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Special Issue 3.2024

Living and Walking in Cities

New challenges for sustainable urban mobility

This Special Issue intended to wonder about the new challenges for sustainable urban mobility, aligning with the European Sustainable & Smart Mobility Strategy. Contributions come from selected papers of the XXVI International Conference "Living and Walking in Cities" and have been collected around two main topics: the relationship between transport systems and pedestrian mobility and the transformative potential of temporary urban changes. Reflections and suggestions elaborated underline a collective great leap forward to reshaping urban mobility paradigms.

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TeMA

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Land Use, Mobility and Environment

Special Issue 3.2024

Living and walking in cities: new challenges for sustainable urban mobility

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DICEA - Department of Civil, Architectural and Environmental Engineering
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Cover photo: Herrengasse street in Graz (Austria), baroque pedestrian avenue and centre of public life, provided by Michela Tiboni (June, 2024)

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Special Issue 3.2024

Living and walking in cities: new challenges for sustainable urban mobility

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Urban forms interpretation for the car-era spaces reuse. A comparison of walking, automobile, and sustainable cities

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Abstract

The shape of the city is described in various ways, but it's not incorrect to view it as the result of intricate connections between tangible components and intangible influences, specifically the behaviors of its inhabitants. Over the last century, through the Modern Movement and the impulses of the CIAM, the studies of typological, technological, and stylistic innovation necessary to give the character of 'rationality' to the shape construction, summarized in the metaphor of 'machinist civilization', have produced infrastructures and urban spaces dedicated to the automobile efficiency. Today, the issue of sustainability is bursting into all sectors, shaping new urban and mobility models, mainly based on non-motorized travel. A situation not too different from that which has characterized cities in the past, in particular Italian realities.

Starting from these conditions and from the identification of a strong link between urban structure and mobility, the paper gives an interpretation of Italian cases able to connect the different components of the city, made up of spatial dimensions, represented by the urban structure, and temporal dimensions, identified in mobility patterns. Beginning with the walking city model, which is 30-minute walkable, the historic city, the rationalist one of the automobile city, and the polycentric structures are investigated to trace examples of design that can still be valid today and understand the possibilities to reuse the automobile-age spaces.

Keywords

Urban structure; Mobility patterns; Urban forms.

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1. Introduction

Sigfried Giedion, in 1954, in his well-known book *Space, Time and Architecture* says «A city is the expression of the diversity of social relationships which have become fused into a single organism» (Giedion, 1954, p.41). From this statement, we can conclude that the city can be interpreted as the product of complex processes of interaction that are established between material elements, such as streets, buildings, open spaces, and intangible components, represented by the uses and behaviors of citizens but especially by the flows of their movements, capable of profoundly shaping urban and territorial transformations. The form of a city, which by definition refers to the material and tangible part of physical space is, therefore, the result of the integration of social practices and activities, especially of interaction and movement, and mobility in this context is the element that innervates all aspects of urbanity (Urry, 2000).

Furthermore, new technologies have always found their primary application in transport systems, with deep implications for the city and its material and immaterial elements (Balletto, 2022), so much so that urban transformations have always been linked to the means of mobility, and the morphology of cities is the consequence of the technologies of the time in which they grew. In fact, many authors arranged the historic city for foot and horseback movements, the industrial city for rail transport, and the modern city for car use (Zanirato, 2020, p.89). For example, Newman and Kenworthy (1996) identify the mobility model of the *Walking city* in the historical city structure, while for cities built in the second half of the last century, they call about the *Automobile city* model.

In the past, urban planning and design have mainly focused on infrastructure spaces as physical elements, thinking of their functioning in terms of efficiency, technique, and speed. For several years now, however, these disciplines have been looking more and more at mobility as a possibility, as an aptitude, ability, and ease to move, to travel of individuals in the space of the city and the territory (Tira et al., 2021; Gargiulo et al., 2022). Also, numerous studies and investigations currently interpret the city as a composition of different units divided according to a metric determined by the temporal factor. After the Covid-19 pandemic, thanks to the recent Parisian experiment of the *Ville du quart d'heure*, interest in the 'chronourbanism' theorized by Carlos Moreno has increased (Moreno et al., 2021), but these ideas are based on numerous studies carried out in the past by the urban disciplines (Christaller, 1933; Jacobs, 1961; Gehl, 2009; Gehl, 2011; Hall, 2001; Perry, 1929). As highlighted by Moreno the concept of 'chronourbanism' and the choice of 15-minutes may seem arbitrary therefore he suggests adaptations based on the morphology and specific demands and characteristics of individual cities (Moreno et al., 2021). Indeed, many examples of studies suggest a wider range of metrics, such as the American examples of the 20-minute cities of Tempe in Arizona (Capasso et al., 2019), or Portland in Oregon (McNeil, 2011), but also the 30-minute cities (van Vuren, 2020). The common element of all these experiments lies in the approach, which is proximity-based urban planning, intercepted as the indispensable element to sustain the quality of life, provide for basic urban functions, and ensure sustainability and resilience in urban settlements. These examples, and many more, underscore the importance of the rhythms of city life in understanding urban dynamics and the central role played by travel and therefore mobility.

By considering mobility as a fundamental opportunity to rethink urban and territorial settlements and recognizing the strong relationship between urban structures and mobility, this study explores historical and current experiences related to how cities have responded and continue to respond to the social demands arising from the movement of goods and people.

2. Urban interpretation methods: urban structures and mobility patterns

As highlighted by the *III Habitat report*, the Italian territory presents a settlement structure composed of many urban centers (more than 20,000) mostly characterized by small size. Even today, about 42 percent of the Italian population resides in municipalities with fewer than 15 thousand inhabitants (Presidenza del Consiglio dei Ministri, 2016). Cities of the same size and characteristics were found by Newman and Kenworthy (1996)

for the historical urban structure of the *Walking city*, a walking-based city whose destinations can be reached on foot in an average of half an hour.

At the same time, a project, whether it involves the territorial, urban, or architectural scale, can be considered as a work on potential space, only the use that the inhabitants apply within the built site can transform the potential into real space. The citizens are the effective producers of places, they adjust and modify the uses by attributing new meanings to the designed form (Mingardi, 2014, p.1280). Therefore, «to understand the city in its three-dimensional dynamism, to follow and modulate its process of self-generation, to connect and extend its tissue, a study of man is necessary to understand how human experience transforms the built form into an image» (Rykwert, 2003, p.307). Borrowing Rykwert's words, this study examines some urban structures by linking the different material components of the city and temporal issues, identified in the mobility patterns.

Historical and rationalist urban structures are the starting points of this interpretation; as mentioned above, Newman and Kenworthy associate these city typologies with the *Walking city* and the *Automobile city* mobility patterns. To best explain and clarify the elements and characters found in the literature, four Italian cases are used: the city of Venice and Urbino, and the district of San Siro and Pilastro. The research focuses on national case studies due to the already cited importance and peculiarities of the historic tissue in Italy, which, more than other contexts characterizes most of the cities and corresponds to the identified criteria.

Therefore, the cities of Venice and Urbino will be investigated, because in their historical layouts and at different scales, both manifest, in a clear and distinguishable form, the fundamentals and particularities of historical urban structures commonly found in many other national contexts. Also, the modernist experiments made in the San Siro (Milan) and Pilastro (Bologna) neighborhoods, with apparent different forms and structures, make it possible to clarify and delineate unequivocally the concepts and the characteristics of urban environments designed according to the theories of the Modern Movement. These case studies represent an emblematic sample for understanding the forms associated with the historical construction of the city and the later transformation phenomena that can be found in numerous other contexts.

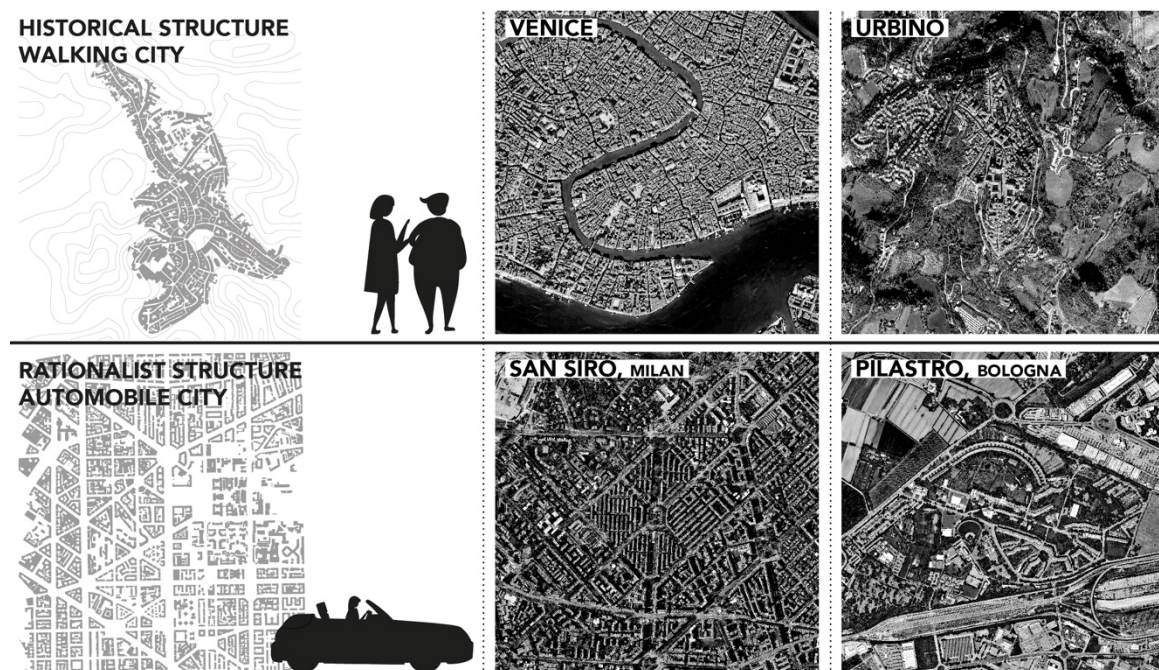


Fig.1 Aerial view of the four cases used for the urban forms interpretation

The framework used for the study focuses, on the one hand, on the material elements of dimension, density, land use, and geometry of the tissues; in parallel, some mobility patterns are intercepted, which are the ways

and manners in which citizens transit within the city, analyzing the spontaneous use of urban spaces and the effects they have on the shape of the city and the mobility project. The interpretation grid is applied to the historical and rationalist urban structure and finally overlaps on the present polycentric structures.

Recognizing polycentric urban structures as extremely important for the project of sustainable mobility patterns, the reading tries to find points of contact between past experiences and current experiments to identify characteristics and requirements that contemporary mobility design is called to actualize. The framework and characteristics identified in past urban structures are finally found in current polycentric structures, investigating in parallel the results of design experiences that are now largely established and the trajectories of current policies and projects, the study aims to define the characteristics that mobility design must respect to ensure efficient, equitable and accessible urban systems.

This study aims to define new grids for understanding the urban phenomenon, but at the same time define characters and design criteria useful for drawing walkable 30-minute urban environments, like polycentric structures similar to the average cities that distinguish the Italian territory. It was decided to reflect on a temporal frame of 30 minutes as it was recognized as the most appropriate to represent the geography, the structure, and the conformation of the urban contexts most present and particularly characterizing the national territory. Therefore, focusing on 30 minutes seems to be an excellent opportunity for the replicability of the studies and for the possibility of suggesting different declinations of contemporary realities.

The survey, therefore, follows the historical evolution of the processes that have shaped urban structures and attempts to actualize principles and practices intercepted in examples from past eras that can still be valid today and, as Paolo Sica ably remarks for the methodology used by Le Corbusier in the development of *Toward a New Architecture*, also in this survey recourse to history is used to shed light on contemporary problems (Sica, 1991, p.136).

3. The historical structure of the Walking city

The first urban structure examined is the historical city, for which Paul Newman and Jeffrey Kenworthy intercept the mobility pattern of the *Walking city*. As Jan Gehl notes «In old cities almost all traffic was by foot. Walking was the way to get around, the way to experience society and people on a daily basis. City space was meeting place, market place and movement space between the various functions of the city. The common denominator was travel by foot» (Gehl, 2009, p.115) in the *Walking city* model, indeed, destinations can be reached on foot in an average of half an hour, which is why the city rarely stretches more than 5 km (Newman & Kenworthy, 1996, pp.27-28).

This structure is based on pedestrian mobility and its physical characteristics are represented by the already mentioned limited extension, due to the specific needs of the walking activities. Other properties are the high density and the mixed land use, always related to the conduct of the pedestrian behaviors, but also to the contained dimension of the urban settlements. Finally, the geometry of the tissues is ordered by the natural elements present on the different sites, topography and morphology are the forces that condition the urban project, therefore the streets present narrow and organic shapes (Fig.2).

Among the several historical cities, the famous American urban planner Lewis Mumford (1961) identifies in the medieval ones the most natural form of the city, which despite the sinuous layouts of streets and buildings (far from the strict geometry of the typical Roman land division) manages to appear equally orderly. In this type of city, the act of walking is the starting point for structuring, for creating urban form, because man «was created to walk, and all of life's events large and small develop when we walk among other people. Life in all its diversity unfolds before us when we are on foot» (Gehl, 2009, p. 19).

In medieval cities, the composition of the urban space is based on surprise, catching the whole scene with a single gaze is impossible so to properly understand the layout and arrangement of the elements, and to understand the functioning of the historic city, the third and fourth dimensions are indispensable; analyzing

the buildings, heights, and architectural details on the one hand, and the sequence of needs and temporal factors on the other are essential requirements for understanding this reality (Mumford, 1961).

Thinking about the apparent physical disorder of the old cities, we must realize that they have a complex social order guaranteed by the dense mix of different urban uses along the streets, an order that allows the operation of a wide variety of activities alongside one another (Jacobs, 1961). The lack of monotony and the succession of spontaneous and unplanned actions are what make moving through urban space a real experience and not just an action dictated by the need for movement.

Across history, urban areas have served as multifaceted gathering spots for urban inhabitants. Residents convened, shared information, negotiated agreements, and facilitated unions, while street performers provided amusement and merchandise was put up for purchase. Urbanites partook in both major and minor civic gatherings. Parades were organized, authority was showcased, and celebrations and penalties were executed openly (Gehl, 2009, p. 25). The entire city was a meeting place.

The open spaces are designed for the many practices that take place there from commerce to recreation or city assemblies, like the alleys and porticoes that are essential for protection from the weather and winds, follow more utilitarian than formal logic, that is also why they take on irregular shapes. However, the medieval city is not only a consequence of practical needs; it cannot be denied that there is in the construction of these structures an aesthetic awareness, an urbanism that reacted to the needs of life and accepted changes and innovations without allowing itself to be destroyed by them (Mumford, 1961).

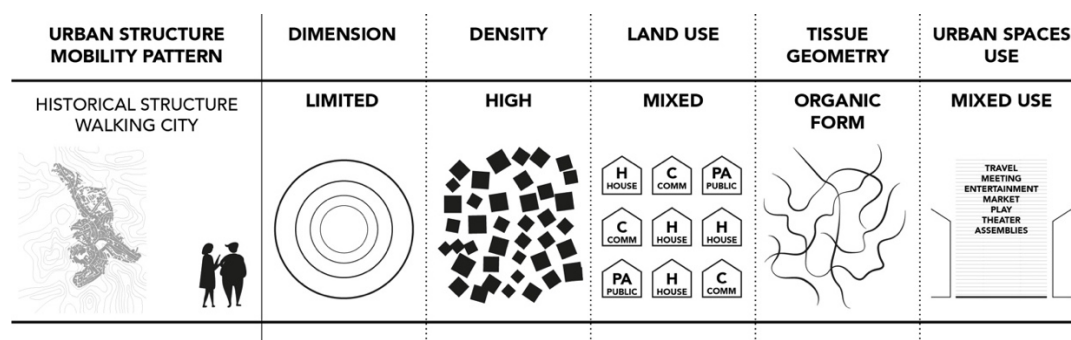


Fig.2 Interpretation grid of the historical cities

3.1 Italian cases of Venice and Urbino

The most iconic example of the medieval Italian city is Venice: no other city can show in a more schematic form the ideal components of the medieval urban structure. And none better prefigured, by its internal evolution, a new urban constellation that promised to overcome the ancient walled enclosure, such as had existed since the end of the Neolithic period (Mumford, 1961, p.321).

Despite its richness of streets, alleys, and squares in varying sizes, the fundamental structure of Venice is uncomplicated and simple, focused on a few central streets that link main locations and a clear distinction between major and minor squares. The city's entire design revolves around a framework that facilitates direct pathways and a handful of significant but essential areas (Gehl, 2009). An arrangement that logically adheres to the most convenient walking paths and permits more attention to enhancing the quality of each space and the whole itinerary. In Venice, it's still common to take 10,000, 15,000, or even 20,000 steps in a typical day, these distances don't feel significant due to the multitude of experiences along the way and the sheer beauty of the cityscape (Gehl, 2009). The canals are additional pathways and boundaries between the different parts of the city, water strips that also serve as roads, like the green belts and highways of a well-designed modern city, the lagoons serve as inviting water promenade and park in one, where the water replace the agricultural landscape of the mainland (Mumford, 1961, p. 323).

Looking at the evolution of San Marco Square, its form and content can be defined as the product of an accumulation of urban purposes and uses, modified by the stratification and succession of different instances, functions, and times imposed by the spontaneous use of the community. An «organic products that no single human genius could produce in a few months over a drafting board» (Mumford, 1961, p. 322).

Therefore, the medieval city plan is not conceived as a static design that responds to the necessities of a specific generation by rejecting any possibility of transformation, rather it tangibly expresses these mutations by creating a unity that emerged from a complex order (Mumford, 1961, p. 322). Equally and quite naturally, in the space of San Marco Square, gradually political and especially social functions substitute the original purposes of the place related to commerce and agriculture, which find locations in other areas of the city. The San Marco pattern is also replicated on a smaller scale in every city parish, «each has its campo or square, often of an odd trapezoidal shape, with its fountain, its church, its school, often its own guildhall» (Mumford, 1961, p.323). This settlement typology depicts an urban structure that can easily be attributed to polycentrism.

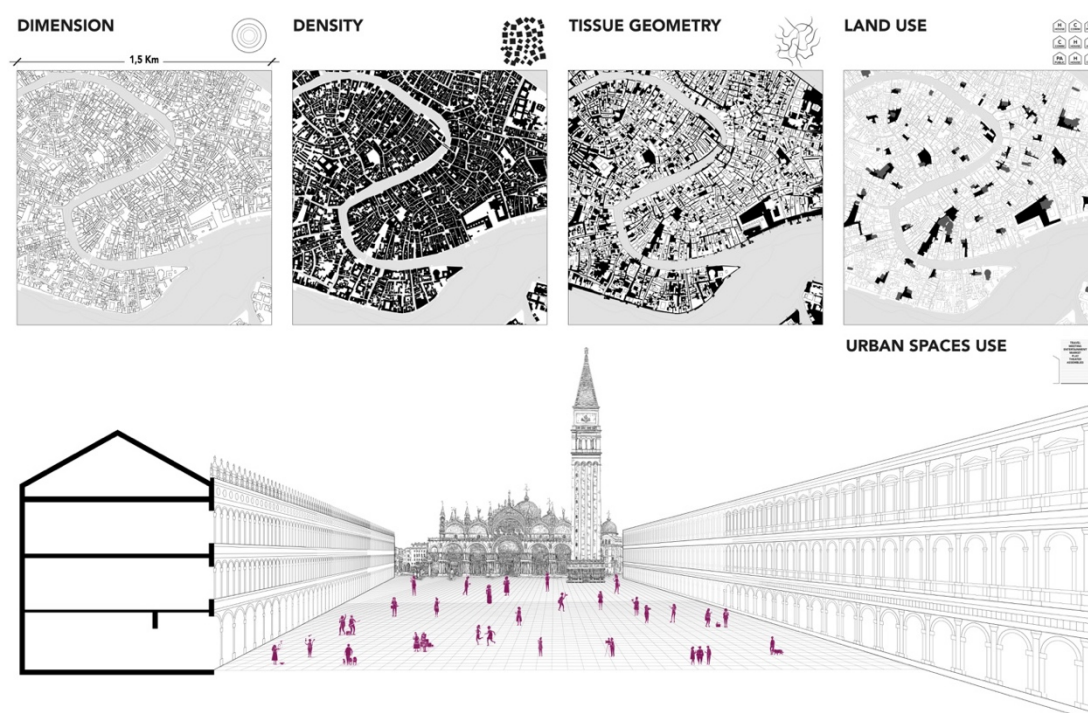


Fig.3 Decomposition of the Venice Case

Surrounded by the mid-Adriatic hills, between the Foglia and Metauro Valleys, settle on two hills is situated the small Urbino. A town with a similar urban structure to Venice but located in a different geographical context and on a smaller scale. His history and particular aesthetic qualities are closely linked to the *Palazzo Ducale* and the historical figures of Francesco Di Giorgio Martini, and in modern times, to the architect Giancarlo De Carlo. About this town, De Carlo says «Few historic cities have, as Urbino, such a measured and fine mixture of the grand and the popular, the emblematic and the direct, the exciting and the heartbreaking: such a complex and textured urban continuity. Which is found especially in the oldest areas of development» (De Carlo, 1966, p.79). He remarks, that although the most relevant urban interventions are later than the years of the Middle Ages, no intervention of the Italian Renaissance completed with greater coherence the program of building a continuous and unified urban space, starting just from the urban texture of the medieval period, from the same characteristics, intercepted also in Venice.

The composition of the urban landscape of Urbino is closely linked to human motion; the volumes of the *Palazzo Ducale* rotate from the square to the apartments section, and in the rotation, the architectural language also changes, this approach is reflected and amplified in the surrounding buildings, creating an

articulated sequence of urban spaces (De Carlo, 1966). To emphasize the relationship between the geometry of the tissues and the harmony to the context, De Carlo points out that «the architects of Urbino had a global conception of the relationship between context and form» (De Carlo, 1966, p.77).

In Urbino, the *Mercatale*, in particular, is the entrance area to the city for those coming from Rome, the magical place of conjunction and separation (De Carlo, 1966, p.79). It is a large artificial surface designed by Francesco di Giorgio Martini, obtained by covering a valley, and was, from the 15th century forward, a meeting place but also a site of interchange, commerce and play; it hosted markets, but also circuses, fairgrounds, and events of the most diverse kinds, as in the case of San Marco's Square in Venice, highlights the flexibility of use characteristic of medieval urban spaces. In 1974, when the new Plan for the city was being prepared, it was again Giancarlo De Carlo who intercepted this as an extremely strategic area for mobility.

In fact, *Operazione Mercatale* envisioned several actions that, in their synergy, rethink the qualities of the ancient public space to adapt them to new and changed needs. Below the large horizontal plan was planned to be a garage to preserve the historic city from cars, while a bus station was to be located above. A network of pedestrian paths to the Fort Albornoz and interventions to restore various artifacts such as the reopening of the *Rampa di Francesco di Giorgio* and the restoration of the Theater were also planned. Of all the interventions De Carlo managed to realize only the last two and the garage.

In *Operazione Mercatale* he builds a spatial sequence between new and pre-existing areas, a dynamic exploration of architectural and urban space. To maintain it as a common space for people to gather, socialize, and engage in recreational activities, it was envisioned that the structure of the underground garage would be hidden beneath a layer of earth. The project provided for the paving a material resembling the color of Urbino clay, known for its pedestrian traffic durability. It needed to be strong and lightweight, as motorized vehicle access would be restricted to exceptional situations.

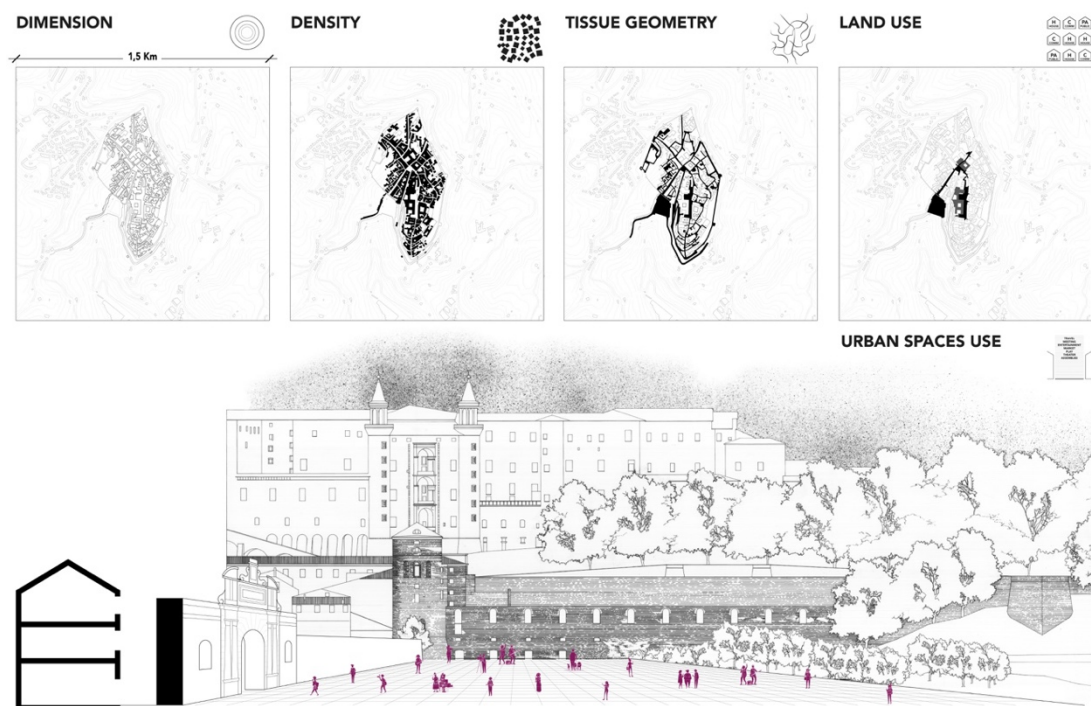


Fig.4 Decomposition of the Urbino Case

4. Modernist cities and the mobility pattern of the automobile

The most immediate and concrete example of the difference between pre-modern and modern times lies just in the street layouts that from the eighteenth century acquired autonomy from the context and sinuous lines of river systems and hill and mountain slopes (Farinelli, 2003, p.15). The Industrial Revolution era marks, in

these aspects, a critical point in the history of city development, urban rail networks becoming the new backbone of the geographical organization of settlements in the territory. The new supply of rail mobility is decisive for territories and cities that shape up by following instances dictated also by new housing patterns related to the spread of industries.

However, it is since the post-World War II period that the structures of large cities have changed significantly. Population growth, the rise in demand for travel, new cultural and economic patterns such as new spatial relationships between home and work, and the widespread use of private cars, led to the emergence of the *Automobile city* (Newman & Kenworthy, 1996, pp.31-33). The mass use of cars is the foundation of modern urban structures whose physical properties are unlimited sprawl, low density, specialized land use, and wide linear roads designed exclusively for the efficiency and speed of cars (Fig.5). Proximity is no longer a fundamental need since the automobile opens up the possibility of reaching more faraway destinations, so the city grows horizontally occupying more and more available spaces.

In Europe, the destruction due to war also leaves large voids within consolidated cities, often in highly strategic areas such as infrastructure and mobility networks. In Italy, in particular, the most important growth happens in these years coinciding with the advent of the mass automobile distribution giving rise to what Campos Venturi calls the '*genetic anomaly of Italian cities*', (*anomalia genetica delle città italiane*) that is, the characteristic that heavily links, more than in other European contexts, the growth of the city to the automobile model (Campos Venuti, 2001).

In opposition to the historical city, modern urbanism, which spread in Italy with the plans after World War II, following the theories of the Modern Movement, is based on a principle of order founded on desegregation, and the specialization and separation of elementary land uses, which are assigned an autonomous and isolated location. This happens because the structuring unit of the city is no longer the street but the block (Farinelli, 2003, p.125). In examining the newly formed neighborhoods, a new perspective on the city's physical growth emerges that focuses on the dense presence of *functional values*. This concept envisions the city as a collection of distinct *neighborhood units*, each individually defined and unitarily solved (Scaglia, 2014, p.87). Each building of the units is integrated into an organic urban layout within the neighborhood boundary, representing a stark departure from the morphology of the pre-existing city.

The articulation of space and the interrelationships between individual buildings are now prioritized differently from the traditional emphasis on materials that shape and define the urban environment, like public spaces and street layouts. The structuring is assigned to simple positional associations between architectural objects, the main rules look at the integration and juxtaposition only of simple different building typologies (Scaglia, 2014, p.90). To create an ideal and homogeneous urban structure the formal composition takes the meaning role and the architecture has a well-defined representational goal.

It is at this time, moreover, that the process of oversimplification that had already begun in the Baroque era reaches its peak: as Mumford reminds us some of the best and worst examples of Baroque town planning are from a time when they had ceased to be symbolically or practically appropriate to the historical period that expressed them (Mumford, 1961, p.401). In the *Automobile city*, space and landscape are shaped by the necessity of the motorist who, traveling at higher speeds than the average 5 kilometers per hour of the pedestrian, needs simplicity to enjoy the context and not be overcome by it. As a result, large symmetrical streets are established, enclosed views are removed, and straight lines and uniform building arrangements take precedence. The gradual dissolution of built space and the consequent expansion of empty areas gives rise to new dimensions, rhythms, and measures of open spaces (Scaglia, 2014, p.90). In this spirit, boundaries do not exist and disappear. Distances and travel patterns dilate, pressing the model of the automobile as a symbol of modernity, speed, and efficiency of city living. Urban space is organized by making it continuous, reducing it to order and measure associated with the space-time paradigm less time and more movement. Urban boulevards become more straight to quickly connect distant places, wider and wider to accommodate

as much traffic as possible, and become obstacles to crosswalks and pedestrian connections between spaces that are instead very close; in the rationalist city, it becomes easier to move to distant directions than to proximity areas.


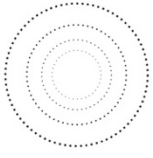

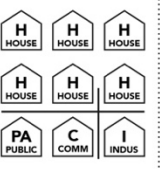
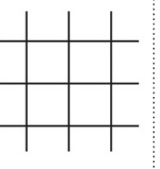
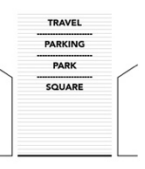
URBAN STRUCTURE MOBILITY PATTERN	DIMENSION	DENSITY	LAND USE	TISSUE GEOMETRY	URBAN SPACES USE
RATIONALIST STRUCTURE AUTOMOBILE CITY 	UNLIMITED 	LOW 	SEPARATED 	GEOMETRIC GRID 	SPECIALIZED 

Fig.5 Interpretation grid of the rationalist cities

4.1 Italian districts of San Siro in Milan and Pilastro in Bologna

In Italy, a significant transformation began in the 1930s with the development of three neighborhoods in the city of Milan, characterized by a strong sense of unity. These neighborhoods were created by architects Franco Albini, Renato Camus, and Giancarlo Pianti, who employed the principles of maximum unification, juxtaposing similar typological elements (Galliani & Spinelli, 2014). The *San Siro District*, in particular, looks like one of the most explicitly rationalist Italian examples. Is a quadrilateral built on two wide triangular areas organized on the main streets of *Mar Jonio Boulevards* and *Aretusa Street* in the north of the city, built between 1935 and 1947. The project for the western part, known as *Milite Ignoto*, was designed by Albini, Camus, and Pianti. In this area, there are 2.925 residential units, and when combined with the 3.208 of the eastern part, the entire San Siro district comprises 6.133 apartments.

The morphological and typological principles brought forth by the Rationalist Movement, especially through the work of these three architects, turned this new neighborhood into a landmark and a pioneering element within the urban landscape. They introduced the concept of the *open urban scene* by refining the elements of urban imagery at the block level, shaped by the interplay between parallel buildings and open spaces (Galliani & Spinelli, 2014). The guidelines used in the project were economy, optimization, and standardization of aggregative principles. It is a neighborhood consisting mainly of residential buildings, with no particular functional heterogeneity or a uniform grounds plan (Cognetti, 2014, p.112). The rigidity of the street grid that structures the new neighborhood has produced an *inner suburb* today, very different from the urban context that has developed around it, as the expansion of the city of Milan has spread the boundaries of San Siro have become even more evident designing a geography of separation that touches high levels (Cognetti, 2014, p.114). The seriality and monotony of the buildings make the design of the neighborhood rigid in space and static in time, a uniform block, fixed and frozen for eternity, using an abstract form that bounds the social contents rather than arising from it (Mumford, 1961).

Through the separation of the built-up area from the street layout, the principle of parallel buildings introduces new connections between city blocks and public urban spaces. The construction of these blocks is redefined, shifting the focus away from aesthetic considerations of facade decoration along public streets. Instead, the main issue becomes the quantity and typologies of the habitable space within the buildings (Scaglia, 2014, p.90). The attention of the architecture is directed inward, to the optimization of the living spaces, rather than toward the external common areas. However, the specific and innovative aspects of this urban initiative, such as the uniformity and the lack of contextual adaptation, which refers to the indiscriminate application of the project in any urban setting, have now become the main challenges that undermine both the significance and the long-term utility of these residential areas, making them susceptible to instability. The lack of support

services for the resident community and the substandard quality of open spaces are critical issues today, but they also offer tangible opportunities for comprehensive improvement through internal building adjustments and the redesign of open spaces (Galliani & Spinelli, 2014).

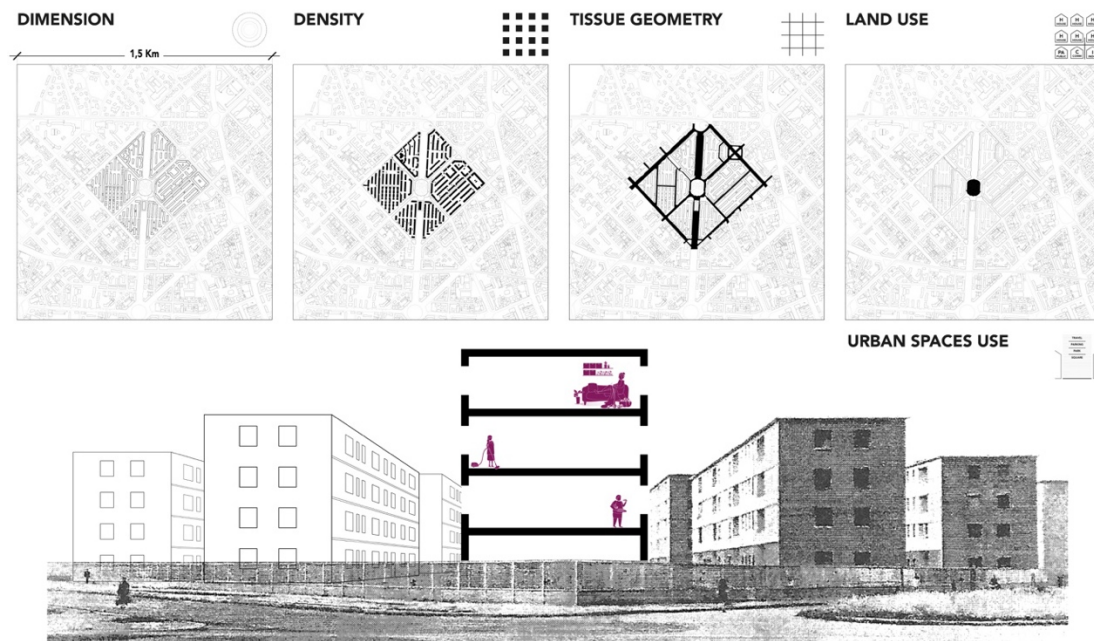


Fig.6 Decomposition of the San Siro Case

Another example, different from the formal approach of Albini, Camus, and Palanti but similar in results, is the *Villaggio Pilastro* in Bologna, a project by architects Francesco Santini, Giorgio Trebbi, Glauco Gresleri, and the engineer Giorgio Brighetti. The initial purpose was the implementation of a wide-scale urban plan to settle about ten thousand inhabitants by creating a self-sustaining core. Located between two high-voltage power lines, the settlement is structured as a linear park. Residences are arranged around this large open space, along irregularly shaped streets that recall the sinuous lines of medieval cities (Mingardi, 2014, p.1277).

Compared to the case of San Siro in Milan, the typological experimentation in Pilastro focuses on different building typologies, combining towers, in-line blocks, and townhouses. The central park serves as a link to the main access road and is a focal point where important public and common services are concentrated. From the center of this kind of square, the dense residential structure, composed of buildings in a serpentine line, branches out. The shape of the buildings is designed to create changeable spaces between them that serve as catalysts for social life. Rather than focusing on a single element, the architects' attention is directed to the overall composition to create urban scenes in a place where they are naturally absent, using a design rich in complexity that attempts to reconstruct typical urban dynamics that are not easily found in such an isolated area (Mingardi, 2014, pp.1277-1278).

Despite careful planning, the neighborhood cannot reproduce the needs of communities typical of the historic city where social arrangements are the result of the stratification of many generations and in which continuous unplanned contamination takes place (Mingardi, 2014, pp.1283). Although the district is the result of layered interventions, it is not possible, in the case of the *Pilastro*, to talk about stratification. Like San Siro, the neighborhood today is configured as a place enclosed within its margins, unable to accept disturbances from the surrounding city despite its large open spaces; the lack of boundaries is equally capable of generating an alienating public environment (Sendra & Sennet, 2020). In its streets and parks, the intense flow of daily life does not happen, public dimension is absent, and the lack of attractions and spaces adequately designed to human needs means that «the concrete statues shaped by the sculptor Nicola Zamboni seem to be the only users of the space» (Mingardi, 2014, p.1284). In the end, the planners' persistent efforts to create spaces that

encourage socialization have proved unsuccessful; the scarcity of human presence is a defining feature of *Pilastro*, an absence that becomes all the more significant when one considers how meticulously the place has been designed and organized specifically for social interaction.

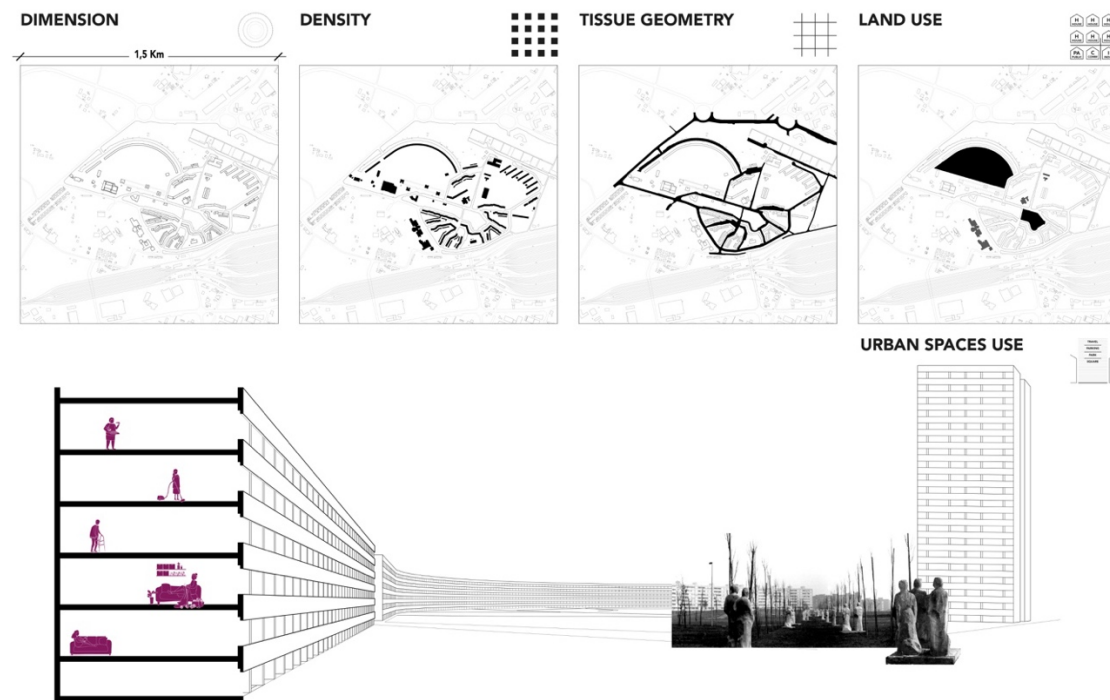


Fig.7 Decomposition of the Pilastro Case

5. Conclusions: sustainable city, the polycentric way

It has now been largely demonstrated that the history and development of urban settlements have always been conditioned by mobility; particularly, the rise and diversification of routes for moving people and materials has significantly influenced urban and territorial planning (Cutini, 2003). The approach to the city as a rationalist expression of a well-defined function is in crisis today; instead, there seems to be a growing need to interpret it as a system of several fragmented and self-sufficient components. New urban models and approaches adopted, pursue the idea of a multipolar system measured by time-of-use metrics (Bocca, 2021). Looking at the debate regarding the polycentric urban model, the focus is mainly on the variety and diversity of functions, their distribution, and the consequent relationships of integration and interdependence among different cores, highlighting the major role played by mobility.

A polycentric city therefore is a spatial structure made up of distinct centers linked to each other by a series of complex networked relationships, the city of Venice, quite spontaneously and in very distant times, consists of an example of a polycentric city. The structure of St. Mark's Square and parish-satellites generates an open nuclear form with the same characteristics searched for today for the *X-minute cities* or the *complete neighborhoods*, which are based on the principle of proximity and for which high density and mixed land use are an indispensable prerogative.

As Gehl (2009, pp.12-13) remarks «Venice has everything: dense city structure, short walking distances, beautiful courses of space, high degree of mixed-use, active ground floors, distinguished architecture and carefully designed details — and all on a human scale. For centuries Venice has offered a sophisticated framework for city life and continues to do so, issuing a whole-hearted invitation to walk». Many ancient cities were originally designed as pedestrian-oriented urban centers, and in some cases this role persists. For example, in Urbino, thanks to the careful vision of Giancarlo De Carlo, in the 1960s coinciding with the explosion of the mass use of the automobile, it was decided to leave all automobile traffic-related facilities

outside of the historical parts of the city. He considered the motor car a completely extraneous element for these urban tissues that are closely designed in relation to human movement. The arrangement of the city's architectural elements in Urbino, more than in other places, relies on visual connections that would be incompatible with the perspective of a motorist. Indeed, De Carlo writes «No attempt at rationalization would overcome the intolerance of the city's form to a mode of circulation extraneous to it because the correlations that exist between built surfaces and volumes are directly related to human movement, and only in the constant explanation of this relationship the basis of an absolute spatial continuity can be recovered» (De Carlo, 1966, p. 77). Just as Giancarlo De Carlo did in Urbino, a similar transition from fast to slow traffic in Venice takes place at the city limits rather than at the front door. This approach is thought-provoking and offers inspiration for the modern concept of creating sustainable and healthy cities (Gehl, 2009, p.95).

The theme of density, emerging from the historic city, continues today to represent an indispensable paradigm for polycentric structures, particularly for the dense system of medium-sized cities that scatter the Italian territory. The territorialization of services implemented in Barcelona with the *Superilles Plan* since 2014, for example, has been successful because it has enhanced and powered the existing urban density (Manzini, 2021, p.103). Equally, Moreno's theory but also Italian experiments, for example, in Milan through the *Piano dei Quartieri* or in Turin thanks to the *Integrated Urban Plan*, are based on the proximity between origins and destinations, but especially in the concentration and centrality of activities (Rossetti & Zazzi, 2019) for which density is a vital precondition. However, as Gehl remarks «we often see that poorly planned high density actually obstructs the establishment of good city space, thus quenching life in the city» (Gehl, 2009, p.68) and this is evident if one thinks about the case of the *Pilastro* neighborhood whose over-extension of open spaces causes the citizens' disuse. Therefore, the issue of proximity and consequently density also turns out to be closely linked to the real capacity of infrastructure to host functions and users, and thus the quality of places is essential to ensure the use or reuse of these spaces.

Regarding tissue geometry, while it is true that narrow Parisian streets permitted the French Revolution so much that Mumford calls them the last refuges of urban freedoms (Mumford, 1961), contemporary experiences show the great potential of wide boulevards and street space provided by the rationalist city. Always consider the *Superilles* case, the reticular grid designed by Ildefonso Cerdà in the mid-19th century is reused with a total rethinking of mobility, excluding car traffic from some streets without completely eliminating it; the roads inside the Superblocks are therefore transformed into spaces more accessible to the pedestrian, as well as less noisy, greener, and more pleasant, and this is mainly due to the large size of the street space. A similar strategy makes in Italy is represented by the *Piazze Aperte program* of the Milan city (Comune di Milano, 2022), one of the most successful national examples of tactical urbanism, again the space of cars, either for movement or parking, is reappropriated for pedestrian circulation and to create wide public spaces. The case of the *Superilles* also shows that the rigid geometry of the street layout of the automobile city is not necessarily a problem for the reuse of this infrastructure, geometry can still have a positive function in the design of the city. The use of geometry in urban planning can be used to guide and enlighten pathways but, like all processes of abstraction, it must always be linked to the concrete situation and variety, offering solutions that give way to the specific expression and aspects of city life overlooked by the pure application of the rule (Mumford, 1961, p.393).

Finally, regarding the use of space and thus the immaterial component of the city, it seems clear that «The new mobilities paradigm suggests a set of questions, theories, and methodologies rather than a totalising or reductive description of the contemporary world» (Sheller & Urry, 2006, p.210). As shown by the social and community failure of San Siro and Pilastro, but not only in these cases, it is necessary for planners and architects today to think of cities as «a multi-purpose, shifting organization, a tent for many functions, raised by many hands and with relative speed. Complete specialization, final meshing, is improbable and undesirable. The form must be somewhat noncommittal, plastic to the purposes and perceptions of its citizens» (Lynch,

1960, p.91). Pablo Sendra proposes infrastructure as the starting point for a continuous and open process, the primary space for creating conditions and procuring possibilities for change without imposition, through a design of public places as the result of community-led actions and negotiations (Sendra & Sennet, 2020, p.73). The multifunctionality and hybridization characteristic of places such as the *Mercatale* in Urbino now appears as an indispensable prerogative for the reuse of infrastructure spaces. The great vision, later betrayed in the work execution, of Giancarlo De Carlo in the *Operazione Mercatale*, lies not only in the perfect construction of a dynamic exploration of architectural and urban space but in the choice to preserve the public, social, and mutable characteristics of the place. De Carlo's approach outlines a method of action that is markedly linked to an interpretation of the city and the experiences and practices that turn into it. He believes that the essence of space is shaped by the life it accommodates, and it is this life that defines its various interpretations. Consequently, in his efforts to return architecture to the public without compromising its fundamental role in societal change, he crafts solutions that are rooted in the lived experience of space. He arranges volumes from the inside of the structure and seamlessly integrates them into the urban environment, embracing a fluid and organic design approach (Romani, 2001). A recent example, very similar to De Carlo's intentions for the *Mercatale* parking, is the *Park'n'Play*: an architectural experiment made by the Danish study *Jaja Architects*, as part of the extensive program of actions for the regeneration of the Copenhagen Port. In this case, the intervention at the scale of the building becomes an important urban opera; the large infrastructure of multi-level parking, usually dedicated to the car, hosts within it a large playground and green spaces, giving a real example of hybridization, multifunctionality and actualization of the new forms of automotive infrastructure spaces.


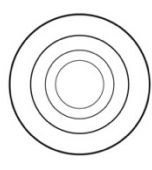

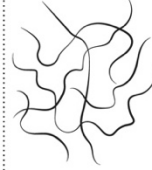

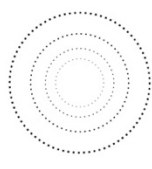

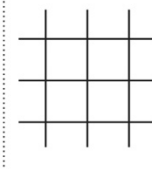

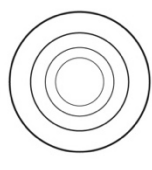

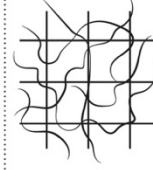
URBAN STRUCTURE MOBILITY PATTERN	DIMENSION	DENSITY	LAND USE	TISSUE GEOMETRY	URBAN SPACES USE
HISTORICAL STRUCTURE WALKING CITY 			<div>H HOUSE C COMM PA PUBLIC</div> <div>C COMM H HOUSE H HOUSE</div> <div>PA PUBLIC H HOUSE C COMM</div>		<div>TRAVEL</div> <div>MEETING</div> <div>ENTERTAINMENT</div> <div>MARKET</div> <div>PLAY</div> <div>THEATER</div> <div>ASSEMBLIES</div>
RATIONALIST STRUCTURE AUTOMOBILE CITY 			<div>H HOUSE H HOUSE H HOUSE</div> <div>H HOUSE H HOUSE H HOUSE</div> <div>PA PUBLIC C COMM I INDUS</div>		<div>TRAVEL</div> <div>PARKING</div> <div>PARK</div> <div>SQUARE</div>
POLYCENTRIC STRUCTURE SUSTAINABLE CITY 			<div>H HOUSE C COMM PA PUBLIC</div> <div>C COMM H HOUSE I INDUS</div> <div>PA PUBLIC H HOUSE C COMM</div>		<div>TRAVEL</div> <div>MEETING</div> <div>ENTERTAINMENT</div> <div>MARKET</div> <div>PLAY</div> <div>THEATER</div> <div>ASSEMBLIES</div> <div>PARKING</div> <div>PARK</div> <div>SQUARE</div>

Fig.8 Comparison grid of the historical, rationalist, and polycentric cities

In conclusion, paraphrasing Mumford's statements, it is not seriously thought that we can solve urban mobility problems by restoring a more primitive technological or social base (Mumford, 1961), rather it is necessary to understand how we can make the best of the past experiences and how these can be actualized in the present and future; because just as the automobile shaped the 20th-century city with all its deformities, the new mobility systems of the third millennium, could redefine the use of urban space with a new, more balanced layout (Zanirato, 2020, pp.89-90). Therefore, it is important to identify the many urban situations, not only for their problems but also for their real different needs and possibilities. The city is not a white page (Bellmont,

2021), and we need to interpret urban space for the juxtapositions and relationships that bind different layers, from historical qualities and facts to spontaneous and unplanned uses.

In addition, the proposed methodology, by interpreting urban transformations through mobility and observing the ongoing phenomena at different scales, made it possible to bring together the spatial and temporal dimensions of urban dynamics (Pucci, 2015, p.41). The use of the specific lens of mobility also allowed for a study of the city, its forms, functioning, and spaces, from the practices that take place in it. The comparison with the rhythms with which people inhabit and use the city for the mobility project seems indispensable because, within urban areas, mobility is «part of the social production process of time and space» (Cresswell, 2006, p.5) and is therefore capable of describing the space-time variability of urban practices and with it the transformations of the contemporary city (Pucci, 2015, p.40).

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Image Sources

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