept and the emergence of the 15 minutes city subject. This concept states that every essential service must be at a temporal distance of 15 minutes, on foot or by bicycle, promoting the sustainability, in its dissimilar pillars, of the urban area.

In view of these circumstances, it is possible to state that the new reality, raises a wealth of questions and challenges to the built environment and the way we interact with it. Is the concept of the intelligent and inclusive city, based on the principle of the 15-minutecity a solution to the fragilities of the suburban residential areas? Is remote work a critical parameter to achieve such goal? What is the impact of remote work on the balance of the pillars that support the concept of sustainability?

### **15-MINUTE CITY: FROM CONCEPT TO REALITY**

The way we work contributes significantly to define where and how we live. The 20<sup>th</sup> century witnessed the spread of urban environment towards unsustainable metropolitan areas, which substantiate the human migration searching for a chance to improve human existence. These areas rely on an unbalanced model, that offers in city centre the services and employment while dwelling is mostly on its fringes, supported by commuting in private or public transportation. This model impacts sustainable assumptions concept and the international concerted targets to achieve it. Suburban areas provide the dwelling demands of metropolitan areas in a car centred planning approach to answer to users' commuting.

The development of information and communication technologies (ICT) and its incursion on individuals' professional and personal lives encouraged new ways of working of living that slightly changed our behaviours oriented by a tailored computerised model. The possibility to commute information instead of people was and still is conditioned by bureaucratic standards and the individual's physical presence. Despite this tailored computational model that drives the standard work routines, the need to achieve sustainable goals and the development of ICT support the objective of many municipalities to be labelled as smart cities.

The pandemic context of Covid-19 disrupted the *status quo* of the system emphasising the importance of technology to preserve the activities of dissimilar areas, when all the world was confined at home and limited to the immediate neighbourhood area. On the need for physical distance (not social one), the change of daily routines and the movement restriction to the immediate neighbourhood disclosed the fragilities of the suburban areas, namely the difficulty to provide essential services, leisure areas and contact with natural elements.

The way individuals' experience their neighbourhood areas and the ICT impact along the years of epidemic context due to covid-19 justify the existence and adoption of the concept of 15-minute city. The concept dates from 2016, was coined by Carlos Moreno and aims to appeal to a flexible urban model that allows the access to daily requirements within a 15-minute distance beating the mono-functionalities offered by suburban and even city centre area. The implementation of the concept enhances the existence of housing, workspaces, services, business, leisure, and cultural areas, improving human interactions with built environment and between individuals. The concept is based on four premisses: proximity, density, ubiquity, and diversity. Proximity between the multi-functional solutions offered; density to ensure the required number of people to allow the subsistence of the multi-functional solutions; ubiquity relates to the need of these environs as a practice not an exception, thus available and affordable by the ones who want to live there; diversity relays on the multi-functional solutions required to respond to human needs (Moreno et al., 2021).

From smart city to 15-minute city there is a spot on the need to humanise city, and as the smart cities network, which encourage the improve the intelligence of the cities towards their responsiveness to context and people requirements, there are some cities which have already start to implement the 15-minute city framework. However, the implementation of the 15-minute city framework cannot and does not void the importance of and access to city centre. There are institutions which are not possible or desirable to replicate, an impossibility endorsed by the premises of the concept.

It is critical to show that once the model is not one size fits all every attempt to its implementation must consider geographic, demographic, economic and cultural context (Ratti and Florida, 2021). Some suburban areas and neighbourhoods guarantee some easy in the implementation of the model while others ensure considerable difficulties and, at the limit, restrict individuals to their disadvantaged communities. As Ed Glaeser points out, a 15-minute city is not a city once its response to human needs closes the place on itself. A city is a collection of symbiotic environs to connect human heterogeneity, if not, it neglects its essential purpose and a place of opportunity. The concept encourages the creation of subdivisions increasing the gap between advantages and disadvantages regions and between rich and poor. Moreover, remote work enhances the inequity of opportunities (Glaeser, 2021).

We do not believe that 15-minute city paradigm is the answer to all the fragilities of urban fabrics as we do not believe that its implementation increases, dramatically, the already existing inequity of opportunity. From the premise that the 15-minute city paradigm is human centric, its implementation demands a survey and evaluation of the context. Currently, the pressure of elderly growth, reveals the physical and mobile vulnerabilities of this group, which impact their lives and their caregivers. Other groups may just prefer to be at a location that promotes the satisfaction of the human daily requirements in a short distance and time. Likewise, we do not believe that the traditional city with all the features that build up its social and cultural (and financial) dynamics and identity is challenged on its basic objectives and experiences. Flexibility and freedom of choice ought to be the rule. Besides that,

the journey must be a positive experience and not a daily penance to ensure our financial survival.

The most advantageous suburban neighbourhoods, respond positively to human requirements, offering the multi-functional solutions that comply with contemporary daily routines. However, even on these advantageous neighbourhoods and suburbs there is a common issue that deserves sustainable alternatives solutions: mobility and the relationship between dwelling and workplace. This reality boosted the geographical distance from the suburbs and the acceptance of traffic congestion to reach the destination despite the promises of a short time travel. Commuting emerges as a major suburbs problem. The daily commuting has significant impact on sustainable goals achievement and in individuals' quality of life.

### **THE REMOTE WORK**

The improvement of information and communication technologies (ICT) in the second half of the 20<sup>th</sup> century boost significant changes and challenges in the way we live, work, and interact. Computers invaded workplaces and dwelling environments allowing new methods of performance and interaction regardless its professional or personal nature. The access to equipment and the introduction of world wide web sponsored the exchange of information instead of people. During the nineties, remote work was a hot topic, launching the concepts of telework and telecentre: the first consider home as the workplace location while the second considers remote offices, belonging to the company or independent spaces dedicated to work, in fact the launch of coworking environments (Caramelo Gomes, 2004).

Regardless all the possibilities offered by technology, the model did not have much acceptance. Although information is the raw material for much of the workforce, the workplace was imbued in a Taylorist model, oriented to the work schedule instead to results. Employers were challenged by the lack of control and employees for the fear of losing benefits of working in site. A reality validated by statistical data.

The pandemic context of Covid-19 challenged the way we live, work, and socialise. Unexpectedly, we were confined at home and restricted to immediate surrounds. Remote work as remote interactions defined the new normality. The physical mobility was replaced by the (remote) access allowing, for most of the people, to work, study and interact with familiars and friends. Regardless the difficulties felt by people because of the experience novelty, limited space at home, the problems related with ICT, the lack of privacy due to the number of people working and living in the same space 24/7, the management of familiar duties, at the end the experience was perceived as a positive one by employees and employers.

The experienced lockdown emphasised the neighbourhood response to human requests. Local commerce prospered and streets support individuals' needs to contact with the exterior and mobility. Individuals (re)discovered their neighbourhood throughout erratic walks and interactions with unknown neighbours. Suddenly, suburban areas experienced different dynamics and a new reality.

Regardless the reasons behind the forced lockdown and the tiredness of being cloistered, working from home was perceived as a positive experience, endorsed by the workforce that aims to return to office but with a hybrid model of work. The adoption of hybrid models of work, working from home or from other remote space, one or more days a week, decreases the commuting movements plus the ecologic footprint while build up new dynamics in suburban neighbourhoods. Above all, the importance of being able to choose and not be restricted to a *déjà vue* standard and outdated Taylorist model. The lockdown has been an experiment, in a real-world scenario, of the premisses enunciated by the smart city and 15-minute city concepts. The experiment, allowed to test the ICT infrastructures and give to employers and employees the opportunity to test a remote work model. The experience offer(ed) a time to be challenged and to change to a humanised and sustainable urban fabric.

### PARIS | BARCELONA: CASE STUDIES

During the pandemic confinement individuals experienced the need of human centred dwelling environments. The experience raised the need for cities planned to satisfy human needs more than cars and mobility amenities, emphasising the premisses of the 15-minute city concept and several cities around the world start to apply policies to its implementation. Good practice examples can be found under different names but the same objective, supported by responsive methods to the particularities of the context, towards a dynamic, inclusive, and equitable urban environ. This article illustrates the ones of Paris and Barcelona, once both are European cities.

**Paris** - In line with the Paris Agreement for climate change signed in 2015, pointing the reduction of global warming and carbon neutrality, a congregation of several mayors discussed the subject and defined strategies to follow (Barcelona Metropolis, 2020). The climate challenges and the pandemic context for the years 2020 and 2021, stimulate the discussion upon the 15-minute city and the need to improve citizens' quality of life. In practice, the proposed measures concern the reduction of cars to decrease CO<sub>2</sub> emissions and to improve air quality. This objective was encouraged by the construction of cycle lanes and the reduction of a considerable number of parking spots, these ones replaced by playgrounds, allotments, and green areas. To stimulate the experience of the city by the users, cars are banned along the river Seine and one Sunday every month will be car free. The number of electric vehicles charging points were increased and the speedy limit was restricted to 30km/h (Postaria, 2021). There is the idea to give multifunctionalities to buildings, namely the public ones, to increase its occupancy for longer. The same place can host different purposes based on different time, weekdays, and months schedules. Also, Parisian schools' grounds were converted to green areas, and more green areas are expected granting the contact with natural elements, contributing to the quality of the air, the temperature and the embellishment of urban environ (Yeung, 2021).

The commuting movements are challenged by ICT developments, the increase spaces dedicated to remote work and the number of people who

choose a hybrid model of work. The reduction of commuting will be an advantage for the people who, by professional function, need to be on-site. The investment in a good network of public transportation contributes to its preference by the users (Werz, 2020).

The physical proximity between the functional spaces that support human daily routines as well as the public spaces and walking paths impact appreciably human interactions between individuals and individuals and built environment. These interactions are crucial for building up the sense of belonging and the community culture to the change of urban areas in liveable, resilient, and equitably communities.

**Barcelona** - In the year 2016, the city of Barcelona, as result of the Paris Agreement, launched the Superblocks conceptual framework, to improve the public space by the reduction of traffic, pollution levels, environmental noise, traffic accidents and sedentary ways of living. The model proposes the restriction of car traffic in some areas to make them healthier and safer, and greener public spaces. The operability of the model is supported by public participation of locals, associations, Municipal authorities experts and technicians, and everyone who wants to participate through thematic meetings, workshops and electronic platform (Ajuntament de Barcelona,?).

A superblock works as a unit of 400 by 400 meters made up of 9 (3x3) existing blocks. The peripheral roads support the automobile traffic while the interiors ones along with squares are dedicated to mixed-use and green public spaces to encourage human activities and interactions. The impacts of heavy traffic, noise levels and air pollution, climate change and the raise of summer temperatures dictate the need for green areas to face these challenges along with the beautification of built environ. To meet this goal, a considerable number of courtyards of the Eixample district were planted with trees and other city squares were devoted to parking restrictions (Mccluskey, 2019). The model intends for a human centred design approach, where public space is the arena to perform a diversity of uses as well as the interactions performed by a diversity of people (C40 Cities Climate Leadership Group, 2022).

The superblock model is an expression of freedom to perform pleasant activities and interactions or, by the opposite, a restriction to, the standard and unsustainable way of living. This dichotomy is the expression of the voices that support and/or context the model. The plea against the model relates to the relation of affection and dependence between users and cars. The model proposes the disruption, in a short period of time, of the living model that we are used to for decades. Some people complain about traffic restrictions, for the increase of traffic in the peripheral arteries of the superblocks, others as they perceive as meaningless the interior squares and streets. The model is validated by those who knows the challenges faced by climate change and by the ones who noticed an improvement in their quality of life: an outcome of the decrease of pollution and noise level; the contact with the natural elements and the dissimilar activities to perform near home; the strengthening of neighbourly relations; the construction of positive experiences and the sense of belonging to a community width which they identify and respect (Popescu, 2020).

## ISSUES TO DISCUSS

The climate changes and the pandemic context of Covid-19 clearly demonstrate the need to reinterpret and redesign the urban environment. There are different models to achieve a more sustainable, resilient, and humanised urban environment, from which the article highlights the smart city and the 15-minute city. The 15-minute city often named as the smart city evolution, aims the redesign of the built environment with a human-centred design approach to improve users' quality of life. In practice, this objective forces a disruption in the functional and symbolic importance of the automobile, freed the public space from cars and reinvent the area with services and amenities to support daily living routines in a walkable distance. The release of time spent on mobility, despite its nature, can be dedicated to positive outdoor (as indoors) experiences and interactions. This paradigm shift can be sponsored by the progress of ICT and related infrastructures, the access to services and personal and professional activities performed in a remote way. To reinforce the challenge, the dichotomy of dwelling-workplace needs to change. As never before, remote work, ought to be a common practice for people in general regardless professional profile. Remote work means the professional performance outside the standard office setting: at home, at coworking spaces, cafes, libraries, etc... and supported by ICT. This does not mean the abandon of the city centre nor the traditional workplace in standard office buildings, but to give an opportunity to flexible and hybrid models of work responsive to a more secure, healthy, and green urban environment. ICT contributes significantly to promote innovation and the achievement of the city of the future. The development of ICT and big data support ultra-connected citizens in a more efficient, sustainable, and habitable urban fabric. The emphasis was on the access, allowed by technology, to almost everything. The difference from smart city to 15-minute city (regardless the different nomenclatures given to the concept) is that the focus now goes to the users' experience of built environment, in a creation of multi-functional neighbourhoods and participatory communities, under the living locally mantra. At the end, smart city and 15-minute city concepts are the two faces of the same coin, and the strength of each concept enhances the other, to the improvement of users' quality of life. A good example of this interconnection between the two concepts is the remote work. Without the standardisation of hybrid models of work is not possible to achieve the premisses defended by smart city and 15-minute city concepts. Without new working models and workers behaviours, the promised paradise of smart city and 15-minute city become a purgatory by the management of car-dependent experiences.

## ACKNOWLEDGMENT

This work is financed by national funds through FCT - Fundação para a Ciência e a Tecnologia, I.P., under the Strategic Project with the reference UIDB/04008/2020 and UIDP/04008/2020.

## REFERENCES

- Ajuntament de Barcelona (?) Superblocks - 'Let's fill the streets with life'. Ajuntament de Barcelona Website: <https://ajuntament.barcelona.cat/ecologiaurbana/en/bodies-involved/citizen-participation/superblocks>
- Barcelona Metropolis (Dec, 2020) Living in proximity, the 15-minute city. Barcelona Metropolis Website: <https://www.barcelona.cat/metropolis/en/contents/living-proximity-the-15-minute-city>
- C40 Cities Climate Leadership Group (2022) Benchmark: 15-minute cities. C40 Cities Climate Leadership Group Website: [https://www.c40knowledgehub.org/s/article/Benchmark-15-minute-cities?language=en\\_US](https://www.c40knowledgehub.org/s/article/Benchmark-15-minute-cities?language=en_US)
- Caramelo Gomes, C.: A Conceptual Model to Introduce Telework in Lisbon. Universidade Lusíada Editora, Lisboa (2004).
- Cities Forum Website: <https://www.citiesforum.org/news/15-minute-city/>
- Glaeser, E. (May 28, 2021) The 15-minute city is a dead end — cities must be places of opportunity for everyone. LSE Website: <https://blogs.lse.ac.uk/covid19/2021/05/28/the-15-minute-city-is-a-dead-end-cities-must-be-places-of-opportunity-for-everyone/>
- Mccluskey, B. (Jan. 21, 2019) 5 “green cities” lead the way. Technologist Website: <https://www.technologist.eu/5-green-cities-lead-the-way/>
- Moreno C, Allam Z, Chabaud D, Gall C, Pralong F. (2021) “Introducing the “15-Minute City”: Sustainability, Resilience and Place Identity in Future Post-Pandemic Cities.” *Smart Cities* 4 n°1:93-111
- Popescu, C (Oct.30, 2020) The Six-Foot and 15-Minute City. Cities of the Future Website: <https://citiesofthefuture.eu/15-minute-6-foot-city/>
- Postaria, R. (Nov. 5, 2021) “15-minute city” – how do we get there?
- Ratti, C., Florida, R. (Nov.11, 2021) The 15-minute city meets human needs but leaves desires wanting. Here's why. World Economic Forum Website: <https://www.weforum.org/agenda/2021/11/15minute-city-falls-short/>
- Werz, J. (2020) Planning the cities of the future with the “15-minutes city” concept. ETHZ Website: <https://wp-prd.let.ethz.ch/WP0-CIPRF91243/chapter/planning-the-cities-of-the-future-with-the-15-minute-city-concept/>
- Yeung, P. (Jan. 4, 2021) How ‘15-minute cities’ will change the way we socialise. BBC Website: <https://www.bbc.com/worklife/article/20201214-how-15-minute-cities-will-change-the-way-we-socialise>