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Editorial

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The essays of this volume constitute the second lot selected from the conference which took place in July 2023. They illustrate the diverse and multifaceted nature of contemporary architectural research, reflecting its engagement with technological advancements, sustainable practices, the integration of history in design thinking, and ethical considerations.

The essays of this volume constitute the second lot selected from the conference which took place in July 2023. They illustrate the diverse and multifaceted nature of contemporary architectural research, reflecting its engagement with technological advancements, sustainable practices, the integration of history in design thinking, and ethical considerations. While each one tackles unique subjects, they all contribute to an overarching discourse that shapes how architecture is perceived, designed, and executed in the current era.

Dilara Yaratgan's in *"Ethical Engagements in Urban Space Design"* explores the ethical dimensions of urban landscape design, emphasising the role of human intervention and its relationship with nature. By decentering the role of the human designer, the essay challenges the traditional perception of architectural authorship. This shift is

vital in contemporary architecture, where the focus is moving from individual creators to a collaborative process involving various stakeholders, including nonhuman agents such as nature itself. In the context of urbanism, this research holds significant relevance as cities face ecological crises and challenges in maintaining biodiversity. Contemporary architectural practices are increasingly expected to prioritize sustainability, regeneration, and ethical interventions, and this essay's focus on urban parks in London reflects this growing trend. The use of "natureculture" as a key concept demonstrates a convergence between natural and cultural elements, which mirrors broader global discussions on landscape urbanism and the Anthropocene.

Carlo Vannini's work in *"Digital Models for Sustainable Housing Renewal"* addresses the renovation of post-war social housing through the lens of sustainability and digital

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Whilst practising and conducting research, Maria worked as an adjunct lecturer at the School of Architecture of the University of Bath. She decided to engage further in academia. Prior to becoming a Professor of Architecture at ARU (September 2018) Maria taught for over 11 years at Bath and Plymouth universities as Senior Lecturer, as a Visiting Professor for a semester in Denmark (Aarhus School of Architecture) and as Professor of Design and Technology until 2018, at the School of Architecture of Aristotle University of Thessaloniki.

Maria is a confirmed researcher and educator, a proof of which is her recent book *Architectural Materialisms: nonhuman creativity* (Edinburgh University Press, October 2018) and 9 prizes her students were recently awarded on their final design theses by participating in international student competitions.

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Valerio has published in several international magazines and has been invited as a speaker in European and Asian venues. He is a member of the Editorial Boards of architectural journals and series such as FORUM A+P - Interdisciplinary Journal of Architecture and Scientific Environment, the OMB Series, the Tracce series (DIAP), and the Gli Strumenti series. In 2020 he has published his first monography *L'attività ludica come strategia progettuale. Regole e libertà per una grammatica del gioco in architettura* (in en. *Ludic Activity as a Design Strategies. Rules and Freedoms for a Grammar of Games in Architecture* (Quodlibet).

innovation. His research reflects the increasing reliance on digital technologies such as Building Information Modeling (BIM), artificial intelligence, and energy-saving strategies in architecture today. Vannini's study aligns with the principles of the European New Green Deal and the New European Bauhaus, both of which call for greener, more efficient buildings. This research holds particular relevance to contemporary architectural discourse by emphasizing the role of digital models and prefabricated building systems in tackling social housing issues. Urbanization pressures, along with the need to create environmentally responsible buildings, have led to renewed interest in updating older housing stocks instead of demolishing them. Vannini's exploration into the recalibration of buildings rather than their destruction is in line with the recent ethical stance towards adaptive reuse, thus fostering economic, social, and environmental sustainability.

Júlia Beltran Borràs's work in *"Reuse of Buildings in Portugal"* investigates the transformation and reuse of existing buildings within the urban fabric of Portugal, focusing on a variety of projects that merge historical elements with modern urban demands. This exploration is crucial to contemporary architecture, which frequently wrestles with balancing preservation and innovation. In architecture today, there is an increasing trend toward adaptive reuse, where old buildings are repurposed for modern functions, rather than demolishing and replacing them. Borràs's analysis of historical buildings in Lisbon, Braga, and Torres Vedras illustrates how architects are creating new public spaces by integrating elements of the past. This idea resonates with the growing appreciation for the cultural and historical contexts of architecture, where the material past informs the design of future urban spaces. Her focus on the "mutation of buildings" reflects an architectural philosophy that recognizes the importance of pre-existing structures, allowing for the creation of urban spaces that are historically informed yet functionally relevant for contemporary society. This contributes to the ongoing dialogue in architecture about sustainability, not only in environmental terms but also in cultural and historical preservation.

The research by **David Pérez-Royo, Alicia Llorca-Ponce, and Fernando García-Martínez** in *"Real Estate Investment and Methodologies"* shifts the focus from architectural design to the financial and technological dimensions of real estate investment. The introduction of big data and artificial intelligence into the real estate sector signifies a growing intersection between architecture and digital technology, particularly in the analysis of housing demand, urban development, and property management. The application of data-driven methodologies to real estate investments aligns with a larger architectural trend of using computational tools to inform design, planning, and management processes. This research speaks to a broader narrative in contemporary architecture, where technology is not only a tool for design but also a means to optimize and innovate in property markets and urban planning. The study emphasizes the importance of structured methodologies and new technologies in making real estate more accessible and efficient, reflecting an emerging architectural

discourse that seeks to blend design and economic considerations with advanced computational tools.

Prefabricated Housing Construction Throughout History (Maria Piqueras Blasco and Ivan Cabrera i Fausto). Maria and Ivan's exploration of prefabricated housing construction through history provides a comprehensive view of its evolution from a temporary solution to a permanent and sustainable option in modern architecture. The focus on speed of assembly and flexibility in design highlights two critical aspects driving the adoption of prefabricated construction today. The study's emphasis on industrialization and technological advances parallels contemporary efforts to create faster, more efficient, and environmentally friendly building methods. This aligns with the global shift towards sustainability and the desire to address housing shortages through innovative construction techniques. Prefabrication, as explored in this paper, is relevant to contemporary architectural practice as it offers a solution to some of today's biggest challenges, including housing crises, cost efficiency, and environmental impact. The method's evolution into a sustainable alternative positions it as a key component of architectural innovation, especially in the context of rapidly growing urban populations and the need for affordable housing solutions.

Across these five essays, several common threads emerge that are highly relevant to contemporary architectural research:

1. **Technological Integration:** The use of digital models, big data, and artificial intelligence features prominently in both Vannini's and Pérez-Royo's research, reflecting a broader shift toward the digitization of architecture. Today, architects and urban planners are increasingly leveraging technological advancements to design more efficient, sustainable, and user-friendly buildings and environments.
2. **Sustainability and Adaptive Reuse:** Both Vannini and Borràs focus on the renovation and reuse of existing buildings, which speaks to a critical contemporary issue: sustainability. Rather than demolishing old structures, modern architecture frequently aims to repurpose them, reducing waste and maintaining historical integrity while adapting them for present-day use. This mirrors global sustainability goals, where the built environment is increasingly designed to conserve energy and minimize environmental impact.
3. **Ethical and Social Considerations:** Yaratgan's and Vannini's research points to the ethical and social responsibilities of architects, whether in promoting biodiversity in urban spaces or in ensuring that social housing meets the needs of contemporary residents. Modern architecture is expected to engage with these broader social and environmental concerns, moving beyond aesthetics to address the challenges posed by urbanization, climate change, and social equity.
4. **Historical Continuity:** Borràs's emphasis on integrating history into modern architectural projects speaks to a growing recognition of the value of historical continuity in urban design. Architects today are

tasked not just with creating new structures but with understanding the layers of history within urban environments and designing in ways that respect and enhance these layers.

5. Collaborative and Multidisciplinary Approach: Another important aspect seen in these works, particularly Yaratgan's, is the decentering of the singular architect's role and recognizing the collaborative nature of creating and maintaining urban spaces. This aligns with current trends in architecture, where multidisciplinary approaches involving ecologists, urban planners, and local communities are becoming essential in the design process.

Contemporary architectural research, as reflected in these essays, is characterised by an interdisciplinary approach that encompasses digital innovation, sustainability, historical preservation, and ethical responsibility. Each study brings forward a different aspect of how architecture is evolving to meet the challenges of the 21st century—whether through rethinking the role of the architect, using technology to enhance the built environment, or integrating the past with the present. As architecture continues to be influenced by global trends such as the green economy, digital transformation, and urbanization, these studies provide critical insights into how the field can adapt and thrive in an increasingly complex world.

A recurring theme is the use of digital tools—from big data to AI—to optimize design and real estate management, as seen in the works of Vannini and Pérez-Royo et al. These technologies are revolutionising how architecture interacts with the environment, the economy, and social structures, facilitating a more efficient, user-centered approach. Sustainability is another critical focal point, with an emphasis on renovating and reusing existing structures rather than demolishing them. Vannini's exploration of social housing renewal and Borràs's studies on adaptive reuse in Portugal underscore the importance of environmentally

and culturally sustainable practices in architecture today. This approach reflects broader global movements, such as the European New Green Deal, aligning architecture with ecological and societal goals.

Yaratgan's work further pushes the boundaries of ethical engagement by advocating for a decentered role of human designers, recognizing the influence of multiple actors—including nature—in shaping urban spaces. This mirrors the evolving understanding of architecture as a collaborative and multidisciplinary practice, essential for addressing complex urban and environmental challenges.

All in all, contemporary architecture is evolving to integrate technological advancements, historical continuity, and social responsibility, aiming to create spaces that are not only functional but also sustainable, inclusive, and sensitive to the past and future needs of society. These essays collectively reflect the expanding scope of architectural research, which now intersects with ecology, technology, history, and ethics in shaping the built environment.

The essays included in this volume illustrate the diverse and evolving nature of contemporary architectural research. Key themes such as technological innovation, sustainability, ethical design, historical continuity, and economic efficiency are reshaping how architects approach the design and development of the built environment. As architecture continues to adapt to the challenges posed by urbanization, climate change, and technological advancements, the ideas presented in these works highlight the critical role of interdisciplinary collaboration and innovation in shaping the future of architecture. Through the use of digital tools, prefabricated construction, adaptive reuse, and data-driven methodologies, architecture is becoming more responsive to both the needs of society and the pressing global issues of our time.

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Prefabricated Housing Construction Throughout History

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This paper explores the historical evolution of prefabricated housing construction, from its origins to its contemporary development. Prefabricated construction has been used since the 19th century as a fast and efficient solution for the creation of structures, notable for the off-site fabrication of components, which optimizes execution times. Over time, this technique has evolved from being used in situations of emergency or temporary need, such as in World War II, to becoming a permanent and sustainable alternative in modern architecture.

The analysis of the historical evolution allows us to identify the interests and motivations that have driven the use of prefabricated construction. These include the need to solve housing crises, the interest in reducing construction costs and the desire to innovate in terms of design and sustainability. Industrialization and technological progress have also played an important role in its adoption, allowing for greater flexibility in materials and assembly systems.

Finally, this study concludes that the main motivations behind the adoption of prefabricated construction lie in two key factors: the speed of assembly, which significantly reduces construction times compared to traditional construction, and the variety in design, which allows prefabricated solutions to be adapted to various architectural and aesthetic needs. These advantages, combined with the possibility of reducing environmental impact and costs, have consolidated prefabricated construction as a viable and attractive option in today's architectural context.

1. Introduction

Prefabricated construction has transformed the architectural sector from its earliest documented uses to the present day, offering an innovative solution to the growing demands for speed, efficiency and savings in the building sector. Throughout history, this technique has been em-

ployed in a variety of forms, from simple temporary structures to complex modular systems that allow for the creation of permanent buildings.

One of the earliest documented uses of prefabricated construction dates back to the 19th century, when rapid, transportable housing solutions began to be developed. During the World War II, this technique boomed, due to

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b Ivan Cabrera i Fausto (Borriana, 1974) graduated in Architecture in 1998 at Universitat Politècnica de València and earned his PhD in Advanced Analysis of Design of Structures and Foundations in 2016. At the same institution he has been a Full Professor since 1999 and Director of the School of Architecture since 2016. In 2010 he was Visiting Professor at the Illinois Institute of Technology at Chicago and in 2023 Invited Researcher at the Massachusetts Institute of Technology at Cambridge. Moreover, he has taught as guest lecturer in institutions such as the Universitetet i Stavanger (Norway), the Politecnico di Milano (Italy), the Yildiz Teknik Üniversitesi (Turkey), the Technische Universiteit Eindhoven (Netherlands) or the Universidad Autónoma de Encarnación (Paraguay). In 2013 he was awarded the Docent Excellence Prize by the UPV Social Council and the Education, Culture and Sport Department of the Valencian Regional Government. Between 2017 and 2021 he was President of the Conference of Spanish Architecture Schools. His expertise is in advanced structures analysis and design focused mainly on structures for housing, historical structures and big sport facilities.

the urgent need to construct large numbers of dwellings and buildings in a short period of time. During this period, it established itself as a viable option for both temporary and permanent housing. As technology advanced, the materials used in prefabricated construction also evolved, allowing for greater durability, flexibility and sustainability in designs.

Over time, the evolution of materials and technologies used in prefabricated construction has improved the durability and adaptability of these structures. From simple timber and metal components to modular concrete and steel systems, prefabrication has advanced to become a sustainable option, reducing material waste and energy consumption compared to traditional methods.

Nowadays, prefabrication has been integrated into large-scale projects, from social housing to high-rise buildings, and has positioned itself as a key solution to address global challenges such as the accelerating urbanization, the housing crisis and the reduction of the environmental impact of construction. This paper explores the historical evolution of prefabricated construction, analyzing its main motivations, achievements and its influence on modern architecture.

2. Research objectives

The general objective of this research is to carry out a bibliographic search of the historical evolution of prefabricated construction. The specific objective is to identify the key interests and motivations that have driven the development of this construction typology, and how it has influenced architecture over time.

3. Methodology and limits of the research

In the course of this study, various scientific platforms were consulted, selected according to the type of information available for the study of prefabricated construction. On the basis of the documentation collected and the bibliographical consultations carried out, the historical evolution of this type of construction was analyzed and identified. Subsequently, the main motivations that have driven its development were critically examined, and the main interests were identified.

4. Background and historical development

4.1. The origins of prefabricated construction

The first references to prefabrication can be found in the 16th century, by Leonardo da Vinci. It was in 1516 when the King of France, Francis I, commissioned the polymath to design new towns in the former Loire region of France. In order to develop the new dwellings and the entire urban development, Da Vinci proposed the placement of a production center in the original area of each new town. In this way, he intended to manufacture the different elements and their subsequent transport, thus establishing a radius of action for the construction of the buildings. Each of these components and the buildings were designed by

himself to accommodate the constructions in a flexible and homogeneous way. In addition, each of the buildings, regardless of typology and use, was designed using the minimum number of construction elements (Aguiló Alonso et al., 1974).

During this same period, the wars between England and France took place (Lantigua De La Cruz, 2015). The war triggered an ingenious construction of prefabricated pavilions made of wood to shelter the combatants. The practice consisted of assembly and disassembly by the soldiers themselves, and subsequent transport by boat as they advanced. This provided solid accommodation, as well as speed of movement and assembly (Pérez, 2008).

4.2. Precursor of prefabricated wooden houses

In the early 19th century, the construction of the *Portable Colonial Cottage*, built from wood and developed by the carpenter Herbert Manning in 1833, was a remarkable milestone for the prefabrication of architecture. The most pioneering aspect of these dwellings was the decomposition and assembly by numbered pieces, classified and manufactured in the workshop, where they were later dismantled and transported by ship to their destination. Once they arrived at their location, they were assembled in a simple way in order to formalize the house. Likewise, all the elements that made up the housing were standardized and adapted to the dimensions offered by the raw material at the time.

The first dwellings were popularized by emigrants who left for the English colonies, mainly from Australia and South Africa. It was a few years later when Manning designed several proposals with differences in size and price, it was at this time, when the houses began to be a commercial product within reach of more people (Bergdoll & Christensen, 2008).

4.3. Early prefabrication systems

Undoubtedly, the major milestone event in industrialised construction relates to the emergence of the system known as the *Balloon Frame* (Fig. 1). The innovative system was born in Chicago, and is often attributed to George W. Snow around 1832, although there are no documents that definitively confirm this. In fact, this achievement has also been associated with Augustine Taylor (Serra Soriano et al., 2016).

The system is based on the construction of a structure made up of thin timber slats, which are joined together with industrial nails to form a frame. Constructively, this system was based on laths of sawn timber that were joined together at right angles by means of nails to form structural frames or baskets (Basket Frame according to the book written by G. E. Woodward and F. W. Woodward in 1865). The sleepers, which were reduced by half at the corners, rested on the foundations. Another remarkable point is the lightness, since in order to optimise the material and its resistance, the slats were cut with the optimum orientation of the fibres (Serra Soriano et al., 2016). These were cut in the workshop and adjusted on site in different arrange-

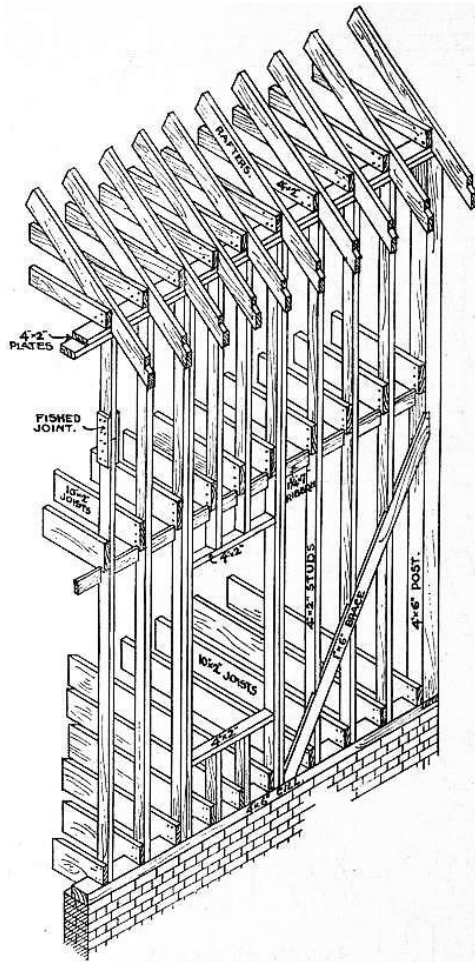


Figure 1. System Balloon Frame

Source: Wikimedia Commons, https://upload.wikimedia.org/wikipedia/commons/3/33/EB1911_Carpentry_Fig._36_-_Balloon_Frame.jpg

ments according to the needs of the programme, even up to three storeys (Ovando Vacarezza, 2015). The attractiveness of this system comes from the use of locally sourced materials, together with its speed of assembly, lightness and economic accessibility (Sarmirnto Ocampo, 2013).

This system led the American company Sears, Roebuck & Company to market a large number of houses in different shapes, prices and sizes from mail order catalogues (Fig. 2). The company was also one of the first to use plasterboard and central heating for interior partitions (Terrados Cepeda, 2012).

4.4. Prefabricated construction in the 20th century and its relation to urban planning and social housing

4.4.1. Proposals by architects

It was between 1911 and 1917, when Frank Lloyd Wright teamed up with the Richards Company to design the so-called *American System-Built Houses* (Sánchez González, 2016). For the architect, the intention of architecture was to improve the quality of individuals, and he sought to design for all types of people. These houses were centred

on the idea of standardization and prefabrication. In other words, each of the elements that made up the house, such as beams, roofs, windows and even doors, were made in a workshop. The great difference of this design, compared to others, was the value of individual identity. Wright developed these flats with the intention of giving each model a personalized design, rather than the intention of creating *repetitive types*. The idea was to produce the same shop-fabricated elements, but to fit them together in different ways. With this in mind, the intention was to reduce manufacturing and assembly times, while at the same time reducing costs, both in terms of materials and labor. However, to provide the client with an individuality of the home (Sánchez González, 2016). The elements were manufactured in the workshop and then moved to the site where they were fitted together and the home was formalized.

With the idea of individualization and adaptation of dwellings in mind, Le Corbusier also devised a housing model called *Dom-ino* in 1914. It is a modular structure made of concrete in the form of a skeleton, in which the vertical elements are released. In this way, the enclosures are separated from the structural load to combine different dwellings according to needs (Gardinetti, 2014). The system concept and the distinction between structural and non-structural elements set guidelines for subsequent prefabricated and modular architecture.

Another architect who also studied prefabricated architecture and its benefits was Richard Buckminster Fuller in 1927-29 with the *Dymaxion Houses*. These experimental houses and their theoretical model are based on the conception of three words that give their name to the house itself: 'dynamic' (DY), 'maximum' (MAX), and 'tension' (ION) (Sánchez González, 2016). The architect sought to generate an economical and efficient model that could be mass-produced and easily transported. Representative of the model was its hexagonal floor plan based on a central stainless steel structure from which the rest of the building, roof, floor and walls, were supported by radial cables (Bergdoll & Christensen, 2008). In addition to the functionality of the space, Fuller tried to give it an energy-efficient approach. To this end, the user could regulate the interior temperature through air flows by opening or closing the top of the house. The *Dymaxion Houses* remained a prototype, but their novel design and the idea of prefabricated, modular housing represent an innovative vision.

4.4.2. Urban planning and social housing

In the early years of the 20th century, movements emerged calling for decent and affordable housing for all classes. This led great architects to study the opportunities offered by prefabricated and modular architecture. Especially in terms of affordability. Thus, the building efficiency and standardization brought about by industrialization contributed to the thinking of new building forms and techniques (Banham, 2002). Along with this, the rapid growth of cities and the need for workers' housing helped the use of industrialized construction techniques.

This encouraged an approach to the new architecture of urban areas and social housing based on serialization and



Figure 2. Sears, Roebuck & Company cover and example from the catalogue, 'The Hamilton', model no. 102 and 158

Source: Sears Roebuck Catalogue, 1908, <https://upload.wikimedia.org/wikipedia/commons/b/b7/SearsHome102.jpg>

modular repetition. These concepts were in line with the fundamental principles of the Modern Movement, which advocated functionality, rationality and the elimination of unnecessary ornamentation in architectural design.

The application of modular serialization and repetition was particularly relevant in the context of social housing. As the demand for housing was high, standardization and repetition of elements allowed architects and urban planners to respond quickly to this need without compromising quality or architectural coherence. Modular housing complexes, such as Le Corbusier's *Unité d'Habitation*, illustrate how the combination of the same or similar housing units could generate an organized and functional community.

4.5. The first modular systems

4.5.1. The relevance of Gropius in prefabrication

In the second decade of the 20th century, Walter Gropius, founder of the Bauhaus School, was the pioneer of the concept of what we know today as *prefabricated housing*. The architect revolutionized modern architecture, both educationally and theoretically, marking a before and after. Gropius, together with Adolf Meyer, presented what is known as *Baukasten im Großen* or *Large Module* in 1923 (Fig. 3). It is a design comprising six different modules, which, depending on how they are combined, offer different programme options, making this project a wide variety according to needs (Gropius, 1966). This was one of the first contributions to the theoretical knowledge of industrialized and modular construction. In fact, Gropius already showed an interest in industry and mass production from his begin-

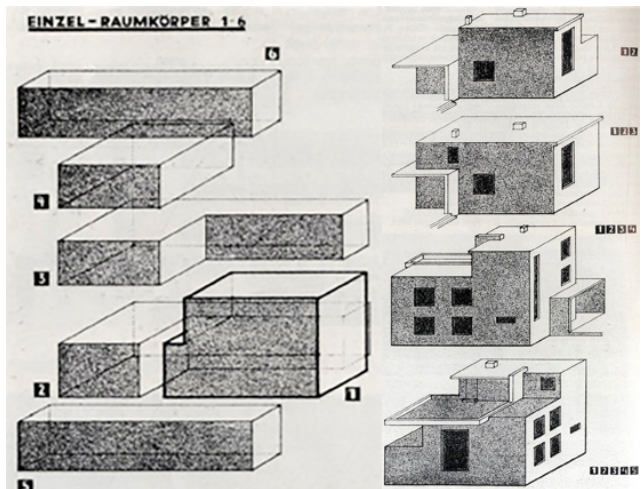


Figure 3. *Baukasten im großen*, Walter Gropius, 1923

Source: Architectural Projects, ETSA Sevilla, <https://proyectos4etsa.wordpress.com/2011/10/31/baukasten-im-gro%C3%9Fen-walter-gropius-y-adolf-meyer-weimar-1922-2/>

nings as an assistant, and this was latent in his later designs (Serra Soriano et al., 2016).

In 1927, for the Stuttgart Housing Exhibition, which lasted approximately three months, Gropius designed two prefabricated houses. The models offered an industrial and prefabricated assembly system, demonstrating his high level of project design and assembly. The intention of these dwellings was to offer a response to the economic context of the majority of people at the time. In other words, affordable housing, with rapid assembly, and with an adaptable and flexible design.

The next example is the *Steel House* of 1927. This project was built in the town of Dessau and designed by Georg Muche and Richard Paulick, members of the Bauhaus School. It was called the Steel House because of its structure, and the enclosure that surrounded it, made from 3mm thick steel exterior plates with thermal insulation, air chamber and mortar slabs. The project tried to adapt, reducing or enlarging itself, using strictly modulated panels. It was an 80 m² house made up of two bodies and resting on a concrete foundation. However, what gave the project its value was its adaptable design using panels and the dry use of steel (Strike, 2004). The great disadvantage of the house was its poor thermal comfort, given that it was cold in the winter months and hot in summer (Sánchez González, 2016). Also, the use of the steel structure was considered heavy, and this made Gropius reconsider the choice of other materials in future projects.

An example of this is the *Copper Houses* of 1931. These five-room dwellings were manufactured in a workshop and dry-assembled on site. It consisted of asbestos-cement cladding on the outside, plus a corrugated copper sheet. On the inside, it was covered with asbestos-cement boards, and the structure was made of wood. The whole system had the joinery incorporated in the workshop, and in situ it was only a question of screwing each of the panels together (Strike, 2004).

The situation after the Second World War left a latent need for housing (Caja, 2021). That is why, in 1942, Gropius together with Konrad Wachsmann presented the *Packaged House*. Undoubtedly, the most distinctive feature of this project was its modulation, speed of assembly and, above all, its connection system. The project involved joining rectangular load-bearing panels, positioned vertically and horizontally depending on the design of the house in question, which could be used for walls, floors and ceilings. Different panels were designed, opaque, with openings for windows and doors, and even panels of different sizes. In such a way that, depending on how they were joined together and the needs of the house, they could be adapted in one way or another. Its assembly system allowed for a wide variety of connections between the different panels. It was a connector that could fit the panels in the shape of an 'L', in a 'T' or in a cross, and vertically or horizontally. All this allowed the system great flexibility and the option of extending the dwellings. In spite of the great success that they expected from the housing system, it did not happen as expected, and therefore, the *Packaged House* remained rather as a thought for the later typologies of prefabricated houses due to its important contribution in the anchoring system (Herbert, 1981).

4.5.2. Modular systems in post-war architecture

After 1945, during the post-war period, there was a need for new housing, as might happen nowadays despite for very different reasons (Piqueras-Blasco & Cabrera-Fausto, 2022). This demand, by then, found an answer in modular systems, producing quick and economical housing (Karle, 2021). The speed of assembly, cost reduction and ease of construction and transport were the main advantages



Figure 4. Tennessee Valley Authority (TVA)

Source: Library of Congress Prints and Photographs Division Washington DC. 20540 USA, 2014



Figure 5. CIAM, Team 10 in Otterlo

Source: Wikimedia Commons, https://upload.wikimedia.org/wikipedia/commons/d/d7/Congres_Team_10_in_Otterlo_-_Team_10_Meeting_in_Otterlo.jpg

(Ovando Vacarezza, 2015). An example of housing offered in the United States came from the Tennessee Valley Authority (TVA) (Fig. 4). These are trailer-like residences designed as emergency housing, although later families looking for affordable accommodation began to use them as well (Kelly, 1951).

4.6. The continuous interest in modular construction. CIAM and its groups

The *Congrès International d'Architecture Moderne* or CIAM was created in 1928 with the intention of discussing the transformation of the city and the improvement of its social modes of living. Also, many of the concepts discussed were how to transform housing to a more industrial and productive method (Fig. 5). In 1947, after the Second World War, the need to propose solutions for the urban planning of different cities and their mass construction was raised. Due to different opinions, CIAM finally disappeared. In spite of this, and thanks to the meetings, different groups were formed. On the one hand, the *Archigram* group was created in Europe, and at the same time, the *Metabolist movement* was formed in Japan.

One proposal that gained interest from the European group was the *Plug-in City*. This approach competed with



Figure 6. The Nakagin Capsule Tower

Source: Jordy Meow, 2013

the classic idea of the city, and proposed the creation of modular residential units connected to a central mega-core, which contains the city's necessary services. However, the most notable of these is Warren Chalk's *Capsule Houses* (Fig. 11). These are towers made up of different prefabricated modules, which are interchanged according to the needs of the inhabitants.

The Japanese movement supports the idea of functional transformation based on technological progress and the development of construction based on modular mega-structures. Kisho Kurokawa's most notable building project was the *Nakagin Capsule Tower* built in 1972 (Fig. 6). It consists of two communication and service cores, to which prefabricated modules are attached, with the idea that they can be replaced and relocated.

5. Interests and motivations in the evolution of prefabricated architecture

A chronological sequence of the most significant highlights and the evolution of prefabricated architecture has identified a temporal development divided into five fundamental stages (Fig. 8):

1. Early ideas of off-site construction: first ideas and concepts related to off-site construction.

2. Easy-to-assemble dwellings: creation of dwellings that could be assembled more quickly and easily than conventional constructions.
3. Systems for day-to-day manufacturing: development of systems that enabled the efficient production of building components and modules on a large scale.
4. Urban thinking: transition towards the consideration of prefabricated solutions in the context of urban planning (Llop Torné, 2022).
5. Mobility in housing: mobility and adaptability of prefabricated housing, opening the door to versatile and mobile housing solutions (Pallasmaa, 2023).

These stages correspond to the evolution of thoughts and ideas in prefabricated and modular construction. The most representative points along the historical evolution and its stages have also been identified. These aspects outlined describe the main motivations of the designs (T. 1). The purpose of this critical overview is to establish the interest of prefabricated architecture and how it has evolved over the years. Therefore, the predominant points identified are:

From these ten points and thirteen projects or designs, the main motivations are speed of assembly and variety in design. This is followed by the reduction of materials, and very close behind by the ease of assembly and transport. A graph of the points identified and their attractiveness in the projects as a whole is shown below (Fig. 7, 8).

6. Conclusions

Prefabricated housing construction has proven to be an adaptive and efficient technique throughout history. The evolution of this methodology, from its beginnings in the 19th century to its contemporary applications, reveals a clear trend towards the optimization of construction time and costs. Through the analysis of its main milestones, it can be seen that the key motivations for its development have been the need for rapid responses to housing crises, cost reduction and advances in technology and design.

The two predominant motivations that have driven the adoption of prefabricated construction are speed of assembly and flexibility in design. The ability to significantly reduce construction time and offer adaptable solutions to diverse architectural and aesthetic needs has established this technique as a viable option in today's context. In addition, prefabricated construction contributes to sustainability by minimizing material waste and improving energy efficiency. Therefore, prefabricated construction remains a relevant and dynamic solution that confronts modern challenges with historical innovations.

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Table 1. Identifying features throughout history

Manufacturing optimization	Use of local raw materials with efficient transport, thus reducing travel time.
Ease of transport	Easy movement of the elements
Ease of assembly	Easy and affordable construction, either because few tools are needed, or because it is an intuitive assembly
Reduction of materials	Efficient use of materials, avoiding material wastage
Speed of assembly	Quick to build, and with reduced lead times
Economic accessibility	Construction solution within the reach of a large part of the population
Low weight	Construction solution with attention to the lightness of the materials and the different elements.
Variety of design	Versatility and/or flexibility
Energy saving	Sustainable solution with reduced energy consumption
Mobility	Mobile and transportable product

Source: Own elaboration, 2024

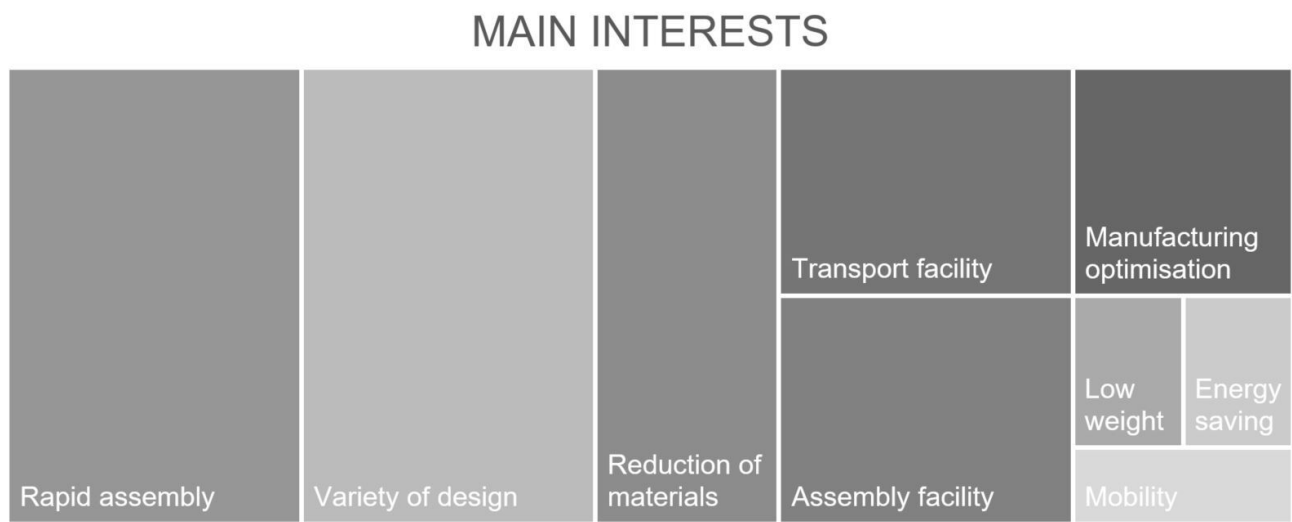


Figure 7. Main motivations of the projects analyzed during the evolution of the project

Source: (Piqueras-Blasco, 2024)

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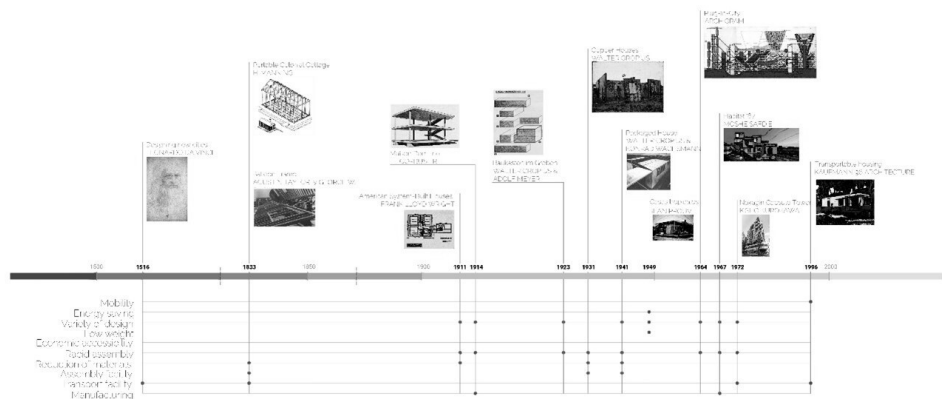


Figure 8. Chronological sequence with identification of stages, main projects and identifying features

Source: (Piqueras-Blasco, 2024)

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On the Need to Define an Analysis and Development Methodology for Real Estate Investment

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Investment in real estate is a very attractive way to generate passive income. It is usually perceived as a stable and secure investment. However, as with any other type of investment, it also comes with certain risks and challenges. The lack of a solid and structured methodology for real estate investment can lead to wrong decisions and therefore not achieving the expected return. The global market and the entry of investment funds have significantly changed the analysis and decision-making process, assimilating it to that of the financial markets. However, there are characteristics that make it different, and it is necessary to take them into account. On the one hand, the investment and divestment terms are long, which increases the associated risk. On the other hand, it is a market that is very sensitive to the ups and downs of the global economy, politics, social trends, demographics, etc., both globally and locally. It is therefore essential to define a methodology that takes all these variables into account. Today, the origin of capital in investment is very diverse. Funds raise money from investors all over the world. And, on another scale, the search for more profitable or stable markets for small investors, real estate crowdfunding platforms, investment vehicles, etc. also lead to the incursion of non-specialized investors. Both require professional managers who carry out a rigorous process in the approach and development of operations. All this is happening in a context in which Protech has burst onto the scene in a very powerful way, providing tools that modify access to investment, management, advertising and even the variety of the product. In this scenario, determining a methodology, with the help of new technologies, that allows all these variables to be introduced and serves as a guide in the investment process is essential to achieve the objectives and minimise the risks. For all these reasons, the possible use of big data as a tool for analyzing the needs of supply and demand is analyzed in order to determine the most optimal product using tools supported by artificial intelligence.

1. Introduction

Housing is a basic necessity. It is recognized as a right in the *Declaration of Human Rights*¹ and in the *International*

Covenant on Economic, Social and Cultural Rights, as well as in the constitutions of many of the world's countries. However, in most countries there is a serious problem of

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1 <https://www.un.org/sites/un2.un.org/files/2021/03/udhr.pdf>

access to housing for significant strata of society. Both in the acquisition and rental market, supply does not meet the demand. Over the last few decades, society has become more diverse, and with it, so have residential needs and preferences. Yet, supply has not kept up with the demand in this increased diversity and oftentimes remains the unchanged. The new social context calls for an adjustment in investment analysis methodology, introducing more information on demand requirements. This paper explores the changes that need to take place in the methodology so that the supply side is able to cater for diversity, i.e., that the analyses for supply analysis take into account the increased complexity by introducing into the market housing that provides enhanced social welfare. In addition, this paper explores the possibilities of big data and artificial intelligence as tools for the analysis of residential demand. Thus, the objective of the research is to advance in the definition of a methodology that is able to define a residential offer that meets a dual objective: to achieve a better adaptation to the needs of society while being able to provide greater profitability for the developer and/or investor. This research will be useful both for the supply agents from the private sector, developers and investors, and for the public sector in the field of housing policy and, more specifically, social housing.

The objective of advancing in a new methodology is twofold: to be able to define residential proposals more adapted to the demand and, at the same time, to generate greater profitability than that obtained with the traditional methodology. The proposal is based on the classic tools of feasibility analysis in the real estate sector, proposing the introduction of, on the one hand, demand variables that are capable of reflecting the diversity of housing needs, and on the other hand, the determination of sales prices taking into account the market and the real building costs associated with each dwelling.

2. Theoretical Framework

The world of real estate investment has undergone significant changes in recent decades. The global market and the entry of investment funds have significantly altered the process of analysis and decision making, assimilating it to a greater extent to that of the financial markets. One might contend that investments are more of a financial nature than a real estate investment. However, beyond the greater delocalization of capital, real estate is a traditional market, with a large local component, with very slow cycles that, on many occasions, do not respond to the demands of the financial markets. On the other hand, the consumer comes from an increasingly diverse society, and it is necessary to incorporate data that show this diversity through studies of people's behavior and a more in-depth knowledge of the buyer's needs.

There is relevant literature that identifies weaknesses in real estate analysis (Eldred & Zerbst, 1978; Graaskamp, 1980; Peterson, 1993). The major weaknesses to be mentioned comprehend errors in the estimation of relevant variables, the unavailability or impossibility of obtaining adequate amounts of quality data at the local level, and

the indiscriminate use of aggregate data that are not appropriate for investments such as real estate, which have to take into account a local context, such as statistics on housing prices per square meter at the regional level and the use of national or regional economic information that is inappropriately applied to local analyses. Also noteworthy is the performance of flawed financial analyses due to a deficient estimation of relevant variables such as costs, revenues and expenses, as well as unrealistic and/or unfounded assessments. Shortcomings in real estate investment analysis and consequently flawed decision-making stem mainly from their complexity and subjectivity (Peterson, 1993).

Peterson (1993) points out four aspects that cause difficulty or deficiency in real estate analysis: complexity, conflicting aspect, qualitative aspect and difficulty of measurement. First, complexity derives from the existence of many different participants in the process belonging to different fields of knowledge such as geology, topography, architecture, interior design, construction engineering, finance, marketing and legislation. Second, real estate investment decisions may include aspects that entail conflicts both between different knowledge domains and within the same domain. For example, architectural design decisions may involve options that involve high investment costs and lower maintenance costs, or the opposite may be the case. The most viable solution will depend in part on the holding period expected by the investor. In addition, decision-making conflicts may arise, for example, in the case where the investor is also an end consumer. Third, real estate investment decisions may also have qualitative aspects or require value judgments. For example, in the case of finance, there are different instruments available whose best choice will depend on the creditworthiness of the investors and their risk preferences. Finally, fourth, investment characteristics can be difficult to identify and measure. In many cases, decisions involve multiple parties and interests and the relationships between them are often confidential or difficult to define. In other cases, the decision maker has to choose between balancing financial and aesthetic factors. Higher costs in the choice of aesthetics can improve the company's image and sales and, in turn, raise construction costs.

Despite the fact that, as will be discussed in the following section, real estate investment projects do not sufficiently incorporate the preferences of the demanding parties, perhaps, as already indicated, the difficulty in obtaining information is an important limitation. However, there is extensive literature on the house purchase process. The demand for housing is multifunctional and hence depends on multiple factors, both those related to the characteristics of the dwelling itself and external factors related to accessibility, the quality of the environment or the socioeconomic level of the neighborhood (Al-Haddad, 2020; Bin Mohanna & Alqahtany, 2020; Chia et al., 2016; Hasanah & Yudhistira, 2018; Heriyati et al., 2021; Horne, 1991; Jalil et al., 2018; Kaynak et al., 2022; Lamsali et al., 2020; Li et al., 2020; Mang et al., 2020; Moghimi & Jusan, 2015; Mohd Thas Thaker & Chandra Sakaran, 2016; Nasar & Manoj, 2014; Rosser, 1999; Salah Al-Nahdi et al., 2015).

3. Context: Traditional Methodology in Investment Analysis

Economic-financial feasibility analyses of real estate projects are usually based on the determination of discounted cash flows based on a discount rate. While the calculations relating to the discounted values of the cash flows, NPV (Net Present Value) and the rate of return, IRR (Internal Rate of Return), are sophisticated, the simplicity of the reflection carried out for the estimation of the parameters on which these cash flows are determined is surprising. We even come across development companies that only execute very similar investments, always the same project replicated time after time, where the market is not studied and its suitability is not questioned. This conservatism contrasts with other markets where companies are constantly innovating and adapting.

Currently, potential locations are accessed through local commercial agents and a feasibility study is conducted based on three values: the cost of land, the estimated construction cost per square meter and the sales price per square meter in the area. Based on this information, a homogeneous product is defined in which the selling price of each unit responds mainly to the unit price established for the overall development.

Given the lack of data and the absence of a thorough analysis, the conclusions and the real estate products defined in the development tend to be simplified, opting for a standard product that is really adapted to a small market area. Thus, the feasibility of the project is determined on the basis of a limited and rigid real estate project that does not take into account the diversity of the demand.

The linear analysis of the cost of execution and the selling price, cost per square meter built and price per square meter sold, leads to the definition of a uniform product for which there is a considerable difference between the price/cost ratio between large and small units. In this situation, the differential between estimated revenues and costs will be minor for small dwellings, which are usually more expensive to build per square meter. As for larger homes, the homogenized price per square meter means that the total price will end up being very high and potential buyers of large houses will be forced to buy smaller ones. On the other hand, the institutions, lacking tools to facilitate customer management, are unable to offer personalized products. The result is a product that is not adapted to the client, an aspect that is also detrimental to the investor, as it prolongs sales times, generates surpluses and, in terms of opportunity cost, means a loss of potential income. Decision-making processes must take into account local culture, site-specific opportunities and the challenges of caring for the environment in addition to the preferences of the applicants. Ignoring this would lead to losing the innovative and socially conscious approach to architecture, Castellanos Garzon et al (2023).

4. An Increasingly Complex and Diverse Demand

Today's society is witnessing increasing diversity in terms of demographics, lifestyles and housing preferences.

This diversity is the result of a series of economic and social trends and changes that have emerged in recent decades. These changes have transformed, for parts of the population, the ways in which they live and work and, therefore, their housing needs. Demographic changes, such as an aging population and increasing ethnic diversity, have given rise to a more varied demand for housing that is able to adapt to new realities.

Demographic Changes

One of the key factors influencing the need for demand is demographic change. The aging of the population in many parts of the world is generating a growing need for housing adapted to the needs of the elderly, examples of which are senior living communities, assisted living and affordable housing. To cap it all, the low birth rate has considerably reduced the size of households, with a high number of households without children. Traditional housing, prepared for families with several children, is not adapted to the needs of the demand.

Immigration constitutes an additional catalyst for demographic transformation. The population tends to cluster in large cities with a greater capacity to generate employment, while other areas are left uninhabited. Migratory movements unbalance the relationship between supply and demand. While in large cities the supply does not meet the growing demand, in areas with a tendency to become uninhabited, the low demand discourages investment. These migratory movements also generate greater ethnic diversity, which is why a housing supply that reflects the cultural needs and preferences of different population groups is required.

Changes in Housing Preferences

Housing preferences have also evolved significantly. More and more people value sustainability and energy efficiency in their homes. In addition, labor mobility and a preference for living in urban areas have led to a demand for smaller, more functional homes, such as apartments and lofts.

There has also been an important change in the life priorities of young people who, in the past, placed family housing as a preferential objective. Now, however, there is a growing interest in flexibility and the possibility of change and adaptation to their specific situation at any given moment. In addition, the importance of community and social life is growing, which has led to a growing preference for mixed-use housing. In general, people are looking for more freedom of decision and mobility. This requires greater flexibility in terms of ownership, such as long-term rental and rent-to-own.

Social Change

The traditional family model has evolved significantly. Single-parent families, childless couples, singles, people sharing apartments with peers from the same peer group are more common. This requires a housing supply that ac-

commodates diverse family structures, such as one-bedroom apartments and housing designed for cohabitation.

Also, users affected by personal needs or new professional trends such as working from home thanks to the past pandemic have generated new needs in the real estate market. Instances include residences featuring dedicated workspaces or environments conducive to improved health and safety.

5. The Need for Diversity in the Real Estate Product

Faced with this growing social diversity, it is essential that the real estate supply be adapted to take into account the existence of open and flexible ways of living, adapted to people at each stage or moment of their lives. Failure to do so can lead to an excess of supply for one type of family and to the dissatisfaction of a significant part of the population. Thus, three fundamental aspects are considered that should be taken into account in the supply in relation to the attention to diversity: typologies, forms of access and sustainability and quality of life.

The variety of typological options ensures that each individual or family can find the housing that best suits their needs and lifestyle. In addition, they must be designed to be adaptable to the changing needs of the residents.

It is also important to diversify the forms of access, acquisition is not the only option. Formulas that can adapt to different financial capacities should be considered. Long-term renting, renting with an option to buy, housing cooperatives, *cohousing* and *coliving* should gain ground over acquisition.

Housing should be designed with sustainability and residents' health in mind. This implies the inclusion of eco-friendly features and the creation of spaces that promote well-being and quality of life.

6. The Potential of New Technologies for Demand Analysis: Big Data and Artificial Intelligence

The pervasiveness and ease of use of data in contemporary society is a fundamental element for its growth. Information technology introduces the possibility of automatically processing data and transforming it into information. In this historical and cultural moment, architecture has incorporated the digital transition. New tools have been introduced to facilitate and empower architecture, both in the process of conception and creation, Andaloro (2022).

To effectively address the diversity of the real estate market, it is crucial to use analytical tools that allow us to understand demand in real time and make decisions based on accurate data. Big data emerges as a powerful tool to achieve this. The innovation of information and communication technologies enables interaction and the ability, on the one hand, to personalise customer needs, and, on the other hand, to meet the needs of the producer/investor in order to obtain a return on investment.

Digital data becomes a tool for research and broadens the horizons of knowledge of the built environment, Taselli et al (2021). Big data in Real Estate involves the collection

and analysis of large amounts of information, ranging from demographic and economic data to housing preferences and market trends. This information can be obtained from a variety of sources: public records, market surveys, social networks and home search applications.

Big data enables detailed analysis of demand in real time. By using advanced data analysis algorithms and techniques, search patterns, housing preferences and buying behaviors can be identified. This provides real estate investors with valuable information about which types of homes and locations are most in demand at any given time. Using different data collection techniques and the creation of a geo-referenced database, Pereira-Martínez et al (2022) describe a methodology for the analysis of location decisions. Specifically, they analyse the relationship between residential location decisions and economic/social parameters in university students.

On the other hand, one of the key benefits of big data is the ability to customize housing supply to meet the needs and preferences of prospective buyers or renters. This can include tailoring specific features of a home or creating customized packages to suit individual needs.

Artificial intelligence (AI) plays an essential role in defining a new strategy for the analysis and development of real estate investments. AI can analyze and process data in real time, enabling more informed and efficient decisions in the creation of real estate offers. It enables predictive analytics that help investors anticipate market trends. By identifying patterns in historical and current data, AI can forecast future demand and recommend appropriate investment strategies. Its key advantage is the ability to continuously learn. As society's preferences and needs evolve, AI can automatically adjust investment strategies and housing supply to remain relevant and competitive in the market. AI is also useful for automating processes from project management and construction scheduling to property management.

7. Conclusion

The fundamental objective in defining a new strategy for real estate investments is to improve the product so that it is optimally adapted to the demand. This approach has two key objectives: first, to meet society's changing needs and preferences, and second, to improve the profitability of the real estate market through greater efficiency.

Diversity in society is the result of a series of demographic and cultural changes. To meet these changing needs, real estate investors must be willing to adapt their strategies. This implies not only diversifying the supply of housing but also being flexible in terms of timelines and modalities of access to housing.

Globalization, among other factors, has brought about a business competition that makes an in-depth study of the consumer essential for any company. Unlike other markets, the real estate supply does not opt for a strategy of variety in the product, something considered essential by suppliers in other sectors where companies seek to offer the broadest possible variety so that the consumer can compare and decide within the models offered by the same company, avoid-

ing, as much as possible, competition and guaranteeing the sale.

Diversifying and adapting real estate supply not only responds to demand but can also increase the efficiency and ultimately the profitability of the market. By focusing on what the population is really seeking and reducing oversupply in certain categories, investors can avoid unnecessary investments and improve their profit margins. Furthermore, it also reduces uncertainty about the ideal product, thereby significantly minimizing risks.

Firstly, the market must be studied to establish alternatives that meet the needs of the potential customers, sizes, equipment, location, among others, as well as to determine the prices that will optimize the profitability of the project. For these activities, new technologies such as big data and artificial intelligence are very useful. At present, AI tools such as artificial neural networks and machine learning are quite common in the estimation of real estate asset prices.

Secondly, once the relevant information has been identified, the assumptions or alternatives in the definition of the real estate assets that make up the project will be established. The real estate investment analysis tool should be able to determine the effects on profitability by introducing different typologies and prices. As it should assist in decision making, the tool should provide information on the effects on profitability of altering the initial typology definition. In other words, how different alternatives in terms of

size distribution and prices will affect profitability in each case. The tool should move away from linear approaches.

Thirdly, the real estate investment analysis methodology is inherited from the investment analysis of other types of assets such as financial assets, where a single period is assumed for the duration of the investment. The new methodology must be able to establish different periods and modes of return of capital in the same project. It must be able to include scenarios where, in the same project, homes are sold under various alternatives: payment at the time of key entry, rental, rental with option to purchase, among others. Addressing diversity will mean a more complex analysis, but as a result, the investment will be able to define a real estate project that is more adapted to the needs of the consumers and with a higher profitability.

In sum, the research should advance in three aspects: 1. the identification of relevant variables in the study of demand, 2. the introduction of AI tools for information processing and estimation of demand needs, 3. the introduction of diversity in the calculations of basic investment analysis tools such as NPV and IRR.

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Reuse of Buildings in Portugal. the Transition From History to Project and From Project to History

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Keywords: reuse of buildings, pre-existing architecture, urban regeneration, public space, morphology

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This paper is the result of a postdoctoral research at the FAULisboa. It explores and analyses the potential value of architectonic pre-existences in the transformation of Portuguese cities in the 21st century. To select the buildings, it has been explored the recently completed national research project “On building typologies. Composing a morphological inventory of the Portuguese city” (FCT, ref. PTDC/ARTDAQ/30110/2017). Three interventions are analysed: the reconstruction of the Chiado district (1988-2015) in Lisbon’s Baixa Pombalina, the conversion of a former slaughterhouse in Torres Vedras into a cultural centre, and the revitalization of a decrepit market in Braga to establish a music and dance school. Focusing on the individual creative process, the question at hand is: how have architects incorporated history into their design work?

The analyses focus on the mutation of the buildings and the fusion of different times, between pre-existence and new construction, but also on the production of new urban forms in the city, which give continuity to the old layouts. The result is a critical sample of urban fragments in which the project of mutation of the buildings has served to generate new typologies of public spaces – a courtyard, a square, a passage – designed at the right scale, offering new walking routes and places to be, sit, rest or meet. The architects have made an original interpretation of what already exists making an interesting dialogue with history: by recalling old plans of the city like Alvaro Siza, by integrating the surrounding landscape, like José Neves, or by highlighting previous architecture reused with a new meaning, like Eduardo Souto de Moura. In conclusion, these examples have outlined three useful strategies for the building metamorphosis and urban sedimentation.

1. Introduction: recycling architectures

To work on what already exists giving it a new use and meaning is a major issue in the current cultural and architectural discussion. To reuse the existing buildings is above all a material matter, key for the environment – the proposal here is to call it recycling architectures –. However, this text does not focus so much on materials, resources and energy but on exploring the circumstances that turn reusing buildings into an interesting activity for architects, both intellectual and practical. This exploration is organized according to three circumstances. First, as a society: to recharge

new programmes. Then as political citizens: rethinking the pre-existing elements of the city and improving the place. Lastly, as architects, making a dialogue with history.

The mutation of buildings is a necessary condition for the survival of built objects over time. There are three ways to perform a repair work on a particular damaged building. The three strategies as Richard Sennett pointed out consist of restoration, remediation or reconfiguration (Sennett, 2013, p. 212). The first is governed by the object’s original state; the second substitutes better parts or materials while preserving an old form; the third re-imagines the form and

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use of the object in the course of fixing it. In any case, the end result of the relationship between the existing and the new can take many different paths and end goals. However, there is only one assumption that must be transversal to every contemporary architectural approach: the relationship between reading pre-existing structures and design can never assume a deterministic mood, but only inform a creative and individual process (Dias Coelho & Fernandes, 2022, p. 102).

Building mutation projects are promoted and, in turn, drive urban sedimentation processes. Urban sedimentation is defined as “a tension between private plots and between these and public space that slowly reconfigures the fabric over a very extended time, and is basically characterised by its deformation” (Dias Coelho, 2014, p. 27). The result of this process of sedimentation and mutation is always a balance between the introduction of changes and the preservation of pre-existences. European cities can go from being seen as theme parks of picturesque antiques to being models of resilience, in which there are exemplary postproductions and urban reactivations that look towards future.

The methodology includes the CONTEXT perspective, which shows adjustment effects or in where the built form is determined by the city – physical and manufactured artefact that support the building – using type-morphological studies and space syntax analysis. In the TIME perspective, a reflection on the evolution of built forms focused on a critical approach to the recycling potential of architecture, analysing the descriptive memories written by the architects in order to understand the project mechanisms of manipulation of form and materiality, of fusion or contraposition of different times. Finally, visiting the works to observe the use of space with the new PROGRAMME, observing the articulation between the composition of the built forms and the new function of space. But these approaches cannot be considered in isolation, because they are interrelated.

As a result, it is remarked the importance of reading urban form as a design tool – a transition from history to project – and the role of the architect as historian establishing a strong dialogue with the pre-existing – the transition from the project to history. The following case studies represent a critical sample of different ways of using history as a design tool by the Portuguese architects Álvaro Siza, José Neves and Eduardo Souto de Moura, who skilfully combine different ways of introducing old maps, the environment, and old buildings.

2. Programme: Reconstruction of Urban Blocks in Lisbon

Building transformation operations cannot be distinguished from the urban regeneration initiative, since the process of building metabolism must also respond to issues of streets, squares, adjacent collective areas. Reading urban form is not just drawing extemporaneously or ex-novo. Surveying the architecture of the city also involves consulting historical documents, maps, urban plans: a set of existing drawings, made by architects for other architects, to communicate visions, projects, or more simply to transfer knowledge.

The reconstruction of the Chiado district (1988-2015) in Lisbon's Baixa Pombalina is an exceptional example of recycling architecture. Not only does it consist of reuse, but the proposal starts from ruined buildings and examines the mechanisms for updating their image, use, and relationship with the environment. In the reconstruction of the Chiado, the history of the city becomes the main design tool for the renewal project, and the planned programme combines several functions: parking, warehouse, offices and cultural and leisure areas.

In 1988, a serious fire broke out in the Grandella warehouses, next to Carmo Street. The fire spread rapidly due to the neglected state of the neighbouring buildings, resulting in the worst disaster in Lisbon since the earthquake of 1755. Eighteen buildings covering an area of about 10,000 square metres in the heart of the city were destroyed. Álvaro Siza Vieira was invited to lead the recovery of the area in an unprecedented urban regeneration operation. Siza's Reconstruction Project (1998-2015) does not aim to make profound changes, but rather to make small corrections and adjustments. These transformations reinforce the sense of the entire city centre, giving continuity to the Pombaline logic. The street layout, block type and façades were designed in the 18th century as part of a masterplan, although their development took more than a hundred years.

In order to evaluate and accurately compare the configuration of the urban space of the past and the present the method employed is the theory and analysis of space syntax. These analyses provide us with key knowledge to understand the degree of integration, accessibility, connectivity and visibility of an open urban space, allowing us to objectively and scientifically understand certain urban phenomena (Beltran, 2023). The first axial map (Fig. 1) identifies Garret Street, which connects to Chiado Square, as the street with the highest level of integration, the street most used by people. The axial integration map of the current state of this urban fragment shows that the diversification and extension of routes reinforces the original structure, giving even more integrating force to Garret Street. As a result of this complex process of reconstruction following Siza's master plan, and incorporating other Portuguese architects in its materialisation and expansion, as Souto de Moura (Fig. 1, block C) and Gonçalo Byrne (Fig. 1, block D) the area has now been revitalised and new movements and possibilities have been consolidated.

One of the great proposals of the intervention was to establish new routes, to facilitate the use and give public life to these inner spaces of the blocks, opening courtyards and creating passages. Moreover, the intention was to diversify the uses by introducing commercial activities open until late in the evening to increase urban movement in the centre, cultural activity and nightlife. The shopping centre (Fig. 1, block C), was designed by Souto de Moura. Today, the area is revitalised by the presence of strong commercial and social flows and opportunities.

The need to open up courtyard B (Fig. 1, block B) to the public was obvious to Siza. He realised this as he walked around the courtyard when everything was still in ruins. There are many topographical irregularities in this block,



Figure 1. Axial map of the Chiado, before and after the intervention of Siza, with the integration core shown in red, and the most segregated lines shown in blue. Photo of the stairs in the interior of the Block B, in front of the Carmo church (Own elaboration and photo, 2023).

and the idea was to create a connection between the upper and lower parts, entering from Rua Garrett and Rua do Carmo, by placing a staircase in front of the Carmo Church, transforming the interior of Block B into a passageway. Siza recognises that sometimes the solution to the project is already in the place, so knowing the history, the pre-existing urban survey is a useful and valuable tool for making projects in and from the place. In reference to this staircase in block B he said: “To me it seemed like a great discovery and an invention, but then a historian who participated in the project found an image in an old engraving of the city where this door and a staircase can be seen. So, what seemed clear to me through intuition was nothing more than confirmation of a historical fact” (Tostado et al., 2017, p. 41).

As architects, we are accustomed to projecting a (near) future and proposing alternatives that speculate on the present. However, the reverse is less common. That means, these alternatives derived basically from the present and are based on “what is” and “what has been” as opposed to “what could be” and “what could have been” (Mayrhofer-Hufnagl, 2022). The example of the renovation of Chiado,

in Lisbon’s Baixa Pombalina, is an example of the architectonic, urban, economic and social regeneration process of a historical centre, based on an in-depth knowledge of urban history, contemporary and historical urban relief, and interdisciplinary collaboration to understand the past, which sometimes already contains the project solution.

3. Context: a New Square in Torres Vedras

The Carnival Arts Centre (2012-2020), designed by José Neves in Torres Vedras, was born with the purpose of giving a second life to a ruined slaughterhouse and a disused quarry in a suburb of the city, and regenerating the urban fabric and life. In this project, the pre-existing elements in the environment of the building are empowered for the creation of new urban spaces, in an example of the force that pre-existences exert, procuring their permanence through a resistance to the alteration of their traces, which can be adapted to almost any use.

On a 19th century military map of Torres Vedras¹, the slaughterhouse is located at the foot of a hill, near to a chapel, Chapela da Nossa Senhora do Ameal, and a fortress,

¹ See the map: <https://www.joseneves.net/carnival-arts-centre?pgid=kqqr1cn6-5138fb09-7a32-40de-9c43-25f7f034da07>

Forte de São Vicente. This map proves that the slaughterhouse was a structuring building in the configuration of the northern part of the city and has a memorial value. At the beginning of the 21st century, the urban landscape around the building was characterised by the presence of viaducts, hypermarkets and car parks – forming one of the main entrances to Torres Vedras – and by the adjacent neighbourhood *Bairro dos Reis*. The project responds to these two realities without creating a confrontation with these pre-existences, serving as an articulating link between the urban scale of the access to the city and the everyday scale of the neighbourhood. The historic building itself has no heritage value, but in its transformation the façade is preserved as a layer of historic significance and as the main access to the complex, adding a large volume suspended above the existing building.

José Neves admits that the existence of a disused quarry behind the slaughterhouse became one of the main references for the project. The architect affirms that one of the missions of professional work is to know how to discover the possibilities of each project, in order to make a “proposal”, to suggest something that was not foreseen and that, in the end, turns out to be an obvious solution (Neves et al., 2021, p. 6). This idea allows him to go beyond the intention of reusing an abandoned building and to think about the city, about the creation of new urban elements for public space. This is one of the lessons that the architect Luggi Snozzi emphasised as a teacher: “When you design a road, a barn, a house, a neighbourhood, always think of the city”. (Snozzi, 1994, p. 400).

In the Carnival Arts Centre, a square is offered to the city, transforming the quarry into a public space. Before the intervention, the quarry was a large plateau covered with vegetation and surrounded by a rock excavation that appears as a vertical wall. The site for the new square was defined by the size, shape and materiality of these pre-existing elements. The square is elliptical in plan, reinforcing the configuration of the quarry itself, and is conceived as an urban theatre for the celebration of the carnival, and as a stage for the everyday life of the neighbours.

The plan (fig. 2) shows that the square is located on the opposite side of the main entrance and although it is permanently open, it has a single tangential access from the side street, which means that it is not a space for walking across but exclusively for being. This limitation in its accessibility and its hidden location for those arriving at the building from the main façade, make it look more like the backyard of the building than a square. In addition, the building embraces the elliptical shape of the square with a gallery, reinforcing this closed character. The cafeteria and the museum workshops open up to the gallery, extending its activities to the Plaza. The steep slope of the quarry forms the backdrop to the public space and is transformed into a grandstand that closes the ellipse, giving the open space a strong scenographic character, which is used to host the main events of the carnival.

The singularity of this project is precisely this process of generating a new urban form. As Mamfredo Tafuri remarked in an interview with *Casabella* magazine: “in order

to deal with the problem behind the work, the historical must forget every prejudice about its quality” (Tafuri, 1995, p. 96). This reflection notes the distance between a rich spatial discourse architecture, within the building itself, and an urban solution that improves the city life. In other words, studies on urban sedimentation and on the mutation of buildings in a given context could be considered separately, because a project does not necessarily respond convincingly to both problems.

In this intervention, the study of urban pre-existences helped the architect to make better choices and did not limit his creativity, but paradoxically enriched the original commission. The architect José Neves acted in an attempt to read the historical structure of the city and to use this reading to the benefit of the city, giving continuity to the pre-existence, avoiding having to start from scratch. The CAC building demonstrates that the site almost always already contains a project, if the architect is able to read events. In this case, considering the environment means considering history.

4. Time: a “Monumental” Passage in Braga

Working with the time variable as a definer of compositional systems is a resource with great potential for generating tools that allow a suitable dialogue between the pre-existing architecture and the new intervention. (Bosch-Roig & Docci, 2023). The building of the *Carandà* market in Braga allowed Eduardo Souto de Moura to build twice on the same site, the second time creating an “archaeological ruin” of his first intervention, and adapting the interior and exterior spaces to the new use of “cultural market”. The project began when Souto de Moura was still student, working with his professor of the final year, who was an urban planner in Braga.

The first project, in the 1980’s, gave continuity to what already existed, working with the stone walls. The architect admits that the reuse of the wall structures was not an absolute choice, but rather a circumstantial one: “I found interesting consider history from another point of view and make the most of the contradictions, the transition and the encounter between the new and the old. As there wasn’t a lot of money, it was necessary to work with the preexisting, though not from the conceptual standpoint of respect. It is a very Portuguese issue, to get there and have few people, very little money, and transform the previous models of Portuguese architecture in order to use the preexisting”. (Souto de Moura, 2021, p. 87)

Another key aspect to give continuity to the pre-existing was learning from the urban form of the city to insert the new building in Braga’s urban development process. The settlement is of Roman origin, recognizing the ancient structure of axes *cardos* and *decumanus*, the position of the Cathedral, the forum, and the Villa of the Bishop of Braga. The city has also medieval pre-existences: the walls, the gates and the squares with the monasteries. The Baroque period consolidated the radio-centric character of the city, and in modern times, the external belt was expanded with the hospital, schools, and other social and urban services, whose rigid development, in the form of rings, left residual

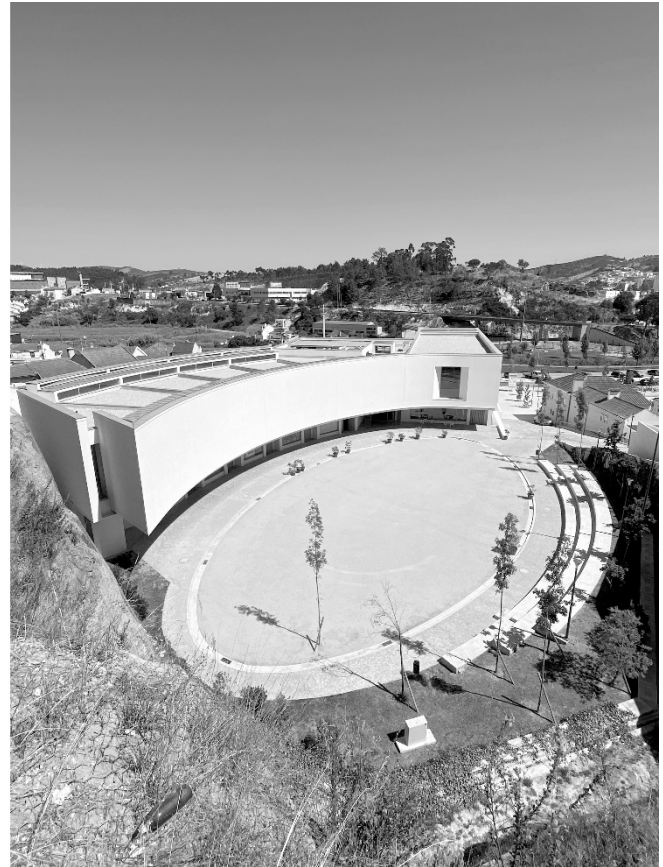
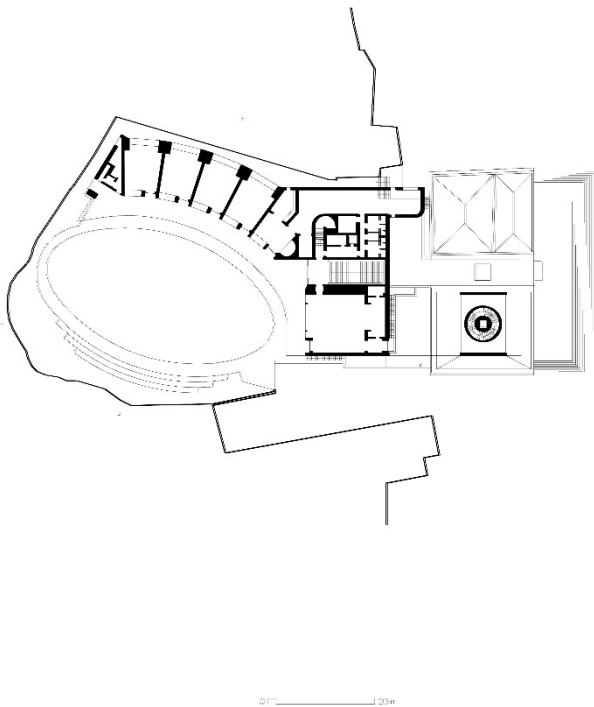


Figure 2. Photograph of the main entrance façade to the CAC (Formaurbis LAB, 2023). Plan of the Centro de Artes do Carnaval building in Torres Vedras (2012-2020), arq. José Neves. (Formaurbis LAB, 2023)

empty spaces, such as this one where the Carandá market have risen. The knowledge about the urban form helped Souto de Moura to make better decisions. The building designed in the 1980s has a markedly urban character, well connected with the pre-existing urban fabric: a covered public passageway connecting two radial streets, counter-acting the radio-centric character of the urban structure.

The main idea of Souto de Moura was to follow the Greek model of “*stoa*” on two levels, divided into three zones, each specialising in one type of product (vegetables in the middle, fish on the right, and meat on the left), establishing a clear separation between the circuits of goods and people. The project was also strongly influenced by Rossi, porticoed like Gallarate. So, the dialogue with history of architecture becomes fundamental to understand the style. As Rossi said: “We can resolve to build ‘monuments’, but to do that we need and architecture, that is, a style” (Rossi, 1995).

Over time it started having problems on the roof, supermarkets began to open nearby, and ended up becoming a ruin. Before demolishing it, the mayor asked Souto if he wanted to design a second life for the building. The architect observed that the market was still being used as a passage, this fact confirmed that the programme could be changed, but the urban function of the “street” had to be preserved. Souto worked with the theme of the pre-existences with total freedom of thought, proposing an original form of “contemporary archaeology”, demolishing what was no longer useful and preserving what could be used for

new purposes. The market roof was demolished and the pillars were preserved, with their steel cables exposed at the top, evoking concrete trees and giving shape to a contemporary garden with artificial elements, in which architecture and nature enter into dialogue, in a monumental and ceremonial *Promenade Architecturale*.

The initial market’s reference to the Greek *stoa* is preserved, with the pillars converted into pieces of modern architectural archaeology, which diversify and enrich the sensory experience in the open space. The building of the new music and dance school preserves the triple division of the previous market, for the sale of vegetables, fish and meat, transformed into spaces for the association, for the music school, and for the dance school, respectively. The remains of the previous building, the courtyards and urban routes alternate with places for the human actions of resting, meeting, strolling, enjoying the weather and the view.

When Souto explains the conversion project, he likes to say that the precedent for this project was the Diocletian’s Palace in Split, where architecture is transformed into a city. The example of the transformation of the Braga market shows Souto de Moura’s strong pragmatism in working on the relationship with the pre-existing buildings. In the process of identifying the significant elements that represent the starting point for the development of the project, Souto says that every arbitrary possibility can be admitted, arguing that every architectural problem can accept many possible solutions, and that every architect can design co-

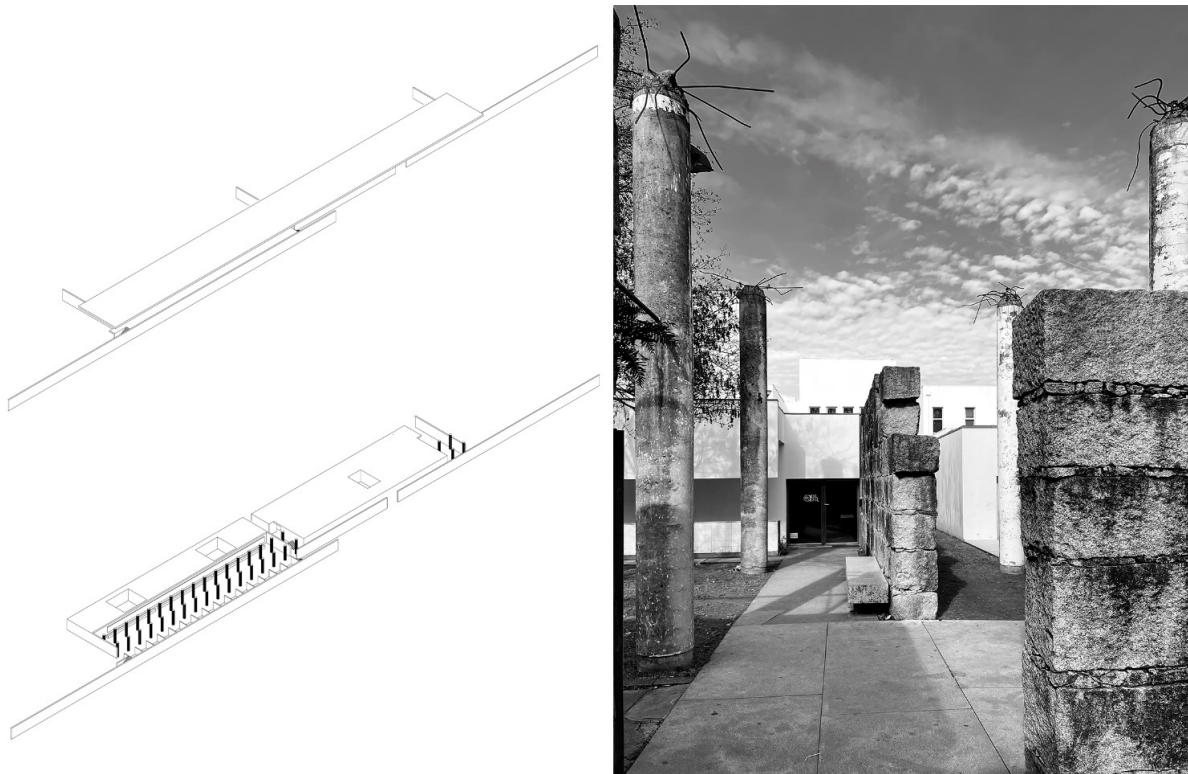


Figure 3. 3D drawing before (1980's) and after the project for the reconversion of the Braga market into a music school (2004-2010), Souto de Moura (Own elaboration, 2023). In the photograph we can see the remains of the columns that remained after the demolition of the market roof. (Formaurbis LAB, 2023).

herently starting from very different objectives and methods (Bogoni, 2020, p. 58). Souto sets out the rules for solving the architectural project, acknowledging that it is only one of many possible ways, his own, thus proving his teacher Fernando Távora right when he said that “in architecture the opposite is also true”.

An architectural project has a very particular logic, based on a construction that is internal to the project itself, but nourished by the geographical and historical culture contemporary to the moment of the creative act. Through this example we can clearly see that it is in the architect's attitude to the pre-existence and in his ability to synchronise with the architectural, historical, geographical and socio-economic context that the originality and strength of each project lies.

5. Conclusions

The three urban interventions based on recycled architecture stand out as examples of the synchronisation, through the project/design, of different approaches to place in relation to space and time: the chronological component of dialogue between times, including formal, material and/or compositional innovation; the geographical component of environmental improvement; and, finally, the socio-economic component that explains the new programme.

As we have seen, the use of pre-existences can be extended beyond the poetic discourse on the relationship between the new and the old, beyond the search for innovation within the history of the profession, specifically

affecting the regeneration of the city, beyond the walls of the building.

In response to the commission to restore the degraded buildings, the architects think of the city, and make a proposal to improve urban life, creating new open public spaces, designed on the appropriate scale, offering new routes for walking and places to be, sit, rest or meet. What all three actions have in common is that they generate new urban elements - a street, a square, the courtyards of the blocks - making an original interpretation of the pre-existence, drawing three useful strategies for the planning of the city of the future.

The case studies have proved useful in advancing a broader investigation into the relationship between the project and history. From the work of Souto de Moura, José Neves and Álvaro Siza, in places such as Braga, Torres Vedras and Lisbon, we clearly perceive the role of the architect in bringing historical precedent to bear on the contemporary practice, in studying old maps of the city to understand the use of space in the past, in incorporating the environment into the project, or in doing archaeology with the ruins of pre-existing buildings.

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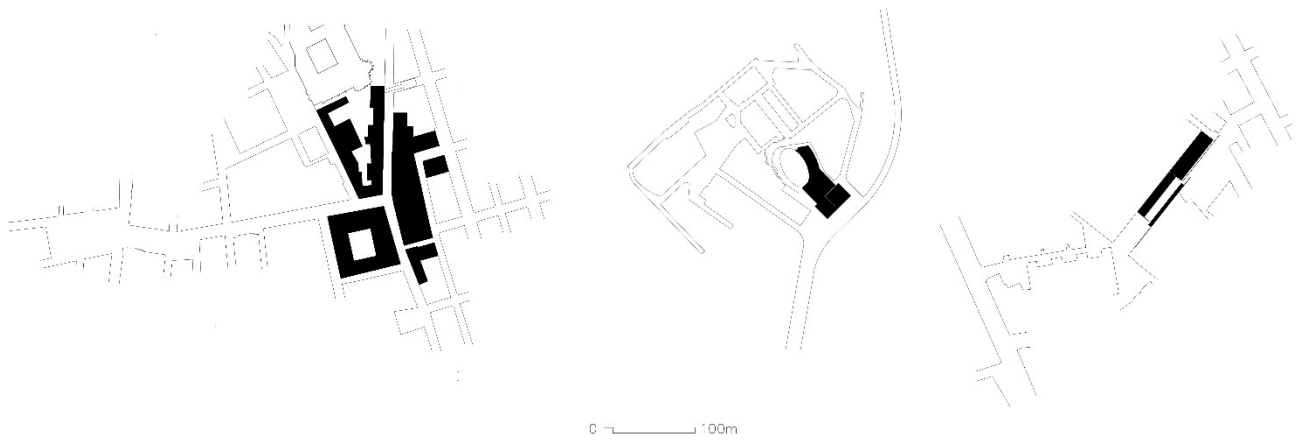


Figure 4. Critical sample of urban fragments in which the project of mutation of the buildings has served to generate new typologies of public spaces - a courtyard, a square, and a passage – (Own elaboration, 2023).

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Digital Models for Technological Design of Social Housing Sustainable Renewal. a Selection of Case Studies on the First Public Housing Plan Stock in Rome (1964)

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According to the New European Bauhaus, a key area for a sustainable transformation of the built environment is the definition of new strategies and operational tools for the renovation of the existing building stock. It is therefore necessary to create environmentally sustainable buildings, reducing consumption and costs for the end user. The research¹ focuses on how to renovate post-war social housing neighborhoods—not only in technical and energy-saving terms but also from a social, cultural, and economic perspective. The objective of this proposal is to develop strategies for the rehabilitation of a large stock of social housing projects in Rome which were realized between the sixties and the eighties of last century. The need to have strategies in place for the re-calibration of these buildings rather than their demolition is an important objective of the European New Green Deal. The research examines the predisposition to the implementation of improvement measures. The element at play here is digitization and the use of digital technologies for greater efficiency and sustainability, with positive spin-offs for the entire economy. This should re-qualify and enrich rather than demolish, resulting in a higher quality of space to support an architecture that meets the needs of the users. These solutions are not limited to technical-normative and typological-functional adaptations. They also consider urban, social and economic implications, as well as the design possibilities and explorations of this reinterpretation and recalibration in function of different contemporary lifestyles and societal needs, through the use of digital technologies.

1. Premise/Introduction

Historically, social housing has been a central element in the evolution of European cities: its affirmation since

the end of the 19th century, in parallel with the improvement of housing conditions for the working classes, coincided with the affirmation of a high level of architectural and urban quality, contributing decisively to the development of national and transnational architectural currents and movements. This project looks at the possibilities for renovation of the modern building stock, which represents a major challenge for the future of the building industry, in line with the objectives of the European New Green Deal for revitalizing the economy and sustainable development (Basson et al., 2021).

After the second post-war period, social housing became a key instrument of urban development in the suburbs, providing the general infrastructure of the territory. The Italian experience is part of this dynamic, and the example of Rome is particularly important. Its production of public buildings, made up of large interventions in terms of number and quality, represents 12% of the total urbanized area (Laboratorio Città Pubblica, 2009). The research proposes a reading of the built environment to explore its characteristics in terms of predisposition to undergo improvement interventions. The intention is to define strategies for the rehabilitation of Rome's public housing stock (Bianchi & Paris, 2018), which was built between the 1970s and 1980s with a logic of maximum savings and which today shows various elements of fragility in terms of building consistency, architectural image and types.

2. The First Public Housing Stock in Rome

In Rome in particular, the approval of the 1st P.E.E.P. (Public Housing Plan) in 1964 inaugurated the period of the great dimension (Insolera, 2011). Inspired by international architectural trends - the Japanese metabolic projects, the

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¹ In relation to the methodological framework described below, this research project started at the beginning of the 2022, so this article is going to give a progress update.



Figure 1. Torrevecchia, the blocks facing the courtyard.

Credits: Carlo Vannini, 2022.

English megastructural proposals, the French *grands ensembles*, etc. - new neighborhoods responded to the logic of self-referentiality and uniqueness of the architectural sign capable of becoming urban. Formal research, which also responds to more general changes affecting the logics of urbanization, is not the only motivation for this move towards the large dimension. In particular, the need to build a large number of dwellings in a short period of time is a result of the strong urbanization processes and the social and political dynamics that they generate. The size and the high concentration of cubages in unitary buildings allowed a significant reduction in construction time and costs, making the best use of urbanization networks (Cellamare, 2016). In this way a city of prefabricated parts, finished in itself, antithetical to the historical compact city was born.

The interest in this particular public housing project comes from the morphological and density characteristics that can differentiate the interventions from the conventional city, as well as the location of the neighborhoods, due to their contribution to the urbanization of today's suburbs.

The peculiarity of this architectural heritage lies in the constructional, morphological and typological characteristics that are repeated according to the principle of industrial prefabrication, which lends itself to the approach of rationalization. With this in mind, there is a growing interest in the concept of digitization within building systems, as all areas of design can benefit from the potential

of digital technologies for greater efficiency and sustainability, with positive spin-offs for the economy as a whole (Agostinelli & Ruperto, 2020).

In terms of typologies, the research and experiments carried out within the 1st P.E.E.P. were significant and gave rise to avant-garde solutions (Maldonado, 1978). First of all, the large scale stimulated designers to break the traditional, schematic and repetitive aggregation between the different housing modules. The main objective was to provide a varied offer of different sizes and shapes of dwellings through the aggregation, in plan and elevation, of different residential and typological modules. Another experimental element was the morphological and functional organization of the spaces on the ground floors and in the roofs, with articulated pathways and common spaces, open and closed, clearly distinguishable in the overall organism. The inclusion of non-residential services aimed at integrating the dwelling and its urban context, re-proposing the human scale in interventions of a monumental nature. Pathways - balconies, walkways, bridges, subways - and the volumes of common services became iconographic and characterizing elements of the projects, in some cases even becoming toponymic references (Lenci, 2006). However, these intentions were largely disregarded in the realizations: the large size became mainly a constraint, and only in a few cases was it translated into articulated solutions and significant typological experiments. For various reasons, including specific regulatory requirements, designers were forced

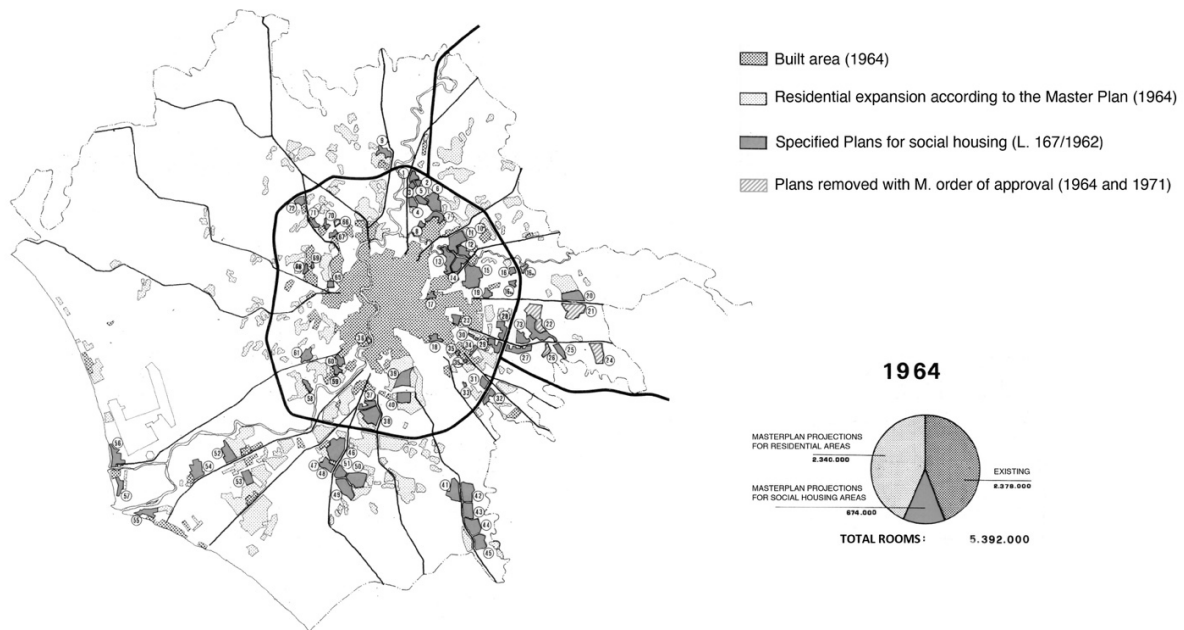


Figure 2. First public housing plan stock in Rome (I° P.E.E.P.).

Credits: Municipality of Rome, 1964.

to interpret the ‘large dimension’ with the blunt tools of traditional typology. Two approaches can be distinguished: on one hand, the typologically experimental, utopian cases of “megastructures”; on the other hand, the traditional typological re-propositions on a large scale, simply “large” buildings. “Large” was transformed from a conceptual resource into a field in which models introduced by national laws or regional regulations could be applied, producing a typological homologation of the concept of social housing and a continuous formal repetition (Rossi, 2012).

The 1st P.E.E.P. and the spread of large size coincided with the opening up of the construction industry to industrialized technologies in order to guarantee faster construction times, the mechanization of certain processes and the reduction of construction costs. In an attempt to bridge the gap with the industrialization of construction in other European countries, interest grew in the prefabrication of building elements and the industrialization of building sites. Innovative aspects such as the prefabrication of components and the rationalization of construction processes were well suited to the open morphology characteristic of interventions and the repetitiveness of work. For this reason, the majority of the Public Initiative interventions were oriented towards this construction model. Two fundamental innovations were used: standardized techniques for the casting of structures and industrialized techniques for the prefabrication of building elements (Lenci, 2009). The main innovations concerned the realization of the load-bearing structures and the construction of the envelope elements. The former made it possible to simplify and speed up the work thanks to the prefabricated and reusable formwork, as well as the simultaneous casting of the vertical and horizontal elements (inverted U formwork, coffer tunnel), guar-

anteeing a particularly rigid structure that has proved to be durable and efficient over the years. The latter, with prefabricated elements to be assembled on site (sandwich panels), has over time shown problems of durability and impermeability to atmospheric agents, especially at the interface with the structure. The introduction of prefabrication has led to a renewal of housing design at various scales, from the individual dwelling to the building and the neighborhood. The repetitiveness of the casting and assembly operations, as required, ensured the necessary reduction of the site’s incidence in terms of time and cost (Diana & Gissara, 2020). Overall, however, the repetitiveness and standardization of the final product was achieved. A direct link was established between the production factors and the typological conformation of the dwelling, which could also have many negative effects. For example: the internal longitudinal distribution was strongly influenced by the transversal load-bearing partitions realized through the use of prefabricated elements for casting; the repetitive sequence of prefabricated infill panels in the elevation increased the semantics of locus and visual homologation. This contributed significantly to the discrediting of the use of systems such as the coffer tunnel and sandwich panels (Marcheggiani, 1977).

3. Best Practices Analysis: Case Studies of Contemporary Retrofit Projects in Europe and UK

Today, digitalization in the construction sector is synonymous with design and process management through the widest possible sharing of information in an electronic and organized form. Integration and collaboration are therefore opposed to the fragmented and competitive nature of tra-

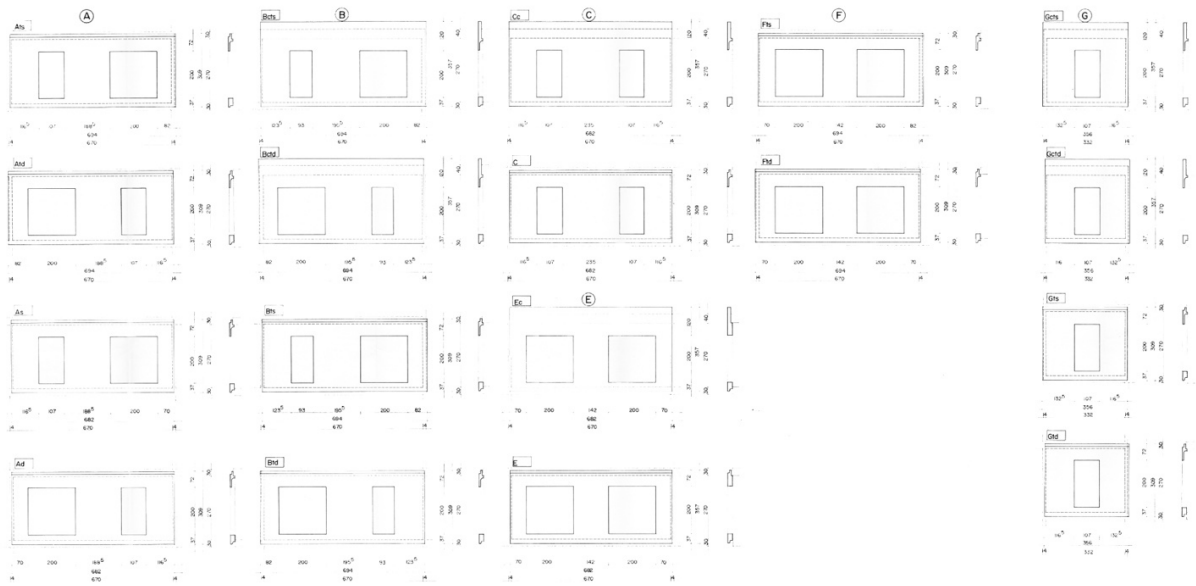


Figure 3. Quartaccio compartment R2, abacus of prefabricated façade panels.

Source: Central State Archive, Pietro Barucci Archive.

ditional business methods. For the purposes of this project, the focus has been on European examples because of legislation, construction techniques and lifestyles. Many housing complexes built in the 1960s and 1970s in Europe have recently been renovated, demonstrating a growing awareness of an approach that values social housing as a lasting asset (Graf, 2014). The case studies were selected to:

- be representative of a range of building types and environmental conditions across continental Europe and the UK
- to provide a holistic perspective on the refurbishment process
- to offer effective measures and to raise an exploration of architectural expressiveness.

A number of additional aspects were considered too. Firstly, the geography of the analysis is limited to those areas of Europe and the UK where the ageing of the building stock is more evident, where its transformation rather than demolition is more entrenched, and where decarbonization policies are more emphasized. Specific selection criteria were:

- Functional: residential or predominantly residential;
- Typology: apartment buildings;
- Construction period: buildings originally built between World War II and the energy crisis of the 1970s;
- Retrofit period: renovations completed in the 2000s.

These projects promote a reinterpretation of the built heritage in function of new ways of living and experiencing the city. They do not limit themselves to technical-normative and typological-functional adaptations, but also think about urban, social and economic implications. In line with

European regeneration strategies, they have the capacity to increase integration and social inclusion, going beyond an exclusively environmental interpretation of the sustainability of interventions. These cases do not involve demolition, but rather the replacement and integration of new volumes, favoring light and dry construction technologies to optimize intervention times and exploit the full potential of an industrialized approach to execution (Lefebvre et al., 2022). These interventions are carried out economically and quickly, reducing social inconveniences and guaranteeing a high level of quality; sustainable materials and passive technological systems are favored. Particular attention is paid to the theme of contemporary living, reinterpreting existing typologies to meet an increasingly heterogeneous housing demand; the new project spaces envisage flexible functional areas with multiple uses, easily adaptable to the different lifestyles of their inhabitants over time.

4. Research Methods and Considerations

The research proposes to scale this approach up to residential buildings, investigating solutions that act on the architectural envelope, both in terms of controlling energy consumption and prolonging the useful life of these artifacts (Graf & Marino, 2016).

The operational methodology is organized in three activities:

- The first one consists of the historical, design and urban analysis of the buildings belonging to the Public Agency for Social Housing of Rome, through research of the archives of the Agency and the architects involved in the design process. In parallel, a study and systematization of the most significant best practices

of architectural and environmental retrofitting interventions are carried out to identify the parts, systems and building components involved.

- The second activity is to create digital models of the buildings by digitizing the found material using parametric software (Tasselli & Maietti, 2021). Then, a diagnostic-cognitive² evaluation of the artifacts will be carried out, in particular of the elements that are most affected by obsolescence and that could affect performance levels. This will highlight the challenges associated with changing housing needs.
- The third phase consists in the elaboration of a set of specific components of industrial production and the creation of an abacus of parametric type solutions, constituting a digital library of experimental building components with tables of renovation costs.

The main elements of interest concerning the buildings of this period are:

- The numerical consistencies and the locations of the districts, which make Rome a unique case for the number of housing units built and for the contribution made to the urbanization of today's suburbs;
- the morphological and typological features;
- the construction characteristics, with prefabricated elements or tools aimed at the industrialization of construction processes.

These characteristics mean that such buildings lend themselves to a digitization process. Incorporating building knowledge throughout the construction process via digitization can greatly enhance energy efficiency in buildings (Cinquelpalmi et al., 2023).. This can be achieved by integrating and optimizing all phases, from design and construction to management and control systems, using principles of Industry 4.0. Industry 4.0 involves the integration of information technologies in industrial production and the adoption of new methods of data management (Granda & Montaña Bello, 2021). By utilizing these technologies, manufacturers and the building process chain can improve efficiency, reduce waste and costs, and effectively meet user needs. The adoption of advanced technologies in the construction industry is crucial to save time, increase productivity, and respond flexibly and efficiently to industry demands. The transformation of monitored data into structured information supports decision-making in building management and operation, which is made possible through a mature process of digitization. Ultimately, the goal is to achieve greater energy efficiency and optimize the operation of buildings.

The aim of the study is to make clearly differentiated interventions coexist in order to restore a livable space with minimal financial resources, paying great attention to the duration of the construction site and thus the movement of

residents made possible by having a single manager, such as the Social Housing Public Agency or the Municipality of Rome. Thanks to the study of the soft parts of the building, a digital catalog of solutions is defined and applied to the renovation of the existing building stock (Bologna, 2021). The answer lies in an integrated approach to the construction process, involving all stakeholders, with the aim of extending control over all phases of a building's life, optimising energy resources and limiting environmental impact.

Re-qualifying, adding, enriching rather than demolishing can lead to a higher quality of space, supporting an architecture that meets the needs of users (Caruso, 2017). A message of responsibility and coherence with the requirements of a precarious economy trying to recover from the crisis, favoring the redevelopment of suburbs in a way that is not quantitative but qualitative; it is a contemporary approach, conscious and closely related to the conditions of current design.

In conclusion, the project begins by overcoming prejudices about repetition, recognizing the intrinsic value of the original construction considered in its entirety, and developing a new modality of intervention that will only be completed with the direct participation of the new inhabitants. Architecture can and must restore the dignity of the original construction of these artifacts (Claudi de Saint Mihiel, 2022). The strong potential of this project lies not only in the effects on the perceived quality of the urban space following these regenerative interventions (Plowright, 2022), but also in the theme of a memory that is preserved through regeneration rather than demolition.

5. Possible Impact of the Research

The results of this design experiment can form the basis for defining intervention models, with different declinations, within the composite heritage of social housing, proposing recurrent, possible and tendentially compatible categories of intervention with the interpretation of the built heritage, from the neighborhood to the building as a "resource" to be renewed and as an opportunity to create economic, social and environmental value. The stock of buildings owned or publicly managed by the Social Housing Public Agency of the Municipality of Rome (ATER) is second only to that of the City of Berlin in terms of size and number of dwellings. It consists of about 670 publicly owned buildings, representing about 25,000 dwellings. The transformation and renovation of this heritage can on one hand improve the overall efficiency of the public housing resource in terms of social, economic and environmental aspects; whilst on the other hand it can have a guiding effect on the heritage, as was the case during the planning phase of the most important social housing districts. The main objective of the experiment carried out is to define, by means of a simulation, potential areas of intervention -

² The approach of this study activity includes a phase of listening to the inhabitants and technicians involved, in order to acquire an awareness of the needs and problems of the neighborhood and its buildings, and a subsequent activity of applied experimentation.



Figure 4. The Archive of the Studio Passarelli.

Credits: Carlo Vannini, 2019.

managed by the public authority - that can coordinate an action of architectural, functional and environmental regeneration of the public housing stock. Current policies focusing on urban and building regeneration primarily target private property, but there is potential for impactful changes in buildings owned by public entities. This presents an opportunity for rational design choices (Castellanos Garzón & Bustacara Panzza, 2023), <https://we.tl/t-pkWdDeiIXc> leading to urban, economic, and social regeneration, cost-savings, and energy-efficient buildings. The research can serve as a useful tool for accessing funding for these interventions.

The search for high construction and transformation qualities means not only recognizing the value of an architectural solution, but also understanding its economic value and assessing its real impact on social dynamics. The environmental issue, which requires serious consideration of what happens after the useful life of a building concerns, for example, the fate and impact of demolition waste, but also the invisible ecological footprint of a new building (Marini & Corbellini, 2016). In a not so distant future the integration of these arguments into mainstream urban regeneration processes will largely depend on the strength of planners to incorporate them into their approach to overbuilding the existing.

Typological and technological-constructive innovations, closely linked as in the past, must today address the issues

of intervention in the existing building in order to achieve its necessary renovation and transformation³. On the architectural level, the experimentation could be even more interesting and varied, opening it up to many design approaches that can be used in relation to the pre-existences. From this point of view the realizations of the 1st P.E.E.P., due to their morpho-typological conformation, would lend themselves well to targeted functional transformations and densifications, with possible changes of use or the insertion of other functions. The comparison with the often-abandoned spaces of the ground floors and roofs would be particularly interesting. Construction innovation could instead focus on sustainable technologies that can reduce the energy and environmental impact of existing buildings and neighborhoods. In this key, the fundamental objective of the technological and construction experiments of the 1st P.E.E.P. could also be reviewed. The attempts to reduce construction time and costs could concern “green” technologies, trying out solutions to be widely applied later.

What has been said so far has a close, multidirectional (reciprocal) relationship with the necessary productive transformation of the construction sector, which must be increasingly oriented towards maintenance, recovery and regeneration i.e. towards qualitative aspects, deviating from the previous quantitative logic based on new construction and urban expansion (Ciorra & Marini, 2011). It would be possible to imagine new specializations and

³ These innovations should address an even greater variety of issues: the right to housing, in an era in which the traditional family is no longer the only aggregation model; the right to the city, which guarantees the inhabitants the possibility of intervening in decisions and directly transforming their living environment; the sustainable use of resources, to be pursued at all levels.



Figure 5. Quartaccio, the market's square.

Credits: Carlo Vannini, 2023.

new roles for designers, characterized by relationships with many other professionals and, above all, with the inhabitants. In fact, an appropriate approach to intervening in what already exists would see the professionals themselves in the background, subordinated to the social protagonist, real or potential, completely reversing the logic of design hypotheses to which people should adapt. The integration of design processes shows a virtuous cross-fertilization between art and science in the field of industrial production: this seems to be embryonic for the transformation of the built environment, still limited to the analysis of phenomena and rather paralyzed in design processes, with slow dynamics and conflictual dialectics between the actors, claim-

ing primacy between the creative and executive spheres. Strictly constructive issues come into play in this comparison, as well as the social implications of some choices for their cultural and economic significance, and for their impact on users. Faced with these issues, the figure of the architect as Total Designer⁴ and guarantor of the project, in its Vitruvian connotations, can acquire a new controlling role in the integration of the various disciplines, in addition to the pure design activity, for the entire duration of the building process. In fact, these tools require an open and humanistic approach to counter a fideistic submission to technology, recovering the etymological role of the critical discourse on the evolution of techniques (Paris, 2021), plac-

⁴ «In the digital turn, process is no longer just a mediator between idea and form; it takes on a constitutive character. [...] Process is not just the representation of a mental mechanism, it is a project in itself that conditions ways of thinking» (Ortega, 2017).

ing the human being once again at the center of a system of concentric circles. To this end, a dialogue should be opened with the humanistic sphere in order to reinvent the future and not to be subjected to it. The recognition of the importance of contexts would be a fundamental aspect of any redevelopment hypothesis, which should therefore always start from the same starting point: the awareness of the fundamental role of the inhabitants in all phases of the

management and transformation of their living environment.

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The Role of Ethical Engagements in the Design of Urban Space: Understanding the Remaking of Landscape Through Architectural Research

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Keywords: natureculture, urban park, landscape urbanism, agency

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This paper engages with issues around the role of humans in transforming nature through design interventions. It draws on literature from the social sciences to consider the nature of authorship in the making of urban spaces and, in particular, the promotion of biodiversity in a London park. It also draws on empirical data from fieldwork to reveal the diverse actors involved in creating and maintaining that environment and urban space, and how they are distributed through time. It will reveal that, far from the human landscape designer being the sole maker of permanent transformation and a fixed image of what a park should be and how it should be maintained as closely as possible thereafter, in fact, the designer is one actor in a chain of relations that shape a continually developing, maturing, evolving, rotting, and renewing landscape through time. Therefore, this paper argues that decentring the role of the human designer in creating a park allows us to recognise a much wider range of makers in the everyday life of urban space.

1. Introduction

There has been a growing discussion on an architect's role as a creative agency within increasingly complex process of value-making. This paper aims to reveal the role of landscape architects in the design and maintaining of a specific London park which aims to promote biodiversity and preserve wildlife. It considers the role of diverse actors as creative agencies in making an urban space for more than human occupants. This research draws on the literature from the social science to consider parks as examples of natureculture hybrids in the city. It also draws on empirical data from research for my thesis to reveal the diverse actors involved in creating and maintaining a park, and how they remake the area through time.

Therefore, the methodology of the research include qualitative data obtained from the in-depth interviews with people in relation to articulating the park, such as designers, officers from the council and members from the community group interested in the spaces of the park; mapping and documentary photography; the study of archival materials and documents relating to the case study; observation of everyday life; and participation of the meetings and activities in the park. The paper consists of two parts. In the first, I am going to outline some key shifts in thinking that form the basis of my investigation, and which also shape design of the park. In the second, I will discuss how these shifts are evident in the making and also maintenance the life of this urban space in South London – Burgess Park.

In my conclusions, I show how design is more than space-making in one time frame. The designer, therefore,

is not the sole creator of permanent transformation and a fixed image of what a space should be. They can instead be seen as an agent operating with other agencies of 'being' towards a multiplication of agents and diversification of agencies. The creative agent who can be anyone intervenes in the realm of this space to install architecture within it. Landscape architecture thus emerges as a relational practice and a part of everyday making. Given the failure of global and market-oriented approaches, this paper therefore highlights that interdisciplinary architectural, ecological, and relational holistic approaches might be necessary to tackle the complexities in promoting and preserving biodiversity in the urban environments.

2. The concept of nature in landscape architectural discourse

Recent scholars across the disciplines represent an approach to decentering of the human in the age of what cultural anthropologists have termed the Anthropocene—the unprecedented dominance of human being on nature which has caused a planet in crisis (Haraway, 2003; Latour, 1993; Van Dooren, 2014). This poststructuralist critical thinking expresses the interrogation of dualisms that have been deeply embedded within the modern traditions of the technoscience and humanist ontologies, such as between nature and culture, human and nonhuman, animate entities, and machines (cf. cyborgs [Haraway, 1991]).

From this perspective, Donna J. Haraway introduces the theory of "natureculture" in her influential 2008 publication 'When Species Meet'. According to her, there can be no

articulation of nature that does not rely on a corresponding culture as it is cultures that interpret and set nature in relation to them, and as multiple interdependencies existing across their apparent bounds. Therefore, a various “naturecultures” as a knot of relationships and entanglements between living matters and social modes of a range of situated epistemological, material and political connections. Drawing upon feminist scholars, this ‘relational’ alternative in which humans are thought as merely one animal among others might create an ethical mode of engagement with the environment, society, and subjectivity (Braidotti, 2013; Code, 2006; Conley, 2006; Grosz, 2005; Haraway, 2011; Petrescu, 2012; Puig de la Bellacasa, 2017; Rawes, 2013).

Such critical thinking has influenced traditional understandings of ‘landscape’ in landscape architectural discourse over time. The first radical shift in discourse took place in the 1960s, when the discipline turned from nature to ecology. Ian McHarg, in his book ‘Design with Nature’ (1969), used the words nature and ecology interchangeably and suggested various land uses in his designs based on information on natural processes. Across a range of disciplines, landscape has become an approach to urbanization. In the mid-1990s, the theorists-, James Corner, Stan Allen, Mohsen Mostafavi, Charles Waldheim, Graham Shane, Richard Weller, Julia Czerniak, George Hargreaves, Chris Reed, Nina-Marie Lister, and Ciro Najle, who all focused on the relationship between architecture and landscape put forward ‘*landscape as urbanism*’ as an urban theory.

‘Landscape Urbanism’ was first articulated by James Corner in his research in the mid-90s. His works set forth an explicit critique of landscape architecture’s recent professional projects. James Corner’s critical thinking is interpreted as the critical rationalism approach to North American urban landscapes, which was influenced by J. B. Jackson’s landscape concept analysis in the 1980s. Corner (1999), in his book called *Recovering Landscape: Essays in Contemporary Landscape Theory*, indicates the rising interest of how a culture relates to and shapes the landscape instead of creating a new aesthetic form. Landscape urbanism is defined as the integration of landscape architecture perspective, supported by ecological design/planning concepts, which are at the centre of nature and design, into contemporary urbanism.

Whilst James Corner’s Field Operations and its partners advanced landscape urbanism in urban landscapes, others continued to refine the concept theoretically through competitions and post-graduate programs in schools. In *The Machinic Landscape* and the Landscape Urbanism course of the Architectural Association (AA), held by Mohsen Mostafavi and Ciro Najle, an interdisciplinary approach and practice was adopted by re-evaluating the role of not only landscape but also architecture in the city. The conceptual changes caused by this new ecological approach have concomitant impacts in not only design, planning, and management of ecosystems but also in North American large parks. In 2003, titled “The Large Parks: New Perspectives Conference” held at Harvard University’s Institute of Design (GSD) (Czerniak and Hargreaves, 2003; Lister, 2007).

In 2007, the term *ecological urbanism* was used in the book *Intervention Architecture*, and it began as a project at Harvard University’s Institute of Design (GSD). Mohsen Mostafavi (2010), influenced by Félix Guattari’s *Three Ecologies* (1989), introduced the term ‘*ecological urbanism*’ as a critique of landscape urbanism. The rise of ecological urbanism has been associated with attempts to reconfigure relationships between nature and city through urban spaces (Mostafavi & Doherty, 2010; Spirn, 2012; Hagan, 2014). In the following years, Charles Waldheim’s publication of *Landscape as Urbanism: A General Theory* (2016) demonstrates the recent formulation of “*ecological urbanism*,” presenting the proposition as a continuation of the landscape urbanism project.

This thinking has implications not just for how cities and urban environments are recognised as a blend of culture and nature, or for recognising the more-than-human inhabitants of cities in design. It also has implications for how we might think about designers themselves or city makers and, in this light, for recognising a much wider range of makers. Additionally, given that architecture has its own political function (Symeonidis & Gourdoukis, 2023), and it has its own capacity to recreate social structures and enhance them (Garzon and Panzza, 2023), ethical, political and relational dynamics between these makers -human and nonhuman forms of life- cannot be ignored in the making of urban environment.

I am therefore looking at the elements of an ecological design approach and urbanism as the ways of making by the various makers who engage with the shaping of the urban landscape on an everyday basis through my case study. This provides the opportunity to reveal the role of the urban parks as a place of nature within the city, how the actors and strategies/policies affect this role, and what they are. The goal of my research has been to explore both how designers think about the relationship of different actors in the making of an urban landscape over time, and what this means for the landscape itself as it unfolds.

3. Case study: Burgess Park

In this paper, the making of the landscape and its narrative through human engagement are explored in the context of archival research and ethnographic research using a combination of transcribed interviews and observations. As a case study, Burgess Park is one of London’s largest parks, stretching from Camberwell and Walworth in the west to Peckham and Old Kent Road in the east. The concept of the park was introduced with the 1943 Abercrombie plan for open spaces in London after hundreds of dwellings and factories were demolished by WWII bombs. However, the urban development of the park and its surroundings took place gradually (see [Fig.1](#)). Burgess Park thus has been created over the last century by piecemeal purchases of land.

Given the historical process in the management of Burgess Park, The London County Council was the administrative body until 1965. After 1965, it became the Greater London Council. In 1986, the responsibility for Burgess park transferred to Southwark Council. From the 1980s onwards, the increasing popularity of nature and wildlife ar-



Figure 1. The location of London and the Burgess Park

changes caused a shift to new conservation and definition of open green space. This led to a profound conceptual change in how green spaces were viewed and maintained (Hannikainen, 2016).

In 2008, Boris Johnson announced a funding competition for London parks. In March 2009, it was announced that Burgess Park had won £2 million from the Mayor of London's Help a London Park scheme¹ and a further £4 million from the Aylesbury New Deal for Communities. In November 2009, LDA Design was commissioned to undertake the major renovation project of the park² which has evolved through consultation process with local communities and stakeholders. Even though the design has been not fully implemented, their work transformed a neglected open space into a well-used public park. According to the plan, the park has a number of facilities for a wide range of users. This provides a new recreational space with a range of improved amenities, and green spaces including woodlands and wetlands on a metropolitan rather than neighbourhood scale.

Besides the fundamental improvements to the park, there were changes in terms the council's policies based on promoting biodiversity and wildlife to build natural cycles for Burgess Park. In 2006, Southwark Council began to prepare a Biodiversity Action Plan containing the Species Action Plans to preserve the natural environment and its flora and fauna; to meet the legal commitments under the Natural Environment and Rural Communities Act (NERC Act). Meanwhile, Southwark Council commissioned a Borough Sites of Importance for Nature Conservation (SINC) review and ecological survey.

In 2009, A Phase 1 habitat survey and protected species risk assessment was carried out by the Ecology Consultancy to the existing biodiversity. Following the major applications, LDA Design created their project, which is based on

rich diversity of habitats across the park, understanding how the habitats can survive over time if there is a lack of water and food or how they are going to change if temperatures dramatically change³. They also focused on design for self-management of the landscape.

According to my observations, and the data I obtained from the documents, they used the trunks as play features, until they start to rot and decay, and then they can become a habitat. This also provides a massive contribution to carbon sink. Besides they kept green wastes, such as the fallen leaves, branches, the dead trees, on site rather than having it taken away (see Fig. 2). Accordingly, they kept the seeds and compost on the site, and thus, these seeds will germinate and self-fulfil the succession of the meadows. In the master plan, all the surface water passes through some reclaims. Throughout all the landforms, the designers built in swales that would just hold the water and slow the flow. This allows different ecologies to form, and thus, natural species can colonise in these rain gardens.

To improve the soil and the design of meadows in the area, LDA Design worked with horticulturalist James Hitchmough. The north facing slopes were planted with a green compost waste that could take more moisture, while the western slopes were planted with the dry species that were sewn into the builder's sand, effectively. Therefore, these meadows effectively can form their own plant communities. The park area had been an industrial area before it turned into an open space. The printing and heavy metals were dug out of the park and removed; however, their residues were in the soil. The designers capped off with geo membranes all the old soil and then put new soil on top.

The masterplan has the main mass of Southampton Way woodland, St George's Way woodland and the wetland which have been vital for local wildlife in the park (see.

¹ Horticulture Week, "London mayor set to announce funds for 10 parks" (6th March 2009), 4.

² Magda Ibrahim, "LDA Design plan chosen for pounds 6m Burgess Park revamp", Horticulture Week (20th November 2009), 6.

³ LDA Design, Burgess Park Master Plan Final Review, 20th October 2015.



Figure 2. The green waste idea of the design (photos by the author, March 2022)



Figure 3. The Southampton Way woodland (photos by the author, March 2022)

[Fig.3](#)). However, with the revitalised the green space and developments in the park, the value of the land has risen, and this has led to increase regeneration projects and housing densities surrounding the park. Although Southwark Council have been holding some exhibitions to display the projects and meetings with stakeholders, community groups and residents to consult them for these ongoing projects, they might have substantial impact on the Burgess Park in terms of biodiversity and wildlife.

Beyond the self-sustainability, which is considered in the masterplan, there are some community groups who have been supporting the management and maintenance of the park, and who have been engaging with Southwark Council and the developers. These volunteers have different levels of commitment and amounts of time that they can share in lack of expertise and agreement that might affect the landscape. This leads to some difficulties to negotiate due to the complexity and people's priorities. Therefore, it is aimed to start a discussion on the data that I have obtained from the fieldwork and community groups between 2022 and 2023.

The Friends of Burgess Park is an association of people and other interest groups who are concerned to protect and promote Burgess Park. Their priorities are the planning applications around the park, buildings in the park, and nature conservation. They describe themselves as a community group whose prime objective is to galvanize interest and the needs of the park. Their aims are to build an awareness around what the natural environment is, and how it is maintained and how people can interact. They have therefore gotten involved in the group because of their interest in nature, and gardening, and their curious about what nature can offer them in terms of their mental health.

When the park was redesigned in 2010, a group of volunteers were interested in finding wild food, and thus, the focus was on lobbying for more edible species within the park planting. They decided that it might be another group that would have run food events or charity event, and harvest fruits. The council then gave them a patch of land that the community garden is on at the moment, which is on the derelict site of an old wharf of the Surrey Canal and provided them some funding support with a five-year lease to



Figure 4. Glengall Wharf Garden (GWG) (photos by the author, September 2022 and May 2023)

establish a garden. Therefore, in 2011, the Glengall Wharf Garden (GWG) was all designed by Sue Amos, an expert in permaculture design (see. [Fig.4](#)). Following the setting up the garden, she pioneered the establishment of a subgroup funded by the National Lottery, which is called Glengall Wharf Gardening Group (GWGG). The gardening group describe their purpose as creating habitats that are friendly to wildlife and taking care of those aspects of the garden that are important to biodiversity.

Decentering the role of the human designer in creating a park that support biodiverse life can actually be identified in the design. LDA design explicitly set out to create a level of open-endedness in their scheme and to avoid forming the sorts of landscapes that would require ongoing heavy handed human intervention to maintain. Indeed, it takes the view that creating a self-sustaining system is actually key to supporting biodiversity alongside ongoing light touch support that is not just a task for designers but also for community-based volunteers. In the Burgess Park, the FOBP and the gardening group as a subgroup have opportunities to consider the management of the area although none of them are in charge. Beyond the design and construction of the park, my research has involved engaging with community groups, gardeners, fish, brambles and so on through the seasons to recognise the complex interactions between different user-maker-inhabitants of the space.

4. Conclusions

My research has been examining Burgess Park and its remaking process from the mid-twentieth century to the present. It addresses much more recent redevelopment of the park (since 2010) that suggests a renewed understanding of the habitat both for human and non-human entities.

This is because the masterplan of the park is based on creating a self-sustaining landscape. It is possible to say that its design emphasises the decentering of the human in the process of making urban space over time. Through the alignment of ideas about landscape urbanism in the city, it is posited that the diverse makers of the park are breaking down the binary between the material/maker and nature/culture. However, the research has also shown that maintenance of the park becomes a combination of natural cycles and human intervention. It leads to a conflict in the everyday making and caring of the urban landscape between human uses and natures which identify a politics of nature-cultures.

In this sense, Burgess Park includes a number of relational ecologies of the environment, political and social dynamics, and human subjectivity forms as the fundamental premise for this study. The extent that maintenance is seen in positive terms of care, that care involves a diverse community – people, earthworms, nesting swans, and so on. It is essential to highlight that these volunteers have different levels of commitment, a variety of agendas, and amounts of time. Indeed, they share in a lack of expertise and agreements between developers and community groups, which might damage the landscape. I argue that caring practices do not necessarily derive from ethical concerns but are entangled with affective and meaningful practical activities consisting of diverse relations between humans/nonhumans. Rather than denying the complexities of care, the complex relations need to be produced in ways that allow human/nonhumans to be promoted in an urban landscape.

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