Ecologica. Urban Regeneration of Buildings of Worship. Cultural and Associative Dynamics in Northern and Southern Europe

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Abstract. In its etymological meaning, ecology proposes and argues the theme of home and habitat as an interactive situation of living species. The distinctive features of the urban landscape refer here to the cultural and material heritage and use codes to interpret and assess the characteristics of the cities: historic, suburb or sprawling cities. This analysis does not focus on individual architectural objects, but looks at urban spaces and their relationships between them. The urban regeneration of squares with buildings of worship of this article requires a multidisciplinary approach: to integrate architectural, urbanistic and sociological skills; to understand the cultural and associative dynamics of different communities and the stratification of places. The interactions and flows between the different components of community life are intended for urban textures of public spaces and buildings. Computer science can aid the design process. They are used in computer programs for electronic design and augmented or virtual reality, but their contribution to the analysis of datas in the urban project is still to be developed and implemented. Cases studio are largo Spartaco at Tuscolano in Rome, the Great Mosque of Rome, the Church of SS. Cipriano Cornelio in Calcata, the Catholic Church of SS. Patrizio Giacomo and the Lukiškės square in Vilnius and, Şakirin Mosque and Courtyard in Istanbul.

Keywords: urban regeneration · urban design · public spaces · places of worship · squares · heritages · technologies · ecological · memories

1 *Ecologica* Premise

In 1866 the German doctor and biologist Ernest Haeckel defined the term ecology in his paper *Generelle Morphologie des Organismen*, designating it as "conditions of possibility" (according to I. Kant's expression) the physical, chemical and biological life of humans, animals and plants. In its etymological meaning, ecology proposes and argues the theme of home and habitat as an interactive situation of living species. In the cultural traditions of Europe, it was effectively explained by Aristotle, who regarded the city-state

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as an institution of a political body in which common interests and common reasons of the social corpus converge. Such an order should lead to ways of civil life, which recognize a valid foundation for friendship and the striving towards good. The house as a small town, the city as a great house. In XV century in Italy this principle was affirmed by L. B. Alberti in his "De re aedificatoria" and taken up in the following centuries by other authors such as Palladio, Aldo Van Eyck, Aldo Rossi. In our historical time, ecology suggests searches and paths of dynamic balance (therefore, never solved), from which parameters and elements of a holistic layout of fertile concerns can be defined. To decline the motive of the house as much at the small scale as at the large one: isolated, cities and territories in order to try better prospections of future for men in their environments. To draw profitable tension from *natura naturata* and *natura naturans* according to the happy interpretation of Spinoza. The article, which presents research of the four authors[1], focuses on some key words: Ecological, Memory, Heritage, Urban Regeneration. The contribution aims to relate areas of Europe, from North to South, which extend to the East, places that have as a recurring character both the value assigned to the material and intangible cultural heritage, and a privileged relationship with the sea (Mediteranno, Baltic, Bosphorus) and examined the cities of: Istanbul, Rome, Vilnius. In an age that sees the weight of the spiritual wane in favor of a secularization, the article asks how places of worship, and their public spaces still produce communities and urban regeneration. The reconfiguration of public space, increasingly rapid to cope with social changes dictated by technological progress, can be facilitated by the exploitation of the heritage of places of worship and the adjacent square. These places of the collective insert in the hectic daily life of the metropolis spaces of rest, physical and intellectual, that well lend themselves to be a flywheel for urban regeneration thanks precisely to their ability to aggregate, due not only to religious functions; They create a collective and social virtual and cultural space that today is also fed by new technologies. Our places of worship, as indicated in this article, also benefit from contributions from computer science. The latter can be a useful means both in the project process, to promote participation from below by citizens, and in the expectation of results on an urban scale, through the analysis of flows, perceptions and increased graphic representation. Finally, they can be used for the creation of so-called virtual squares at the service of culture, education and use of the spaces themselves.

2 The Plural Identity of the Collective Open Space

The distinctive features of the urban landscape refer here to the tangible and intangible cultural heritage and use specific codes to interpret and assess the characteristics of the physical city (whether it is a historic city, a suburb or a sprawling city). The analysis does not focus on individual architectural objects but looks at urban spaces as areas of relationship and the relationships between them. This leads to the reading of an even more complex text, where the narrative structure (represented by the urban structure), intertwine and overlap the plots of individuals and social groups. Next to the objective

[1] The research bearing the same title of the article is composed by Donatella Scatena (chapters: 2, 7), Marcello Valerio Cadorin (chapters: 3, 4, 5), Sergio Amedeo Terracina (chapter: 1), Zeynep Guel (chapter: 6), coordinated by Professor Donatella Scatena;

city, based on the physicality of hard matter, there is therefore a parallel world made up of subjective cities, represented in (and by) each individual, who not only inhabits the physical space of the city, but also lives simultaneously in the affective spaces, aesthetic and symbolic, of the personal mental city.

Since the contemporary city has difficulty in characterizing itself through open space, what interests us in this article is the meaning of new codes of interpretation of the sense of place; a relationship that combines subjective city and objective city, a cultural and physical path that transforms the concept of unique identity into that of plural identity, an experience of participation between those who inhabit the space and those who must "foresee" and design it. To do this, the research uses readings and interpretations not only of architectural theorists, but especially of Nobel prize winner Amartya Sen[2] and sociologist and anthropologist Richard Sennett. The public spaces given as an example will be a small taxonomy of the participation process in place in the transformation of urban characters of open spaces.

2.1 Urban Landscape Theories

Research on the subjective representation of the environment, which has given rise to a wide literature in the international field, have shown how it is possible to distinguish between an architectural space, understood as objective and physical reality of the territory, and a personal space, understood as individual ways of using and imagining the environmental reality.

2.2 Gordon Cullen Townscape

Theories based on perceptual analysis begin with Gordon Cullen, who in 1961 published the book *Townscape* (literally "urban landscape") text-manifesto in which the author immediately introduces an innovative postulate according to which the city is a particular form of landscape, linked to the persistence of the urban image - here understood as a metaphorical extension of the physical meaning of the laws of optics and biometrics. Cullen also uses a problematic assumption: the "perception" of the urban image is used as a tool for reading and designing space. Exploring the evocative potential and aesthetic characteristics of urban spaces, the book thus identifies the vocabulary and syntax for the description and assessment of the context, using representation techniques consistent with the priority given to visual perception and the daily experience of the city. Cullen develops a vision of urban design through visual education aimed at the construction of a new urban landscape.

2.3 Kevin Lynch Concept of *«Figurability»*

Other important scholars, such as Kevin Lynch, and Steen Eiler Rasmussen, and in Italy Ludovico Quaroni, elaborated almost simultaneously in the 50s and 60s of the last

[2] Amartya Kumar Sen is an Indian economist and philosopher, Nobel Prize for economics in 1998, Lamont University Professor at Harvard University, author of "*Identity and Violence"* (2006);

century some fundamental theories on urban perception. In particular, the studies conducted by Lynch, born from the meeting with one of the initiators of the *Gestaltpsycology* Gyorgy Kepes, have always moved in an attempt to remove the theme of the perceptual form of the city from the uncertainty of the individual interpretation, and therefore not codable, introducing the fundamental concept of "figurability". It can be said that this concept is the core of all the research conducted by Lynch, as it points towards a possible objectification, in psychological terms, of the perception of the city, as a result of a relationship between the cognitive structure of and that of the urban environment lived by the inhabitants themselves, in order to a clear "recognizability" of the parties. With his notion of "figurability" of the urban image, Lynch contributed to the birth of a real "cognitive theory of the city", confirming at the same time the considerable distance from the idea of "figure" as matured in the European iconography. Lynch's fame is mainly linked to his 1960's The Image of the City, in which he proposed a perceptive approach to the theme of form and urban landscape. For Lynch, the urban image is structured in a number of recurring elements which he analyses and describes and whose recurrence he tends to verify in his interviews: paths (paths), boundaries (edges), reference points (landmarks), nodes (nodes) and districts (districts). On the basis of this anthropological-perceptive paradigm it is possible to draw a kind of mental topographic map, the so-called mental map, which represents a real visual description of the city. The urban object to acquire significance must become memorizable. Every time a subject occupies an urban space, he has to decipher this enormous complex text that is the city, recognizing in it topological objects useful for his daily action: "living (walking, shopping, parking, etc.) is first and foremost a cognitive or semiotic performance; it requires deciphering the urban text in search of warning signs, possibilities, prohibitions, permission, enjoyment, convenience, etc. This competence is first of all morphological, it consists in recognizing forms and attributing them a meaning connected to the practices of everyday life". In this context, the concept of sense of place is absolutely central: "The sense, or spirit of place, it corresponds to a very complex concept and difficult to reconcile with a linear concept in that it depends both on the features of a territory which together constitute what is defined as the identity of the place, and from the connotation that these features assume in the experience of each individual" [1]. The difficulty of trying to delineate this sense of belonging to a place, understood as meaning for the individual after he has intellectually appropriated it, is evident, being an ambiguous conception, which unites "objectivity and subjectivity, factual geographical reality and inner experience".

2.4 Ludovico Quaroni, Image as Knowledge of Reality

One of the first architects to talk about the perception of personal space in Italy was Ludovico Quaroni, who wrote *Immagine di Roma* in 1969. The innovative choice to talk about Rome, not focusing on structure but image, is conscious for Quaroni because the image is emotionally dirty, passionately addressed, ambiguous for construction, it accompanies and overlaps with the rationality of the language of form, of the project.

Today, the image is the obligatory door of knowledge of reality. More than Urbs, the city of stone, Quaroni is attracted and intrigued by civitas, the population that lives in it and its habits. Habits which, taken as a whole, describe and define the culture of the city, its mentality. The Roman population, proud and contradictory together, is the guarantee

that the city is not rigid in its own simulacrum but is always immersed in the flow of transformations. More than the city that is supposed to be completed, the city designed integrally, Quaroni is attracted by the wonder that the city generates continuously in those who inhabit it, the wonderful city.

The city of Rome is seen by Quaroni as "a figurative whole" where the relationship between history and project is expressed and where architecture, contaminating itself with ancient finds, recognizes the legitimacy of its own tradition; those finds can use the "new" as a litmus paper, as a mirror to be questioned and from which to draw a *principium individutionis*.

The contamination that comes from history, from the existing heritage, allows tradition to express itself even if in a confused way. The same "dirty" way that uses memory, both the private of the Intellectual, considered by election depository of values (Manfredo Tafuri), and the collective one that interests in this article and that is used to create an authentic image of the place-city.

Memory produces the image from which the wonderful daily descends: it includes the contaminations of society, the underhanded, the chaotic, the richness of diversity and leads to the creation of a "difficult unity" (Robert Venturi), typical of poetry. Robert Venturi has made much reference to the difficult unity and inclusive process to explain the beauty of the contradiction and complexity of the urban design: easy unity is achieved through the exclusive process of separation, On the contrary, the inclusive process is achieved through the inclusivity of an urban project made of opposite elements, "good ambiguity" and "confusion of experience" that are typical of the poetic process. In fact, Venturi always tells us, the poet does not separate but includes.

2.5 Unification of the Experience Poetic Background of the Mind

The unification of experience, which is typical of the poetic process, was also a great achievement of science, which through Bateson, reveals the relationship between mind and nature and declares that the poetic background of mind is at the basis of the process of biological evolution.

The unification of experience, also read as a network of relationships that connects us to each other, is the great discovery of the new scientific paradigm, which wants to reveal the new and different order that is at the base of dissipative and chaotic phenomena, but above all it wants to reveal the creative capacity of open systems. The unification of experience, also called the structure that connects, through a new covenant between man and nature, helps us to overcome the architectural nihilism of the *Nonplace*, where the excess of space, of time and ego, together with the spectacularized history and the place as loss of identity and sense).

2.6 The Wonderful Everyday

In this contemporary city, like the Rome of Quaroni and the New Jersey of Lynch, which is mostly identified with the physical "periphery", a meaning of public space must be reconstructed, through the wonderful daily life.

To recover the popular sense of the lost place, it is possible replacing the unique identity with a plural identity, through a work of collaboration and participation that starts from the bottom.

This means clearly addressing the problems posed by globalization, compared to being together, which is the primary foundation of the birth of the city and public space. In the projects we must claim substantial aspects of collaboration, we must understand that it is necessary to think in a new way, that it is necessary to trust in the expression of differences and experiences, to think in plural, claiming diversity. To the "miniaturization of individuals" and to the conflictuality that we find in our time, caused by the crisis of values of the West and which finds exegetes in the theory of the conflict of civilizations, it is necessary to answer with the words of Amartya Sen: "The prospects for peace in the contemporary world may arise perhaps from the recognition of the plural nature of our affiliations, and from recourse to reasoned discussion as mere inhabitants of a vast world, Instead of making of ourselves so many prisoners rigidly imprisoned in narrow containers". Going out in the open air, in open public spaces, because, always quoting Sen, "for democracy (we) mean to discuss it publicly". Plural identity versus single identity: "the polis is composed of men of different types; similar populations cannot give rise to the polis". Therefore, the city obliges people to take into account others who have different identities from their own and to relate to them".

It is not a question of suggesting a way of designing or an architecture of trend, but to propose an experience, convinced that the "theories" at the base of this proposed experience "can influence social thought, political action and public policies". This experience is a difficult collaboration because it requires expertise. Aristotle calls it techne, the technical ability to make a thing be, doing it well.

"The positive alternative (to cynicism, nihilism and collusion of unique identity) is a type of collaboration challenging and difficult: that which tries to bring together people who have different or conflicting interests, who do not have mutual sympathy, that they are not equal or simply do not understand each other. The challenge is to respond to the other or start from his point of view. That is the challenge in all cases of conflict management".

2.7 Single Identity Plural Identity for Urban Design

Bruno Zevi has written in a provocative way: «to do architecture means to visualize the genius loci», it is an «absurdity aimed at passivating the project with respect to its surroundings, instead of pushing to create or at least renew it. If Wright, in the innocuous forest of Bear Run, had proposed to mirror the genius loci, instead of the legendary House on the Waterfall he would have built a dirty shack».

The identity of a place must therefore be understood as an uninterrupted succession of evolutionary characteristics.

To give an example, we think of a place familiar to us and in which one recognizes a strong architectural, cultural, social peculiarity: the Mediterranean. To the question: «what is the Mediterranean?» the historian and geographer Fernand Braudel replied: «A thousand things together. Not a landscape, but countless landscapes. Not a sea, but a succession of seas. Not one civilization, but a series of civilizations stacked on top of each

other. (…) In the physical landscape as in the human one, the Mediterranean is a crossroads, the heterodox Mediterranean presents itself to our memory as a coherent image, a system in which everything merges and recomposes into an original unity». On the other hand, the identity of the Mediterranean, in which material and immaterial relations converge into a «space-movement» that has historically created a very strong unitary imaginary, has not remained unchanged over the centuries. In fact, as Lucien Febvre, quoted by Braudel, reminds us, if Herodotus were to mingle with contemporary tourists, he would not recognize any of those that for us are undoubtedly constituent components of the Mediterranean landscape: oranges, lemons, tomatoes, cypresses, chestnuts, peppers, eggplants. Yet both - the landscape coeval with Herodotus and ours - are original landscapes, endowed with their own unmistakable identity. In both, in fact, the sense of belonging of a community to its own environment finds dwelling and expression, understood as «value continuously built by the will of those who inhabit and use the territory». The identity of a landscape is therefore not a fixed and immutable product, but it is an evolutionary concept, insofar as there exists a two-way link of continuous feedback and active interferences between settled communities and territories. Identity, then, turns out to be the result - historical and geographical - of a process of differentiation of one community from others. Identity must therefore be understood as an uninterrupted succession of evolutionary characteristics. This implies first of all to recognize the dynamic character - for its continuous change over time - and paradoxical - for the ability to offer us new objects and symbolic permanence - of the identity of the urban landscape. This procedural definition of the landscape is perfectly consistent with the definition of «identity», which, referring to mathematics, indicates «an equation that continues to be true whatever the value of the symbols of which it is composed». It is a definition that does not deny but rather implies the continuous change of the symbols that enter the equation.

3 Meeting Places. The Collective Spaces of Four Buildings of Worship, to Live Together

The urban regeneration of squares with buildings of worship of this article therefore requires a multidisciplinary approach that integrates, in unison, architectural, urbanistic and sociological skills, because only by understanding the cultural and associative dynamics of the different communities and the stratification of places, it is possible to achieve satisfactory results from the point of view of design and consequences on citizenship. It is only through a deep understanding of a place and the analysis of its aggregative potential that public spaces are created that are inclusive, functional and representative. The urban regeneration of the squares that house places of worship, such as churches and mosques, represents a potential for the contemporary city, also by virtue of the international scenarios of the beginning of the millennium: religious conflict and interfaith dialogue. The squares and buildings of worship are traditionally places of assembly, that is social aggregation, where lay and religious practices are intertwined, daily and extraordinary, such as celebrations of festivals or various events. The regeneration of these spaces requires a deep understanding of the interactions between the different components of community life, as the public space in front of it links the building to the

city. It makes not only a facade to admire, isolated monument but place of standing and meeting. Place of reflection, of expectation but also of social contamination.

4 Places in the Mediterranean

4.1 Largo Spartaco al Tuscolano: Saverio Muratori, Paolo Portoghesi and a Smart Square that Incorporates Mixed Land Uses[3]

In the 50's of the second post-war period in the city of Rome, as well as in other Italian cities, there was a program of economic housing: the well-known "Piano INA casa". The plan included, among others, a building expansion of the Tuscolano district by a group of architects headed by Mario De Renzi and Saverio Muratori. In the 1960s, the latter also designed the parish of the district equipped with an oratory, the church of the Mary's Assumption, remained unfinished at the top, especially in the ambitious dome roof in reinforced concrete. The complex is now underground and, therefore, the square in front of it consists of a rhomboid square, Largo Spartaco, located on the country floor and delimited by an inline building of houses with shops, also work of Muratori. The unfinished of the church and the fact that the square is separated from the cult building by a driveway with parking, has caused in the 90s the City of Rome, through the office of the "*Centopiazze"* and the Department of Architecture and Analysis of the City of the Sapienza University, studied a proposal to reorganize the public space in front of it in order to reconnect the parish to the city (in Donatella Scatena, 2008) [2]. The project intervention, coordinated by Paolo Portoghesi[4] has drawn several proposals for integral remaking of the square, which descends towards the hypogeous church with a series of steps and terraces. They have experimented with different solutions, with and without the introduction of tree essences, but what unites all the solutions is the rhombus motif of the pavement of the square that comes from the "boomerang" outfit of the building. Two fountains were inserted in the square, which descend from listening to residents who wish to live the collective space, and that expressed themselves at the time in a kind of participatory design event. For the church, it was planned to replace the original dome with ribs and add a bell tower, where the sculptor Paolo Borghi thought of the statue of an angel, the same artist who will be, together with the same architect Portoghesi, protagonist in the construction of the church of Calcata Nuova. On the design of this space, Portoghesi and Scatena then involved the students of the then architectural design laboratory of the faculty of architecture of Sapienza given by the same designers, another example of bottom-up involvement of third parties, or in any case outsiders to the group of insiders (in Donatella Scatena 2008). Years later, this experience is still valid because the square is yet to regenerate and the principles that inspire the intervention are still valid despite technological evolution. In the second half of the 1990s, virtual reality was still in its infancy, from electronic design to the use of three-dimensional models and rendering programs, which have now become a practice, almost obvious, in design, Reversing

[3] Piazza al Tuscolano with the church of the Assumption of Mary, designed by Saverio Muratori and remained unfinished;

[4] Centopiazze group: coordination by P. Portoghesi, with the collaboration of V. G. Berti, C. Del Maro, L. Di Lucchio, M. Pisani, F. Rosa, D. Scatena;

the paradigm of exceptionality as a novelty. A further development of the research project could be the application of models for calculating flows throughout the day of citizens who frequent that square, the place of worship and the oratory, together with a sample of interviews well representative of the uses and functions required, broken down by age groups. The combination of the data obtained, together with the manipulations required by computer science, could confirm, or suggest changes to, the design solutions previously proposed. The words reconnection and connection are currently very popular, if not even abused, in different fields of knowledge, from architectural to computer science, and then go to everyday jargon, but the anthropological and biological vision of Portugal's design science par excellence, architecture, is such that we can understand the insistent use of lozenge in the compositional theme of the pavement of Tuscolano square, If we believe that the urban form of the square is also the result of a: "investigation on the structure that connects all living creatures" [3].

4.2 The Great Mosque of Rome Designed by Paolo Portoghesi. The Use of Technology and Computing Capacity for Effective Help in Managing Urban, Landscape and Cultural Heritage Variables

The Great Mosque of Rome, the best-known project of Paolo Portoghesi, is a place of prayer, with cultural center that promotes interreligious and intercultural dialogue. This building, it should be remembered, is also a destination for tourist visits and not only the Muslim faithful: architecture as a means of social inclusion and amalgamation of different flows, that of the faithful and that of visitors or frequenters the cultural center. Placed in a residual space, adjacent to a railway connecting the capital to the north of Lazio, an infrastructure of speed, a furrow, a divisive sign, commonly perceived as a barrier, thanks to urban design strategies has transformed the place into a hinge between two worlds, the everyday metropolitan and the static calm of spirituality. On the cross-cultural issue of building a place of worship for a religious minority, Portuguese argues that he wants to: "to arrive, in the historical exploration of two architectural civilizations up to identify where they touch; or because they participate of common roots or because in the past grafts have been possible between the two species" [3]. The work is emblematic, above all, for the way in which the architect manages the meeting of the two cultures, the Western Christian and the Eastern Muslim with the place. It is clear what he meant by "poetically dwelling the earth" [2], for the fact that the mighty mole of the built fits into the surrounding hilly panorama, not only respecting the orientation dictated by the Islamic religion, but also the site, that is the major dome insists where there was a "small hill", the architectural elements and finishes, in detail the tree-shaped pillars and materials, marble and brick, are inspired by the surrounding woods and the "archaeological stratification of the place" (in Donatella Scatena 2024) [5]. From the point of view of the city, in summary, Portoghesi states that the urban structure of the project tends to interpret the landscape values of the place according to the visual directions suggested by the shape of the lot, almost coinciding with the cardinal points.

"In the mosque" says Portuguese "listening to the place takes place in different directions: as listening to the physical place (a lot defined geometrically at the foot of two hills on the edge of the Tiber floodplain area); the anthropological place: the city of Rome, and a system of places" (n.d.r. Mecca) [4]. In fact, paraphrasing the symbolism of

the decumanico cardo plant of Roman civilization, there is a dialectic, not only horizontal on the ground from the orientation of the building according to the conformation of the lot and territory, but also an ancestral zenith relationship between heaven and earth. Land understood as: "richness of meanings, […]that the primitive civilizations have assigned to a composite reality […], the reality of the ground, which is trampled on, of what differs and contrasts with the mobility and transparency of the sea, and the immateriality and depth of the sky. […] We can therefore say that architecture has learned from the earth plasticity" [5].

The urban and architectural reasoning behind this project makes it clear that there is a connection between the different disciplines and factors involved when talking about urban regeneration, in particular those of memory, culture and landscape: "The 'road' with houses - objects arranged marginally, reacquires, together with the square, the continuity between building and urban fabric. In this respect, based on the observation of the city, there are many examples of continuous connection both in the Islamic tradition and in the Roman one. Isphahan or Cairo have an uninterrupted sequence of public spaces, closed and open, in an almost labyrinthine tangle: market, promenade, place of prayer. In Rome, which has not produced large porches, there is a tendency to reabsorb the monumental emergencies as privileged parts of the fifth street, through the mediation of the great 'facades' […] in the project of the Islamic Center a road, flanked by semi-pathsopen, mediates between the prayer hall and the city'" (in Donatella Scatena 2024; Portoghesi 1974) [4]. The relationship with the city, even in marginal contexts or in frayed suburbs, is important and delicate when to regenerate a work stimulating community life, in religious cultural field, Because it is necessary to avoid building mega-structures in the desert, thus ends themselves, but that can instead develop an area depressed or forgotten by public policies, a "morphogenetic field", which absorbs, with its "resonances", the testimonies of the past, the Mosque stands at the foot of the ancient settlement of Mount Antenna, is inserted in the landscape, but favors the development of the present and future. Using the expedient of perspective, Portoghesi[5] suggests that the data processing capabilities of current and new technological means should orient the gaze, widening the perspective cone, from architecture - building to architecture - cities, in the direction of the vast area and territory of different scale to ensure that the risks of failure or futility are avoided [6]. The computer sciences are currently used mainly in the contribution to architectural design in the strict sense, think of the reality of BIM, now required by European legislation for certain projects and construction sites, but, in the future, it is foreseeable that they must also provide the necessary interpretation of the copious number of data for a correct geomorphological and anthropological reading of the territory, understood as land, For example, in investigating the presence of

[5] Portoghesi Paolo, *Geomorphism, archetypes and symbols in architecture*, in "Agathón", n. 2, 2017, pp. 11–24: "*[…] The category of perspective (risk), linked in painting to the opening of the landscape towards infinity, to the evocation of distance and the wealth of information about the practicability and habitability of the earth, has a strong architectural value, not only because the presence of architecture often accentuates in the views the sense of depth and habitability but because the architecture itself, especially within the urban context, lends itself to be read and interpreted in terms of perspective depth, of an illusionary suggestion of an ideal percorribility of spaces that only the eye can really travel, but which give the observer the impression of being dragged into a journey […]";*

archaeological ruins or aquifers, but also anthropogenic, not only at the service of new technologies with zero environmental impact for the construction of buildings and how they are lived, both in the occupation of the internal space and in the consumption for their functioning, but also to investigate the perceived interest and well-being on the part of the population to have in suburban or disadvantaged areas of mega-facilities or large projects of urban relevance, with the consequent expenditure of economic resources, but by the result, many times, unfortunately uncertain. The Mosque of Rome seems to be a winning bet in this regard.

4.3 The Church of SS. Cipriano e Cornelio Designed by Paolo Portoghesi in Calcata: The Physical Layout of Small City that Influences Flow Patterns.

North of Rome, but already in the province of Viterbo, you reach the ancient village of Calcata. Here the Portuguese lived in recent decades and here he left a large literary garden and the Church of Saints Cornelius and Cyprian, located in the new part of the country. Calcata nuova is a chaotic urban aggregate, the result of the depopulation of the historic core of the country where the town hall square was lacking a place of worship and was also missing a side that encloses public space.

The intention of Portoghesi was to: "[…] compensate the broken memory, of the old town, with its beautiful church that the inhabitants were forced to leave" [7].

At the small church of Calcata Nuova the traveller arrives climbing a grassy ridge. The church looks back and to enter you have to go around the building, discover it as you go.

While walking around the tufa base of the building we read the ribs of the envelope that close the inner sacred space and act as a structure and want to remember the cliff on which stands Calcata. From the base rises a large star-shaped block that explodes upwards, representing the metaphor of the star being: "absolute centrality but it is not, like the circle, delimitation, closure, but synthesis of opening, irradiation, path, explosion and at the same time recall and concentration. […] symbolic form similar to that of the human eye with the pupil and the radiant iris, which guides the soul upwards"[3].

The silence of the place emphasizes the relationship with nature: "Having identified the symbolic root in reference to the star, the next step could only be a typological investigation, which would bring back to memory the previous experiences of that geometric model. […]" [3], while the symbolic reference to number 7 emancipates architecture from functionalism, in the principle of a parallelism marked by homology between the natural structure and that of the architectural organism, with an "abstract interpretation" [6], which also embodies the concepts of identity and beauty, so that the facade of the church, which completes the urban fifth of the town hall square of Calcata Nuova: "represents the way, of a certain architectural unit, to 'feel' the influence and the call of the urban organism through the logic of its parts as the street and the square" [6].

The cult building brought sociality, sense of community and beauty to a square that was devoid of identity. The cultural heritage of the old town of Calcata, a tuff rock in the middle of the woods, is found in local materials: the massive use of tuff and wood. On the point, the architect clarifies the argument by sharing: "the theory of the setting wants a building to rise in harmony with what is around it" [6]. In his reflections on the current trends of the world of architecture, Portoghesi indicated a possible way to follow

in the category of "geomorphism", the model of: "'assonant fragment' […], a point of structural contact between nature and work" [6]. Which led Portuguese to stigmatize: "But isn't the separation between nature and spirit responsible for the promethean attitude of technology that promised salvation in exchange for the defeat and enslavement of nature and makes us feel today the foreboding of ecological catastrophe?" The church of Calcata, completed in 2009, has used modern technologies, such as software for structural modeling, rendering for representation and prefabrication for the supporting elements and completion of the tiburio, but it has declined in a careful regeneration of the urban agricultural space. The virtual is a powerful tool and at the same time an illusion that must be controlled. The architecture under consideration emphasizes the figure of the designer who is aware of the potential of the new technology instrumentation and uses it, without being exploited or deceived. The computer sciences at the service of the project are mature and almost completely assimilated in the design process, while they still have a "blue ocean" to investigate in the field of social sciences for design purposes.

5 Places of the Baltic

5.1 Vilnius, The Catholic Church of SS. Patrizio e Giacomo and the Lukiškės Square: A Memory as Promoter of Seamless Movement

The Mediterranean and the Baltic, linked by a millenary route, the "amber route", are also linked here by a series of university and academic exchanges that the authors have long started between the Lithuanian universities and Sapienza. This gave way to know the approach to the Lithuanian heritage and to understand that the valorization of the heritage is also very much felt in the Baltic countries, eager to recover their historical memory together with the creation of a democratic political reality. Emblematic is the case study of the Catholic church of SS. Patrick and James together with the Lukiškės square in Vilnius (Lithuania). The building with its square, as well as being a masterpiece of baroque architecture, is important for its historical vicissitudes and for the history of the Lithuanian people, because it was preceded by the presence of a mosque and a Tartar cemetery, both destroyed in Soviet times. State secularism did not spare the church, which was transformed into a storehouse. The square also saw the presence of a symbol of foreign domination, the headquarters of the KGB, the infamous secret service of the USSR. Once political religious freedom was regained, along with independence, the church was reconsecrated, and the square was the subject of a public competition for ideas for the reconfiguration of the square. If Rome and the Lazio reality are a case study of the coexistence of religious buildings of different confessions in space, Lukiškės square is an example of the same coexistence, but also on a temporal level and for a period of time Unfortunately, it lasted until the 1950s. The contest of ideas for the requalification has, therefore, introduced into the public space of the square the concept of memory, in particular that of the victims of dictatorship given the sad presence of the seat of the repressive hand of totalitarian domination, to which we will have to add, also because claimed, that of the already existing mosque with adjoining cemetery of the Tartar presence. Memory is one of the basic elements of cultural heritage, which can, thanks to new virtual and powered reality technologies, provide the material for the creation of a virtual public pizza, where knowledge is transmitted and the virtual

reconstruction of historical traces, recreating the monuments that are no longer there, but that have left a trace, and are still present, in the culture of a people. These technologies are already in place also in the central archaeological area of Rome and beyond. Certainly, we cannot underestimate the virtual regeneration of spaces given by technology, now mature: from the point of view of dissemination for the mass, it is now to spread the points of connection on site and fill with cultural content and not only, Public spaces via the air. The theme of urban regeneration in relation to the buildings of worship and their adjacent spaces is also inserted into the reflections in a broad sense of different scholars. Jane Jacobs highlighted the role of urban elements, starting with the sidewalk in defining an urban space and more generally the public city [8]. On the contrary, Lewis Mumford has theorized the amenity of the city-garden and the rarefaction in front of the uninhabitable cities of the industrial revolution. From these two positions comes the third way to achieve the coexistence of life in a square worthy of a metropolis and with an oasis of tranquility and meditation given by the presence of a cult building. Henri Lefebvre, sociologist and philosopher, also analysed the concept of "right to the city" and "lived space", highlighting how people's daily practices and experiences shape spaces and places. Richard Sennett, sociologist, explored the link between public spaces and social interactions, encouraging interdisciplinarity with architect Pablo Sendra, highlighting the importance of designing squares that encourage reversibility to deal with "disorder" of social change.

Their work, using the tool of architectural design, to highlight the potential of the upper and lower levels of the earth line to be exploited thanks to the porosity of the pavement of public land in order to install technological infrastructures that give the possibility of generating ephemeral events, also and above all from below, to reconfigure the space at affordable costs [9].

This brings us closer to the contributions of computational sciences to redevelopment of public space. If, as already mentioned above, technology from the point of view of dissemination, fashionable can, and perhaps should, become a practice for learning and spreading memory, prodromic to attachment, of places, it, understood as the contribution of quantitative disciplines, what is summarily included in the term algorithm, has potential still to be put into practice in the design phase. Computational science offers tools, predictive models and simulations to assess the impact of different design solutions on user behavior and space use: an increasingly detailed analysis of the flows and precipitations by the citizen of space and the quality of life in it. The development of agent-based models (ABM) can simulate interactions between individuals and the urban environment, helping to predict how structural changes will affect social and cultural dynamics. Augmented and virtual reality technologies, metaverse and advanced renderings, allow a preview of proposed interventions, facilitating community participation, therefore a project process not only exclusive prerogative of the professionals or experts in the field in various capacities, in the decision-making process and verification with the citizenry of the project proposals and expected results. This inclusive approach ensures, or should encourage, that the solutions proposed and then adopted effectively respond to the needs of the different social groups involved in the urban project.

6 Places of the Bosphorus

The research is also directed to the Levant, where the term Bosphorus encapsulates in its original sense the movement of men and animals between continents. Just as the north and south of Europe are connected by the ancient Amber Road, the east and west are also joined by the Silk Road and the traveller Marco Polo. The metaphor of life as a journey is appropriate for the cosmopolitan man of the new millennium who is called to give meaning and significance to the buildings of worship and public spaces relevant to them, conferring an Odeporica image of human occurrences. This experience of travel also flows into the intangible heritage of places, for the memories and sensations that visiting these places evokes in the psyche of each one, whether inhabitant or traveller.

6.1 Şakirin Mosque and Courtyard

Şakirin Mosque is located within Karacaahmet Cemetery, one of the oldest and largest cemetery in Turkey, and was built by the Şakir family between 2005 and 2009 (Batuman 2018). Combining modern architecture with traditional Islamic art, the mosque was opened for worship in Istanbul in 2009. The architectural design of the structure was undertaken by Hüsrev Tayla, while the interior design was executed by Zeynep Fadıllıoğlu (Taşar & Düzenli 2020). The fact that the interior decoration was designed by a female designer constitutes a significant example in the context of gender roles and Islamic architecture, emphasizing the importance of women's presence in artistic and architectural fields within Islamic societies. Additionally, the mosque's design, which integrates modern aesthetics, adds a new dimension to the conventional perception of mosques. The architectural elements, technological integrations, social impact, and cultural significance of the Şakirin Mosque distinguish it as a contemporary religious space. Examining the mosque from these perspectives offers critical insights into the evolving role of religious architecture in the 21st century.

Şakirin Mosque harmonizes Ottoman and Seljuk architectural elements with contemporary architecture. While preserving the fundamental principles of Islamic architecture, the mosque's design incorporates modern materials and construction techniques. The integration of contemporary design principles reflects an aspiration to create a mosque that maintains its religious identity while also appealing to a modern audience. Although the main dome and minarets adhere to traditional design principles, the interior space adopts a minimalist and eclectic approach. The use of light and water elements within the mosque's interior enhances the spiritual dimension of the worship experience. Materials and ornamentation have been deliberately kept simple, a design choice aimed at fostering a focused and contemplative atmosphere for worshippers.

Modern construction technologies were employed in the design of the mosque, with an emphasis on environmentally friendly and sustainable materials. The structural system is reinforced concrete, with glass panels filling the voids. Floor-to-dome glass surfaces allow for the maximum penetration of natural light into the interior space. Additionally, the implementation of a rainwater harvesting system and energy-efficient lighting enhances the mosque's ecological sustainability. Acoustic systems and ventilation arrangements have been meticulously designed to optimize sound distribution within the mosque, ensuring an immersive and balanced auditory experience (Fig. 1).



Fig. 1. Şakirin Mosque, its courtyard area, and its ablution fountain (şadırvan). (Photo by Zeynep Fadıllıoğlu Design).

This small-scale mosque has a footprint of 500 m^2 (5,400 ft^2) and is built on a platform covering 3,000 m^2 (32,300 ft^2). The main prayer hall is covered by a freestanding dome that is supported only at four corner points where it meets the ground. This design enables the mosque to achieve an unprecedented level of transparency. The domed main structure is complemented by a 650 m^2 (7,000 ft^2) courtyard, following the Ottoman tradition, and two separate minarets, each reaching a height of 35 m (115 ft) (Batuman, 2018). The courtyard is designed with sharply defined boundaries.

In Ottoman mosque architecture, the courtyard serves as a crucial transitional space leading to the prayer hall and is typically integrated with an ablution fountain (şadırvan).

While the courtyard of Şakirin Mosque follows this tradition, it also stands out as a spacious and open area shaped by modern architectural principles. It functions as a preparatory and social space before prayer. Unlike traditional Ottoman courtyards, which often feature colonnaded porticos (revak), the design of Şakirin Mosque prioritizes openness and transparency.

The ablution fountain of Şakirin Mosque differs from traditional Ottoman şadırvans, taking the form of a modern water sculpture. Traditional şadırvans are typically octagonal or circular in plan and covered by a dome. However, the şadırvan of Şakirin Mosque is a large stainless steel sphere positioned at the center of the courtyard, with water flowing over its surface, creating a mystical atmosphere within the mosque's courtyard. This design not only emphasizes the purifying qualities of water but also reinterprets traditional architectural elements in a contemporary manner. The minimalist design of the şadırvan integrates seamlessly with the overall aesthetic of the mosque, transforming it from a conventional functional element into a modern work of art.

Throughout history, mosque courtyards have served not only as spaces for ritual preparation but also as centers for social interaction. The courtyard of Şakirin Mosque continues this tradition, offering visitors a space for both physical and spiritual repose. The continuous flow of water from the şadırvan aligns with the Islamic concepts of purification and cleansing, reinforcing the symbolic significance of water in the mosque's architectural and spiritual composition.

According to Fadıllıoğlu, the structural simplicity of the dome in Şakirin Mosque stands out as an aesthetic feature, necessitating complementary elements that would "bring the project even closer to contemporary modern architecture." In line with this approach, the concrete dome was clad with aluminum panels featuring a fish-scale pattern. To reduce transparency and regulate daylight, a double-layered façade system was proposed. The outer layer consists of an inclined aluminum mesh curtain that conforms to the curved openings of the shell structure, while the inner layer is composed of frameless glass curtain walls (Batuman 2018). The mosque's roof is designed with a traditional approach, possessing a solid and substantial structure. The geometric-patterned glass panels extending from the pendentives to the dome continue seamlessly from the floor to the roof. As a whole, Şakirin Mosque features a design composed of inner and outer shells. The mosque, with its square floor plan, has an inner shell also enclosed by glass panels. The interior glass surfaces are adorned with Quranic verses and are designed with an aesthetic approach that allows light to filter through in a refined manner. Sunlight passes through the glass panels, casting intricate patterns that create a balanced interplay of brightness and shadow within the space (Akbulut & Erarslan 2017). The glass panels positioned at eye level for the congregation are designed to resemble the pages of the Quran. The spaces between the lines of text are embellished with gold gilding, producing a similar visual effect. Through this design, the interior space successfully integrates both traditional and contemporary aesthetic principles, fostering a unique architectural experience that bridges historical Islamic art with modern design sensibilities (Fig. 2).

The typical elements of a traditional mosque interior have been reinterpreted in unconventional forms. The mihrab, which indicates the qibla direction, has been designed as a freestanding element in the form of a turquoise crescent. In terms of design, this is

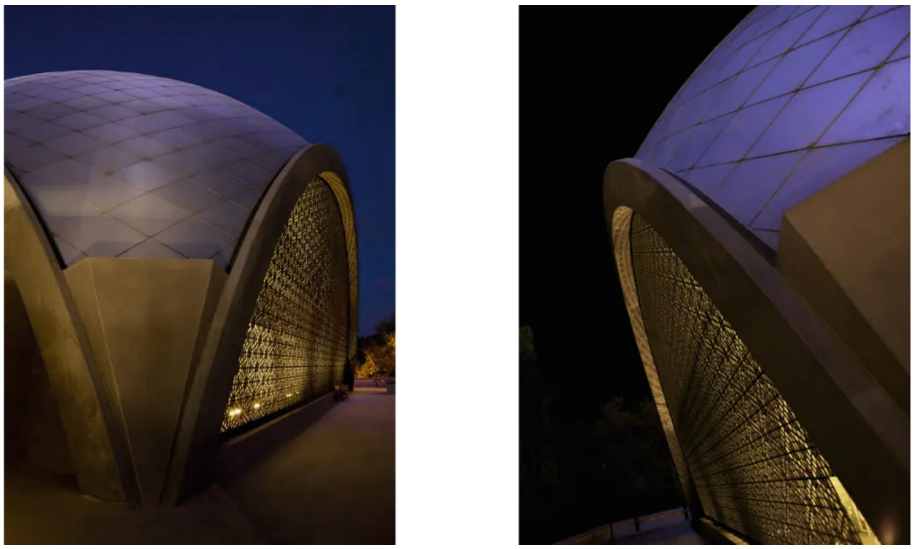

Fig. 2. Şakirin Mosque dome structure and glass details (Photo by Zeynep Fadıllıoğlu Design).

the first instance of a mihrab being presented in a semicircular shape. Its prominence is emphasized through the use of a niche, creating an inward-facing circular structure. As a distinct architectural feature in both form and material, the mihrab stands out as one of the most striking elements of the interior. While its outer circular form is made of turquoise metal, the inner section is gold-colored (Akbulut & Erarslan 2017). The minbar, from which the imam delivers sermons, has been designed as a sculptural object, inspired by the pendentives on the inner surface of the dome. The railings of the minbar's staircase extend from the floor and complete the structure in a crescent shape. The leaf motifs on the steps are arranged in a way that resembles Arabic letters when viewed from a distance. These motifs are said to symbolize the universe. The pulpit (kürsü), made from the same material as the minbar, also has a circular form similar to the mihrab. Additionally, the leaf motifs are incorporated into the design of the pulpit as well (Akbulut & Erarslan 2017). Finally, the chandelier design presents a modern reinterpretation of the traditional large circular iron-framed chandeliers that typically hold candles. In this case, three circular frames are fixed at different angles, forming a three-dimensional composition. Quranic verses are inscribed onto the frames, and glass droplets, which refract light, are suspended from them, enhancing the spiritual ambiance of the interior (Batuman 2018).

The integrated spatial design of the dome has allowed for a unique arrangement of the women's prayer area. In an unconventional approach, this section is positioned as a balcony on the entrance façade of the mosque, directly beneath the central dome, enabling women to fully experience the atmosphere of the main prayer hall. While balcony designs for women's sections are commonly preferred, the parapets used in this space are made from the same metal mesh material as the mosque's façade, ensuring a remarkable degree of transparency. As a result, the partition that visually separates the

male and female congregations is as permeable and elegant as the aluminum curtain that delineates the mosque's interior from the external environment (Batuman 2018) (Fig. 3).



Fig. 3. Şakirin Mosque Interior Design: Mihrab, Minbar, and Chandelier Details. (Photo by Zeynep Fadıllıoğlu Design)

Following its inauguration, Şakirin Mosque has gained international recognition through promotional activities, establishing itself as a noteworthy architectural landmark. Interviews and documentaries featuring Zeynep Fadıllıoğlu in global media outlets have contributed to the mosque's worldwide visibility. Additionally, the Istanbul Directorate of Culture and Tourism has included Şakirin Mosque in tourist itineraries as a significant example of modern architecture. Frequently covered in both national and international media for its contemporary design and artistic details, the mosque has become an attractive destination for visitors with an interest in aesthetics and architecture (Taşar & Düzenli 2020). The high level of visitor interest has transformed the mosque into not only a place of worship but also a hub for artistic and cultural interaction.

Moreover, Şakirin Mosque functions as a social gathering space and a center for cultural exchange. Events such as iftar gatherings during Ramadan, charity campaigns, and donation drives contribute to strengthening social solidarity. By providing more visible and accessible prayer spaces for women, the mosque challenges traditional perceptions of mosque architecture and fosters stronger social connections among female congregants. Additionally, through courses, conferences, and seminars, Şakirin Mosque serves as an educational and informational hub that extends beyond its religious function.

In all these aspects, Şakirin Mosque makes a modern contribution to Istanbul's religious and cultural landscape, serving as a dynamic space for both local communities and international visitors.

7 Conclusions

Buildings of worship, as assembly buildings and places in the vicinity of public squares or spaces, are critical success factors in the process of urban regeneration. Computer science can and should be an aid to this process and the design process. Currently, they are used in electronic design and augmented or virtual reality computer programs, but their contribution to the analysis of data upstream and downstream of the urban project has yet to be developed and enhanced. This is what we might call the interpretation of data from sociological, anthropological, and logistical analysis of human capital flows. Computer science is also increasingly refining landscape modelling and project georeferencing, as well as the energy consumption of buildings, a next step in this direction, it would be to create intelligent maps where the results of social analysis are graficed, that is on the end users, the citizens. It is important, finally, their impact on the training of the designer and the schools of architecture and town planning. We often see a domination of the machine on man, whereas instead, it is essential to conceive the algorithm and the mathematical formula that makes augmented reality possible as a tool, not an illusory end, which can compensate for the lack of a project culture and knowledge of social dynamics. The case studies reported are significant precisely in showing a correct use of these new technological frontiers at the service of projects and works of quality, which have, in fact, led to a territorial regeneration.

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