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Global warming, ageing of population, reduction of energy consumption, immigration flows, optimization of land use, technological innovation

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The cover image shows railway street in Hanoi, Vietnam (Source: TeMA Journal Editorial Staff).

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The 15-minute cities concept applied to a Brazilian neighborhood: case study of the cidade universitária Pedra Branca neighborhood in Palhoça-SC

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Abstract
Although the concept of 15-minute cities may be considered recent, when looking at the history of urban planning it is possible to recognize the trajectory of different paradigms that underpin it. In 2016, Carlos Moreno defined the "15-minute City" as an urban territory where inhabitants can access all their daily needs within a 15-minute walk, making it possible to live, work and access leisure spaces within a comfortable walking radius. In this context, this article aims to apply the concept of "15-minute city" in the analysis of a Brazilian neighborhood. To this end, firstly, the concept is understood through a literature review that covers theoretical and conceptual reflections on the works of authors such as Ebenezer Howard, Clarence Perry, Jane Jacobs, Gordon Cullen, among others. After the literature review, a case study of the Pedra Branca University City neighborhood in the municipality of Palhoça-SC is presented, analyzing it in light of the 15-minute City concept. Finally, this article reinforces the idea that establishing principles that reorganize urban space, mainly at the local scale of neighborhoods, as places of complex social interactions that can result in a city with a higher quality of life.

Keywords
15-minute cities; Urban planning; Cidade Universitária Pedra Branca.

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1. Introduction

According to the "World Population Perspectives", published by the UN (2019), in the next 30 years, the world population is expected to grow by around 2 billion people, increasing further to 9.7 billion by 2050. Another important data is related to the world population that lives in urban areas, where research indicates that by 2050, 70% of the population will live in cities, whereas this figure currently represents 55% of the population (UN, 2019). The need to seek solutions that address the demands arising from this rapid urban expansion is increasingly common among public administration managers, academics and the population.

The relevance of thinking about actions that promote sustainable development is emphasized when it is noted that this urban growth occurs on a larger scale in developing countries, where the population often already lives in urban centers with inadequate infrastructure (UN, 2013). The problems mentioned above are increasingly being discussed among urban planners, society, and managers, however, this is not an issue discussed only in current times.

Among the various initiatives that aim to promote people's quality of life, in 2016, professor Carlos Moreno defined a concept called "15-minute city", describing it as an urban territory where inhabitants can access all their daily needs in about 15 minutes, making it possible to live, work and access leisure spaces within a comfortable walking radius (Moreno, 2016).

Therefore, this article aims to understand the trajectory of the "15-minute city" concept and apply it to the analysis of a Brazilian neighborhood, believing that the parameters that underlie this theory originate from the culmination of several urban planners, architects, thinkers who wrote the history of urban movements.

Thus, we approach the concept, seeking to understand it through a comprehensive literature review that encompasses theoretical and conceptual reflections by renowned authors, such as Ebenezer Howard, Clarence Perry, Jane Jacobs, Gordon Cullen, and other exponents in the field. This review serves as a solid foundation for our analysis. After recognizing the main guidelines and origins of the concept, we sought to apply it to a case study of a Brazilian neighborhood. Therefore, the work includes a detailed case study of the Cidade Universitária Pedra Branca neighborhood, located in the municipality of Palhoça. Through this study, we intend to analyze the neighborhood in light of the 15-minute City concept, exploring how this urban planning approach can be applied and its implications.

Finally, this article reinforces the central idea that establishing principles that reorganize urban space, mainly at the local scale of neighborhoods, can transform them into places of complex social interactions, contributing to the creation of a city with a significantly higher quality of life. Our research aims to deepen understanding of these principles and their practical applications, highlighting the importance of a human-centered approach to urban planning.

2. Literature review

2.1 A brief retrospective on the evolution of urban thinking

In 1898, the British urban planner Ebenezer Howard published the book "To-morrow", which later, in 1902, in its second edition was called "Garden Cities of To-morrow", in Portuguese, Cidades Jardins de Tomorrow (Howard, 1996).

In this work, Howard proposed an alternative to the poor living conditions of people who lived in cities, briefly describing a diagnosis of the consequences of overpopulation in cities, mainly as a result of migration from the countryside, defending a city model where people and nature could live harmoniously (Saboya, 2008).

Thus, Howard presented the benefits and problems of living in the countryside or the city, characterizing the city as an environment of socialization and opportunities, however, with serious problems in people's living conditions due to the high housing density. In contrast, in the countryside, it was possible to live close to nature, with an abundance of water, sun, and food production, but the lack of infrastructure, social experiences

and employment were negative issues. From these observations, an alternative called Town-Country emerged, combining the potential of each place (Saboya, 2008).

Although this thought represented a change in the conception that existed at that time, influencing the urban thinking that would come later, for Hall (2002), the description of the Garden City was made incorrectly.

This interpretation described urban space as a large isolated space in a largely rural area, when in fact Howard's (1902) proposal was exactly the opposite, where cities were built within shorter distances, so that, when a region reached its density to its maximum, another city would be created ensuring that a rural area was between the two (Hall, 2002; Saboya, 2008).

In 1929, Clarence Perry detailed the concept of "Neighborhood Unit" in a monograph entitled "*The neighborhood unit: a scheme of arrangement for Family life Community*" (Roldan, 2019).

This concept had already been presented by the author himself, at a meeting in 1923 of the American Sociological Association, based on his experience as a resident of the garden neighborhood Forest Hills Gardens, created in the early 1910s in the Queens district of New York, a neighborhood that was built on the principles of Ebenezer Howard (Hall, 1988; Rigo, 2017).

The Perry Neighborhood Unit defines that in an urban sector the population density should only be that necessary for the operation of a primary school, being approximately 800 meters from houses, so that a child can travel to school walking, without having the need to cross even one road with greater traffic (Mumford, 2000). The Neighborhood Unit, according to the concept, should accommodate four essential uses: school; leisure area and park; shops, even if small, to encourage the necessary local commerce; and residential space (Rego, 2017).

Following this line of thought, Jane Jacobs, a writer and political activist, published the book "The Death and Life of Great American Cities" (Jacobs, 1961) in 1961.

In her work, she criticized the foundations that guided the planning and reurbanization of cities at that time, which were based on the idea of isolated buildings, with zoning of functions and distancing in the circulation of pedestrians and vehicles. Cities at that time, according to Jacobs, were dominated by individualism, and people's quality of life, as well as social and economic dynamics depended of the overlapping of diverse functions and the interconnection of dense neighborhoods.

Defending the resumption of observation of real cities by modern planners, arguing about the importance of diversities in the uses of urban areas in a complex and dense way, supporting the idea that a city is happy and safe when the streets are dominated by people in a sufficiently dense concentration and when there is a relationship of cordiality and friendship between residents (Montaner, 2007).

In the same year, in Europe, Thomas Gordon Cullen, an English architect and landscaper, published "Townscape" (Cullen, 2012), where he argues that just as the grouping of people brings about other attractions for the community, the grouping of buildings fosters greater visual appeal than an isolated building.

Its publication is considered one of the most important readings regarding urban design in the 20th century, as it reinforces the importance of thinking about urban spaces, considering that the feelings of emotion and drama that emerge in people arise from everything that surrounds us, such as trees, the sky, buildings and the art of rapport. Still in the 60s of the 20th century, Christopher Alexander in his article "A City is not a Tree" (Alexander, 1965) criticized the modern way of thinking and producing cities or parts of them.

Alexander criticized the "artificial" cities planned by modern designers, which were extremely hierarchical and less complex, unlike "natural" cities, which spontaneously took shape through an abstract structure with a network of elements and uses that work in a complex way.

In 1971, the new edition of the book, called "The Concise Townscape", gives definitions and applications. In the definitions, Culler describes three categories to investigate the emotional impacts of individuals, namely: (1) Optical: derived from serial vision, it is formed by successive perceptions of vision in movement in urban spaces. The urban landscape can be captured by discoveries and experiments in the urban environment; (2)

Place: refers to the emotional forces of space and the possible appropriations of people in certain places. This category is related to the individual's reactions according to the sense of location and (3) Content: characteristics of the landscape related to the constitution of the city: colors, textures, scales, equipment, nature, personality and elements that individualize and characterize the styles and sectors of the urban fabric (Adam, 2008).

This period, from the 1960s onwards, known as the crisis of the modern movement, represents a moment of questioning and reevaluation of the principles and ideals that drove modern architecture and urbanism.

In 1980, Léon Krier in his publication "The Reconstruction of the European City" (Krier, 1978), reflects on the "Development and Progress" of the modern city, emphasizing the negative issues generated by the city's functional zoning and industrial society (Ellin, 1996).

In the same year, Donald Appleyard (1980) conducted a study in which he investigated the effects of traffic on the lives of local residents on three different streets in San Francisco, USA. Such streets were identical in many dimensions except for the amount of vehicular traffic. This research was reported in his book "Livable Streets" where he demonstrated the direct relationship between cars, traffic and people, proving the need to rethink urban spaces, especially sidewalks, considering that the feeling of community is strengthened in sidewalks (Spaces, 2008).

Appleyard was an important professor of Urban Design who, as an urban planner, was concerned with the community and environmental and public life problems, believing that cities and neighborhoods needed to become safe and livable (Appleyard, 1980).

After the crisis of the modern movement, several scholars continued to defend the need to think about man's relationship with the city and the environment, such as Jan Gehl (1987), a Danish architect and urban planner who dedicated his career to promoting the quality of life in urban areas, directing urban planning in favor of cyclists and pedestrians. Bill Hiller, in the 1980s, created the theory of Space Syntax, with the intention of describing important aspects of the urban system and its relationships between public and private space (Saboya 2007), or even Peter Calthorpe, urban architect, who was a founding member of the Congress for New Urbanism (Macedo, 2007).

New urbanism has North American references. The movement that was established in the 80s, when several urban planners and writers, through their works, criticized the configuration of cities at the time (Macedo, 2007), manifesting their frustration towards the way in which the development patterns of cities were taking place, with residential areas far from traditional centers and main roads. Thus, the movement was built around the thought that the physical environment can directly impact people's lives, making its inhabitants more or less prosperous and happy.

In 1993, the Congress of New Urbanism (CNU) took place. Three years later, the New Urbanism Charter was launched, setting out parameters touched on by the movement, exploring means for the development of North American cities (Moreira, 2021). This letter declares the concern to defend the restructuring of urban centers and cities that are in metropolitan regions; reconfigure sprawling suburbs into neighborhood communities; conserve natural environments and preserve the legacy.

To this end, the letter brings principles to be followed to guide public policies, good practices and development planning and urban design, thinking about three spheres: the region (metropolis, city and town); the neighborhood, the district and the corridor; the block, the street and the building (CNU, 2022).

Since its validation, the Charter for New Urbanism has influenced planners and developers of neighborhoods and cities around the world.

In 2009, the Canons of Sustainable Architecture and Urbanism were created by CNU members, creating principles to guide decision-making relating the art of building communities and conserving natural resources (CNU, 2022).

2.2 15-minute cities - 15-minute neighborhoods

The concept of a 15-minute city can be considered rather recent, but when looking at the history of urban planning, the advancement of the different paradigms that underlie the current concept is noticeable. In 2016, professor Carlos Moreno defined the "15-minute city", characterizing it as an urban territory where inhabitants can access all their needs within a 15-minute walk, making it possible to live, work and have leisure spaces within a comfortable walking radius (Moreno, 2016). This concept gained greater emphasis and became popular when the current mayor of Paris, Anne Hidalgo, defended it in her re-election campaign, "Paris du Quart d'Heure", can be translated as "15-minute Paris", illustrated in Fig.1.

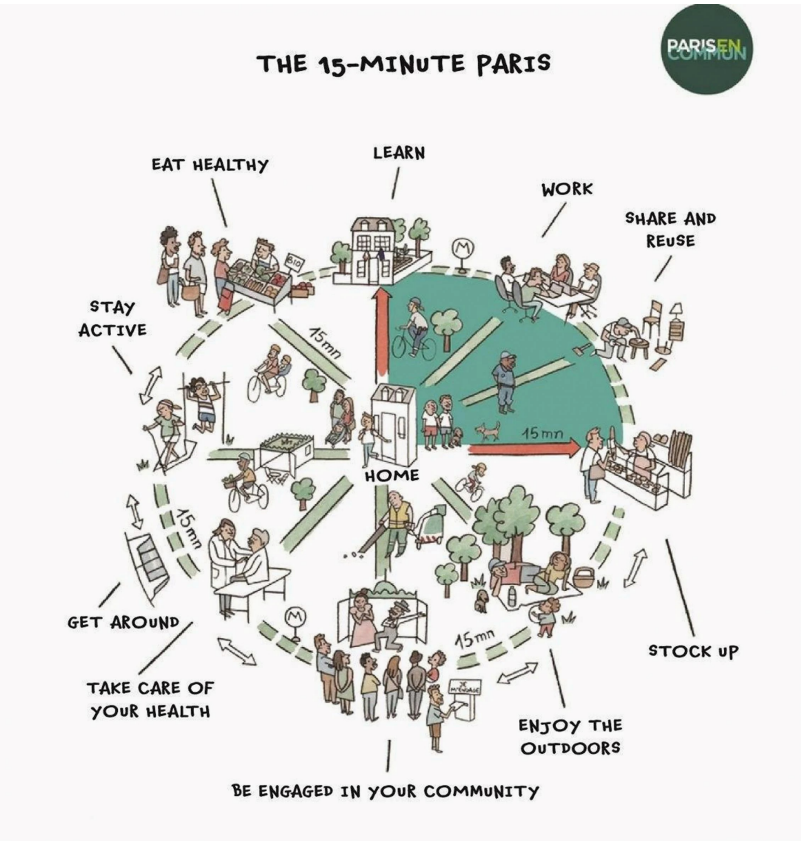


Fig.1 The 15-minute city concept

This proposal won over the citizens of Paris for being a resilient idea, as the city, like the world, had suffered the consequences caused by the COVID-19 pandemic. In this idea, Moreno (2016) argues that quality of life is related to the time that people need to meet their basic daily needs, including (a) living, (b) working, (c) studying, (d) taking care of their health, and (e) having leisure and entertainment.

Therefore, in order to achieve these five essential factors, it is necessary to build healthier urban landscapes, promoting the interaction and participation of residents that strengthen social bonds and trust. From this approach, the 15-minute City concept addresses four necessary dimensions for a city with short distances, which can be drivers for the implementation of measures to redesign cities, namely: (a) Density, (b) Proximity, (c) Diversity and (d) Digitization (Fig.2).

According to Garnier and Moreno (2020), in "Livre Blanc La ville du 1/4 d'Heure. Du concept à la mise en oeuvre", or "White Document: The City of the Quarter of an Hour. From concept to implementation", the dimensions are defined as follows:

(a) Density: relates the number of people per square kilometer. This ideal density perspective is a key element to promote the sustainability of cities in the social dimension.

(b) Proximity: is a fundamental dimension for this concept, seen as temporal and spatial. It considers within a 15-minute radius the possibility of the resident accessing the services listed as basic, within a short walk (or bicycle ride). Shared urban spaces, relaxation areas, children's playgrounds, placemaking and temporary arrangements, enhancement of local heritage and public facilities that enhance culture and promote learning and sport.

Fig.2 The 15-minute city structure

(c) Diversity: defends mixed uses in neighborhoods. To keep the urban fabric active, mixing the uses of commerce, housing and leisure, fosters the area vitality in addition to promoting proximity. Another important point in this item is the encouragement of cultural diversity in neighborhoods, through mixed service offerings that, in addition to helping the local economy, help reduce social inequalities. This dimension is characterized by the axes of action: Sociability through neighborhood networks, inclusion and citizen participation; Diversity activities in the business sector, reindustrialization, public services; Chronotopy through the functional diversity of buildings; Equality between women and men in public spaces and services and security for all.
(d) Digital Tools: The inclusion of new technologies that enable everyday activities such as online shopping, paying bills, accessing information, sharing bicycles and cars, among others. The use of digital tools is aligned with the concept of smart cities, and reinforces hyperproximity, which emphasizes a binary concept (is close/not close) and multimodal (bicycles and personal electric mobility are added) capable of expanding city coverage. neighborhood drive (1/4 mile or 5 minute walk).
The concept defended by Moreno is linked to previous concepts such as "Chronourbanism", "Chronotopia", "Tactical Urbanism", "Placemaking" and "Topophilia". On these concepts, Chronourbanism seeks to define an urbanism that prioritizes the concern for the relationship between space and time, considering the way in which space is used by individuals throughout the day, and emphasizing the importance of distance-time in understanding territories and societies (López, 2015). It refers to the way people live and experience urban spaces, based on different uses and different temporalities. Also, it can be said that chrono-urbanism prioritizes people's quality of life, through holistic, participatory and inclusive approaches. Chronotopia makes the most of existing public space and public equipment resources, avoiding building new ones, making the city more accessible and viable (Daudén; Pinedo; Moreno, 2022). Tactical Urbanism concerns specific interventions that

promote the right to the city, designed together with civil society to propose alternatives to the traditional design process within the urban sphere (Nogueira, 2016). The concept of Placemaking promotes the understanding that the construction of places should not be seen only as "Placemaking", that is, building communities, but rather seeking to meet the needs of diverse people seeking resources that promote the appropriation of space. And Topophilia, which, according to Yi-Fu Tuan in his book "Topophilia: a study of the perception, attitudes and values of the environment" (Tuan, 1974), deals with the relationship between man and his environment and cities, relating the environment physical with the social imaginary, relating landscape, culture and memory, in addition to individual experience and worldview.

Following Moreno's (2016) proposal, the city of Melbourne (Australia) initiated "Plan Melbourne 2017 - 2050" with the aim of defining the future shape of the city and state, thinking about the next 35 years. This plan is based on the "15-minute cities" proposal with the aim of implementing the 20-minute neighborhood concept (Melbourne, 2017). The goals established by the plan are to create a city made up of "20-minute neighborhoods", connected to each other. The proposal is based on the idea that people can satisfy their daily needs within short distances from their homes, which are accessible on foot, with "walkable" streets and avenues, access to public transport and safe cycle paths (Melbourne, 2017). Other urban centers have already implemented this idea, like Portland, which more than ten years ago implemented the "20-minute neighborhood" concept (McNeil, 2011).

Although there is a growing interest in this concept, some aspects generate uncertainty regarding its successful implementation. Issues related to inclusion and the right to the city arise, which cannot be neglected (Casarin, et al., 2023). In the 15-minute city concept, investments in technologies that improve people's access to information and innovation, for example, are useful for those who have electronic devices, capacity and knowledge to access information and resources that will be offered. On the other hand, those who do not have access to technologies or are not able to deal with them end up not being included in this process.

Another important point is the encouragement of active mobility through the use of bicycles, walkable streets, and other modes of travel which do not involve the use of private cars, which must be thought of in such a way that the elderly population and those who have mobility restrictions mobility can also benefit (Calafiore et al., 2022).

Another reality that may exist is the response to investment increase in infrastructure and provision of services in a given location, which often reflects an increase in the value of properties and the pricing of the region, making the population that already resides there need to move to other more peripheral regions (Bright, 2021; Glaeser, 2021; Pozoukidou and Chatziyiannaki, 2021). When private investments enter, with the aim of promoting social renewal and creating diversity, the result often found is an increase in prices (Casarin et al., 2023).

Casarin et al. (2023) mention that poverty concentrated in certain regions clearly represents social inequality and, by mixing communities, the effect can reduce the visibility of extreme poverty, however this policy only "appears" to be successful, but in fact does not contribute to improving the living situation of the disadvantaged population and can even favor community displacement, caused by gentrification. This displacement process generates new clusters of isolated groups, and is called "segregation of diversity" (Hyra, 2015), causing greater risks of social inequality (Casarin et al., 2023).

3. Methodology

The research carried out is exploratory in nature, developed with the objective of relating the concept of 15-minute cities to the case study of the planned neighborhood "Cidade Universitária Pedra Branca", located in Palhoça-SC, in Brazil.

To do this, the objective is, specifically, to understand the concept of 15-minute cities, as well as its variations, such as 15-minute neighborhoods; carry out a case study on the "Cidade Universitária Pedra Branca"

neighborhood, so that its characteristics can be related to the concept under study. Thus, scientific research is structured into methodological stages that, according to Badin (2016), allow for better understanding:

- Stage I - Bibliographical research enabled the understanding and contextualization of concepts that relate to the analysis of this article, with the aim of understanding the urban thoughts that preceded the current concept of the 15-minute city. Such references originate from studies already carried out and available in theses and dissertations accessed from the Scopus Science and Google Scholar platforms, in addition to news and information published on websites related to the object of study of this research;
- Stage II - Case study referring to the "Cidade Universitária Pedra Branca" neighborhood, where data collection was carried out through bibliographical research in secondary sources, enabling the understanding of the historical context of the place, in addition to identifying the main characteristics of the project;
- Stage III - Compilation, crossing of information collected in the previous stages, which allowed the comparative analysis of the concept of 15-minute cities, relating it to the neighborhood under study.

4. Analysis and Discussions

4.1 Case Study of the "Cidade Universitária Pedra Branca" neighborhood

Cidade Universitária Pedra Branca is located in the municipality of Palhoça, Metropolitan Region of Florianópolis, State of Santa Catarina, Brazil. The area that the neighborhood occupies was initially a family farm that stood out for its natural beauty. The neighborhood project began in 1997 in partnership with the land owner, where, meanwhile, the Campus of the University of Southern Santa Catarina was installed. In 1999, the first residential subdivision was started (Criativa, 2023).

From 2005 on, the intervention project for this neighborhood began, aligned with the "New Urbanism" concept, with the aim of improving the city for people. To develop the Pedra Branca MasterPlan, the project received consultancy from specialists such as the North American offices DPZ Latin America and Keystone, Gehl Architects from Denmark and several Brazilian offices, including Jaime Lerner Arquitetura e Urbanismo, in addition to three laboratories from Federal University of Santa Catarina.

During the development of the project, 10 principles guided the proposal: 1) Pedestrian priority; 2) Mixed use; 3) Attractive and safe public spaces; 4) Diversity of Residents; 5) Sense of Community; 6) Balanced Density; 7) Harmony between nature and urban amenities; 8) Sustainability and high performance of the built environment; 9) Connectivity and, 10) Lifestyle (Criativa, 2023).

(a) **(b)**

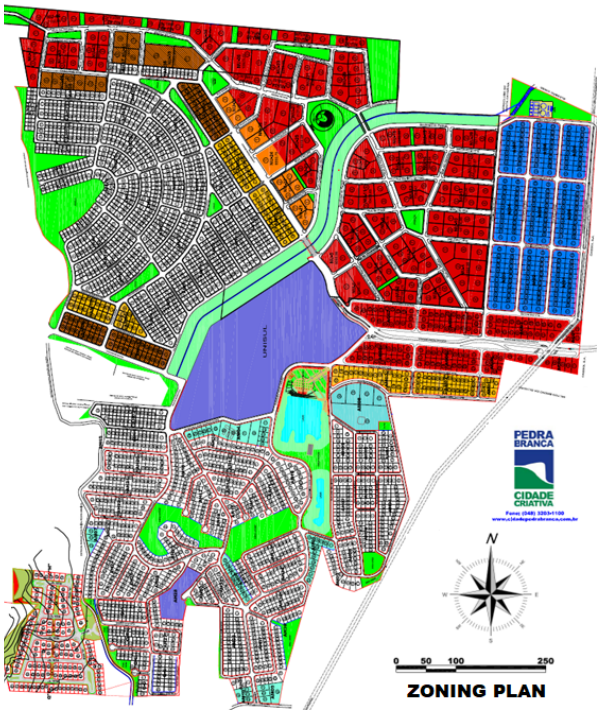
Fig.3 (a) MasterPlan Pedra Branca and (b) Image of the current area with the project implementation

In 2009, the Pedra Branca project was selected as one of the 18 projects that would establish the Climate Positive Development Program (Ecobriefing, 2009). This program supports the development of large-scale

urban projects that demonstrate how cities can grow in a climate-friendly way. Thus, the neighborhood's real estate developments are designed to implement economically viable innovations, waste management, water management, transportation and public lighting, clean energy generation, among others.

Fig.3(a) shows the project proposal presented in 2009, and alongside, Fig.3(b) shows the neighborhood as it currently looks, 14 years later. It can be seen then that the implementation of the project is happening gradually, from the central part of the neighborhood to the rest of the area.This neighborhood was designed to receive around 40 thousand residents, being 10 thousand students and 30 thousand workers (Criativa, 2023). This neighborhood is made up of a wide variety of uses, such as schools, universities, companies, leisure and entertainment spaces, and housing.

In Fig.4, the image of the zoning proposed for this neighborhood, demonstrates the concern in concentrating this great diversity of uses. The neighborhood's infrastructure offers the opportunity to work, study, live, shop and have fun, having an urban area organized in such a way that the local community can establish greater links between residents, through attractive and safe public spaces. Furthermore, in the residential and commercial developments in the neighborhood, sustainable strategies were used such as ventilation and natural lighting, waste management, less aggressive construction materials, use of natural gas, among others (Palhoça, 2022).



ZONING UNIVERSITY CITY PEDRA BRANCA			
MASTER PLAN	TEMPLATE	OCCUPANCY RATE	UTILIZATION RATE
AMC_7 – CENTRAL MIXED AREA 7	12 Floors	50% (A) up to 8 floors 58% - N° (A) < 8 floors	5.2
AMC_4 – CENTRAL MIXED AREA 4	8 Floors	50% (A)	4.0
AMC_3 – CENTRAL MIXED AREA 3	8 Floors	50% (A)	3.9
AMC_2 – CENTRAL MIXED AREA 2	4 Floors	50% (A)	2.3
ARP_4 – PREDOMINANT RESIDENTIAL AREA	2 Floors	50%	1.6
MAS_2 – MIXED SERVICE AREA	15 m	80%	2.4
AMS – MIXED SERVICE AREA	4 Floors	60%	2.0
ARE – EXCLUSIVE RESIDENTIAL AREA	2 Floors	50%	1.0
ACI – INSTITUTIONAL COMMUNITY AREA	4 Floors	50%	2.3
ASE – SANITATION AND ENERGY AREA	-x-	-x-	-x-
AVL – GREEN AND LEISURE AREAS	1 Floor	5%	0.05
APP – PERMANENT PRESERVATION AREA	-x-	-x-	-x-

Observation:
(A) = Maximum occupancy rate of 80% for the ground floor or 75% for the first two floors, when intended exclusively for commercial activities, services or garage floors.
N° = Number of floors according to article 46 (Law 16/93)

Fig.4 Zoning of the Cidade Universitária Pedra Branca neighborhood

In 2014, the neighborhood had 5000 inhabitants and 5500 jobs, in addition to 7000 students (Criativa, 2023). In 2022, more than 8 thousand people lived in the neighborhood and it was estimated that the monthly floating population was 100 thousand people (Palhoça, 2022). The neighborhood is a pioneer in planning the first shared street in Brazil, known as "Passeio Pedra Branca" (Fig.5). This location has an open-air shopping mall, where more than 50 retailers drive the economy of this neighborhood.

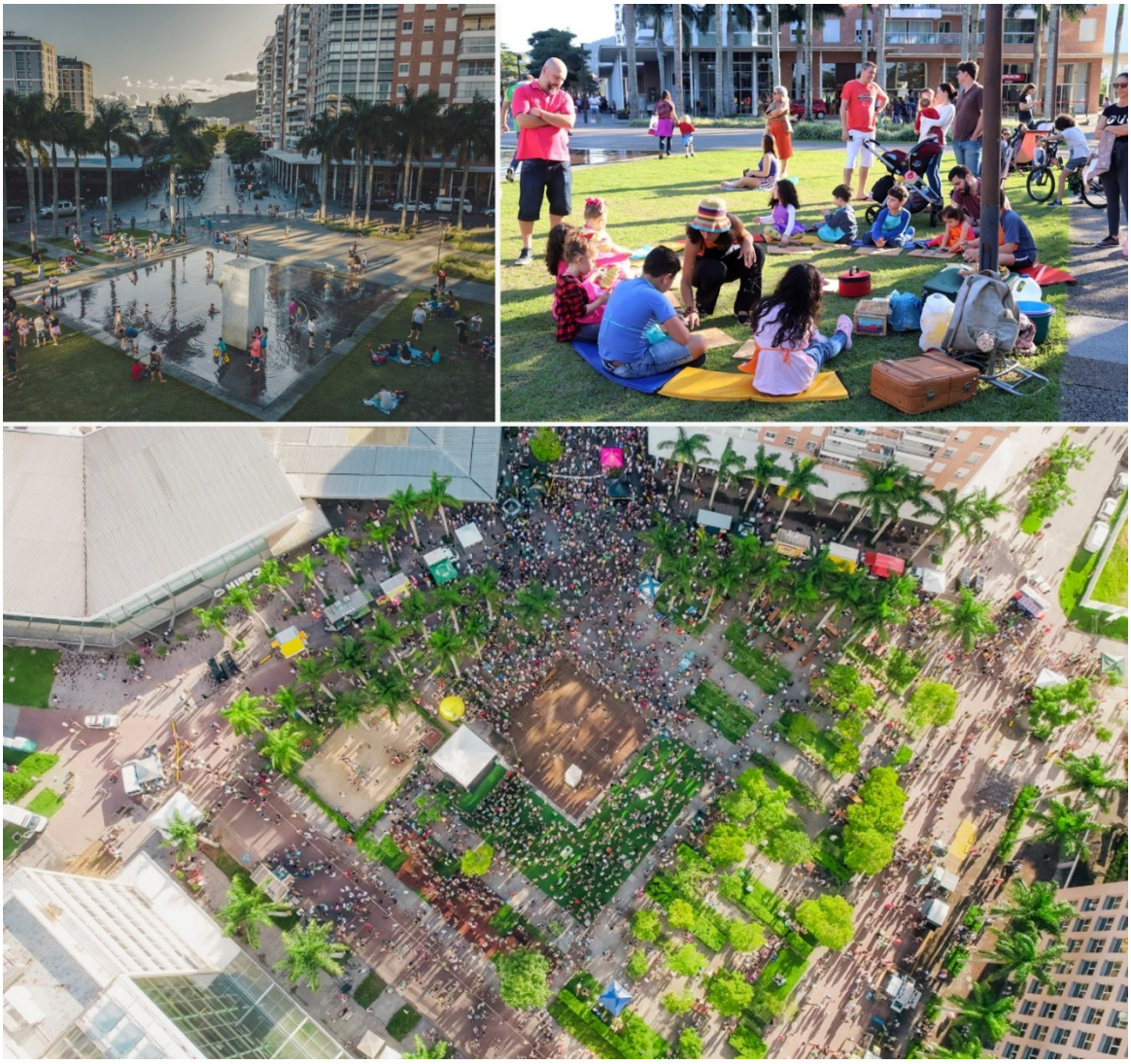


Fig.5 Shared street "Pedra Branca Walk"

4.2 The Pedra Branca neighborhood, according to the 15-minute Cities concept

The concepts of New Urbanism and Sustainable Urbanism are evident in the proposal for the Pedra Branca neighborhood. The concern with recovering the sense of place, rescuing the centrality where people can work, study, have fun and live. When analyzing the region, within the dimensions proposed by Moreno (2016): density, proximity, diversity and digital tools. The dimensions of density and proximity can be observed through the aerial images presented in Fig.6, which record the growth of the region where the neighborhood was located and its surroundings over 20 years, with images from 2003 in Fig.6(a), from 2013 in Fig.6(b) and, from 2023 in Fig.6(c). It is then observed that both the Pedra Branca neighborhood and its surroundings have grown significantly. Although this growth has occurred, in the specific study area, urban voids still predominate, showing that the ratio of people per square kilometer, which would represent the ideal density, is still in

development. The highest building densities, which suggest a greater number of people, are located in the central area of the neighborhood.

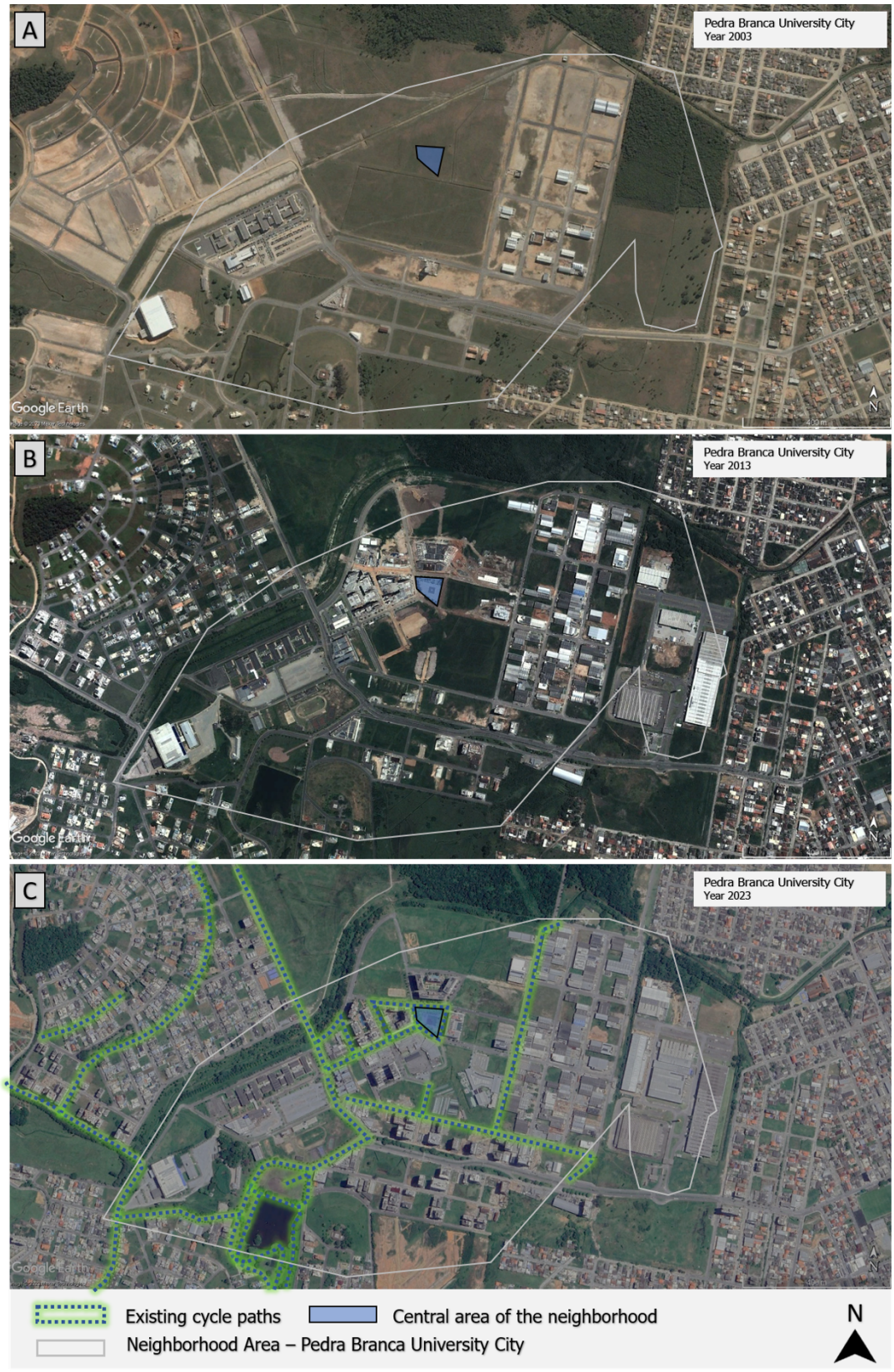


Fig.6 Sequence of images from Google Earth, in the years 2003 (a), 2013 (b) and 2023 (c) respectively, showing the growth of the region where the Pedra Branca neighborhood is located

As for proximity, relating the temporal and spatial vision within the concept of 15-minute cities, it is observed that although the neighborhood favors walkability and the use of bicycles, when analyzing the map in Fig. 6(c) in general, it is clear that it is clear that the cycling infrastructure is still quite restricted, and makes a small connection with the east side of the city, leaving the west side without any connectivity. On the other hand, the urban design of the neighborhood favors urbanity through connected public spaces, green areas, a network of public sidewalks, leisure spaces and active building facades (Fig.7). However, this urbanity is somewhat lost when analyzing the urban structure in its entirety.

(a)

(b)

Fig.7 Leisure and social spaces in the neighborhood

As for the diversity of uses, it is a mixed-use zone, as shown in the zoning map in Fig.4. This condition guarantees the ground floor of the buildings more connectivity with public life, and favors its intensity. The population residing in the neighborhood is made up of different age groups, and is not exclusively university students, as suggested by its name "Cidade universitária Pedra Branca". Given the diversity of uses, the local economy remains active throughout the year.

The last dimension, digitalization, is aligned with the concept of smart cities. In the Pedra Branca neighborhood, a subscription housing concept makes property rental more flexible. The use of technologies is found in all residential and commercial developments, through construction waste management, solar heating, and several other sustainable elements. The neighborhood promotes various events and meetings, and through an online community it posts information with all the neighborhood's programs.

It is concluded, then, that the proposal for the Pedra Branca neighborhood plays the role of articulator and creator of socially diverse encounters. The diversity of uses allows local residents to carry out all their necessary basic functions, within a radius comfortably reached within a 15-minute walk, just as the 15-minute City concept proposes. Furthermore, in the neighborhood under study, active mobility is highly valued through the implementation of adequate and inclusive cycle paths and public sidewalks. However, some elements are still deficient, such as the density of the location, which still has several urban voids, and the lack of connectivity with the surrounding neighborhoods and the rest of the city.

5. Final considerations

The COVID-19 pandemic revealed the vulnerability of cities, making us energetically rethink measures to contain the spread of the virus, adapting the population's routine with new habits, so that their basic activities were guaranteed. This radical thinking about life in cities gave rise to the concept of 15-minute cities proposed by Moreno (2016). As presented in this article, the concern about cities that prioritize people over vehicles is a subject that has been widely discussed over the years.

Thinking about dense cities and neighborhoods, with a diversity of uses that meet the needs of the population, is part of the innovative ideas presented by Jane Jacobs since 1960, for example. According to Jan Gehl, "the

natural starting point of the work of designing cities for people is mobility and human senses, as these provide the biological basis of activities, behavior and communication in urban space" (GEHL, 2013, p.33). The pandemic that the world experienced in 2020 further reinforced the need to think about "cities for people" as Gehl addresses in his book (GEHL, 2013), and the importance of having quality outdoor spaces in favor of a better quality of life. The pandemic awakened feelings in people that seemed obvious, but that many took for granted, such as the importance of contact with people and living in a community. The value of having access to basic services such as health, education, leisure and transport, at distances that can be reached with a comfortable walk or even by bicycle, is something necessary and possible. All of these relationships are addressed by the 15-minute Cities concept.

Although this way of thinking about cities or neighborhoods is not something simple to implement, this concept is very broad, and much more than a guideline for designing urban spaces, this concept reflects a lifestyle that promotes environmentally friendly habits. The idea of denser neighborhoods capable of reconnecting people to these local areas establishing the life of the city, are the scope of this approach which, in general terms are based on attributes already discussed in the past by other writers, architects, and urban planners, where the mixture of uses, density, accessibility and walkability were already guidelines for designing an ideal city. The 15-minute City concept adds the dimension of proximity that highlights the self-sufficiency of a neighborhood, so that a wide range of services and uses are offered in this area instead of offering more efficient means of travel, such as public transport, to have access to such services in other regions of the city.

However, the implementation of the proposed idea for a 15-minute city may face challenges, which vary according to the location, ranging from historical issues of urban inequality, social polarization, territorial dimensions, urban population, among others. Unlike the cases mentioned in this study, such as the 20-minute neighborhoods of Melbourne and Portland, as well as the largest reference for the concept of 15-minute cities, which is Paris, the case study presented in this research refers to a planned neighborhood, which was designed from the project's conception to be a neighborhood converging with the principles of New Urbanism.

The case of the Brazilian neighborhood Pedra Branca differs from the other examples presented in some aspects, since it is a planned neighborhood and not an urban transformation of a city or consolidated location. Although it is a unitary transformation, which was initially led by a group of people who saw great potential in developing the region around the university, the project aimed to improve the city for its residents. This proposal is related to the concept of a 15-minute city, as it rescues the way of living in a community, sharing public spaces, and basic needs met within a nearby radius.

It is important to highlight that this study does not intend to compare the applicability of the concept in urban transformations in the context of a consolidated city or in projects for new urban neighborhoods. Rather, we sought to deepen the vision around the case presented, in order to understand its contributions to the city in which it is located, as an urban design project, and its positive impacts on the city as a whole.

Thus, analyzing the Pedra Branca neighborhood on a local scale, one can see its great relationship with the concept studied: in the heart of the neighborhood, leisure and coexistence spaces strengthen the daily interaction of the population; in the central area, the "Passeio Pedra Branca" square, has daily attractions for the population residing in the neighborhood, and for people who go there to enjoy the activities and infrastructure it provides; the streets are narrow and the sidewalks are wide, with the aim of discouraging the use of cars; public sidewalks are protected by trees that provide greater comfort for pedestrians; the facades are active, and the occupation of the space is mixed, favoring living, working and leisure in the same place.

Although this concept is applied to a planned neighborhood, this example reverberates throughout the rest of the city. The neighborhood borders other neighborhoods in the city, as can be seen in Fig.6, and cycle paths connect this neighborhood to other regions of the city. Furthermore, as it offers several leisure and entertainment attractions, the neighborhood is very popular with the population that lives outside of it, which

keeps the local activity and economy active throughout the year, even considering the seasonality of the academic calendar.

Thus, as Jane Jacobs (1961) argued, what brings security to the city is the presence of people circulating at different times of the day or night. It is not common in the neighborhood under study to have walls, lookouts, or gates, but rather the occupation of spaces by people. The sense of belonging connects the neighborhood's residents to the rest of the city. Although it is a developing neighborhood, it is believed that good urban planning practices can expand outside of it. Furthermore, although the neighborhood has great development potential, with the university as a driver, density is still far from expected. Many factors can contribute to this, including the fact that the neighborhood is not fully integrated with the rest of the urban fabric. Another argument that can be suggested is the possible overvaluation of real estate. Still, the neighborhood is very popular with the population of the city of Palhoça. All space reorganization actions that the concept suggests generate technical issues that need to be thought about before implementing such guidelines, redistributing the functions of the neighborhood considering geographic, economic and social principles, such as population limits and number of markets, pharmacies, schools, etc, in addition to reorganizing municipal laws. Another relevant point is the fact that having easier access to these services and the hyperproximity centers generated can contribute to the process of gentrification and real estate speculation in these regions. It is also worth highlighting the issues related to hyperlocalism which, according to some authors, is the difficulty of implementing these concepts in smaller cities or with low purchasing power and also resolving issues of social segregation, leaving these problems as suggestions for future studies. In short, every change must first be disseminated so that people can assimilate it. For this reason, this article justifies its importance, as it encourages discussions on a subject that impacts the way people will position themselves in the face of current challenges. The concept presented is not a new proposal, but rather the culmination of several years of studies and reflections to provide greater vitality and quality to cities and the people who inhabit them. Establishing principles that reorganize urban space, especially neighborhoods, as places of complex social interactions, promoting well-being from the inside in these regions, can result in a city with a higher quality of life.

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Image Sources

Fig.1: Manifesty, Odilia Renaningtyas; PARK, Jin Young. A Case Study of a 15-Minute City Concept in Singapore's 2040 Land Transport Master Plan: 20-Minute Towns and a 45-Minute City. (2022) *International Journal of Sustainable Transportation, 5* (1), 1-11.

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