Bilge International Journal of Science and Technology Research

ISSN: 2651-401X
e-ISSN: 2651-4028
Research Article

2023, Volume: 7, Issue: 2, 177-186
Received: 05.09.2023; Accepted: 26.09.2023
DOI: 10.30516/bilgesci.1355311

City and Brain Analogy: a Sample for Conservative Versus Adaptive Phenotypical Vision of a Genotypical Heritage

Ozgu Hafizoğlu[1], Kader Reyhan[2]

Abstract: Historical urban settlements and traditional structures are significant indicators and substantial values thet document the past ways of life. From a contextual perspective, the preservation of these values and the revitalization of architectural heritage are like sustaining through the conservation of the integrated and continuous culture tied to the past just like a human brain does. This study encompasses all dimensions of a strategic model to conservation versus adaptation examining their interaction with historical building remnants through old-new compatibility. In this study, first; following the architectural assessment of each monumental structure, their spatial, formal, functional, and structural relationships are examined to grow the essences and values for a new vision of the city. Second, the advantages and disadvantages of the conservation approach are critiqued in comparison to adaptive renovation of the city heritages. The preservation of the physical characteristics of Viena Gasometer monumental structures while renovation of the functions of the space within this framework reflect not only Europe's industrial, historical, and social evolution but also hold significance in terms of safeguarding socio-economic and cultural values. Furthermore, they contribute to shaping contemporary notions of conservation while adapting them to the vision of the new era operating the city as a brain.

Keywords: Analogy, Conservation, Adaptation, Heritage, Vision, Vienna Gasometers, Adaptive Industrial Heritage Reuse, City and Brain

[1]**Address:** PamukkaleUniversity, Faculty of Architecture and Design, Denizli/Türkiye.
[2]**Address:** Osmangazi University, Faculty of Architecture, Eskişehir/ Türkiye.

***Corresponding author**: drozgutr@gmail.com

Citation: Hafizoglu, O., Reyhan, K. (2023). City and Brain Analogy: a Sample for Conservative Versus Adaptive Phenotypical Vision of a Genotypical Heritage. 21. Yüzyılda Fen ve Teknik Dergisi, 7(2): 177-186.

1. INTRODUCTION

Industrial heritage can be defined as physical structures, machinery, spaces, or documents that bear the historical traces of industrial developments and production activities (Madran and Kılınç, 2007; Douet, 2013). This type of heritage is often regarded as an important source for understanding and remembering past industrial processes, technologies, and societal changes. Industrial heritage can be found across a broad spectrum, spanning from pre-industrial periods to modern industrial eras. This heritage may encompass industrial facilities such as factories, mines, railways, warehouse buildings, bridges, gasometers, among others. Additionally, photographs, maps, documents, and other archival materials representing the documentation of industrial processes and lifestyles are also considered part of industrial heritage (Tekeli, 2001; TICCIH, 2023).

The conservation and restoration of industrial heritage aim to transmit the industrial culture of the past to future generations. At the same time, these types of areas offering tourism and educational opportunities hold economic and cultural values.

Adaptive reuse of industrial heritage buildings means adapting these structures to new and different uses beyond their original industrial purposes. This approach combines the conservation of historical buildings with meeting the needs of modern society, thus promoting sustainability and increasing their value. Reuse projects can serve both cultural heritage conservation and provide economic, social, and environmental benefits (Mérai & Kulikov, 2021).

The main purpose and goal of preservation is to safeguard visual, aesthetic, environmental, historical, and architectural values, as well as cultural characteristics. These evaluative efforts, which are essential to be developed within the context of conservation approaches, aim to provide perspectives that establish the framework and general principles for the conservation and adaptive reusing of industrial heritage. Furthermore, this work intends to propose architectural assessments within the scope of conservation, offering insights into the steps to be taken before making intervention decisions regarding historic structures and buildings within the framework of conservation approaches.

The content of the study consists of providing a general approach to the subject, conservation approaches within the settlement areas where the structures are located, the historical processes of the buildings, architectural analyses of each building both in relation to the whole and within their individual contexts, and finally, an overall assessment, presented in sequence.

The selection of the Simmering district and the Gasometer structures located on the outskirts of Austria for the subject matter is driven by the significance of the conservation decision in the context of the region. When considering the potential for new developments in the area, its adaptability for transformation, and the architectural features, scale, and location of the buildings, the decision to conserve becomes inevitable. Additionally, the Gasometer structures reflect an important turning point in Europe's historical and social development, emphasizing the conservation of socio-economic and cultural values in the context of physical characteristics and representing contemporary conservation practices and approaches. Due to their significant historical and social value, the Gasometer group of buildings falls within the scope of conservation. The group of structures is not only a symbol for Vienna but also holds an important place in the overall cityscape due to its dimensional scale and location throughout the city, thus considered to possess true monumental value. In this sense, the need for conservation in terms of its historical exterior appearance in Vienna is unquestionable. From this perspective, this study holds a significant framework for the examination of conservation approaches in general.

2. MATERIAL AND METHOD

Four monumental Gasometer structures located in the Simmering district on the outskirts of Austria serve as the sample for this study. The methodology employed in the study comprises the description of the chosen construction site and its characteristics, an examination of the general preservation approach associated with the site, an exploration of the intended use of the structure, an assessment of the structure's previous condition, an investigation of the transformations the structure underwent throughout its historical evolution (the reasons necessitating these transformations), an evaluation of the structure's current (present-day) condition, and the analysis of data concerning the site's and structure's general characteristics. These analyses are then subject to evaluation and discussion.

It is expected that the method applied in the assessments will contribute to the development of a systematic approach that allows for the creation of a framework reflecting the value of historical buildings in relation to their historical and architectural features, in connection with newly designed structures and functions. The analyses in the study are based on visually emphasizing the architectural characteristics of monumental structures and ranking them in order of importance.

In this study, the examination of the relationships between the city and architectural values through the analogy of a brain-like model is emphasized for its developmental significance at the urban scale. Below, in Figure 1, the abstract diagram of the brain model, resembling the Gasometers and the city, is depicted. The core, connections, and outer layer have been visualized based on an analogy between architectural and biological connections, proposing a new perspective across different layers of thought and strategy.

Figure 1. The brain's tri-layers: brainstem in red, axonal linkage in yellow, and new cortex in blue.

3. RESULTS

3.1. The Gasometer structures and their surroundings

In the 19th century, gas production was of great importance in terms of street lighting and the interior illumination of prestigious buildings. Gas production in Vienna began precisely in the year 1829. The Vienna city council signed an agreement with the Imperial-Continental Gas Association in London to supply gas to the city. In fact, the name of the "Guglgasse" street in Fuenfhaus is derived from the fact that this area was where the British company operated and supplied gas to many parts of the city.

Upon the completion of construction, project leader Franz Kapaun stated that the architecture of the Gasometer buildings would exert an authoritative influence on the system of future large industrial complex structures built with similar simple systems. Indeed, the four Gasometer structures have become significant symbols of Vienna's industrial age. In terms of architectural details, they exist as a reminder of 19th-century traditions in industrial construction. As a group consisting of four buildings, these structures have the unique distinction of being singular in Europe.

The Gasometer buildings, units serving urban gas production, were constructed between 1896 and 1899. During this period, Vienna was home to approximately two million people. In this era characterized by industrialization, Vienna's residential areas coexisted with growing and expanding commercial and industrial sectors (Wehdorn, 2000; Enichlmair, et al., 2005). Initially, the Gasometer structures were gas containers used for lighting streets and homes. Over time, new technical equipment and facilities were added during their use, but the external shell of the building remained unchanged. In 1985, the Gasometer buildings were closed (Schwarz, 2000).

The area where the Gasometer structures were established is the Simmering district, which is a quiet corner of Vienna. It is located approximately 10 minutes away from the city center and in the middle of the city and the "Wien-Schwechat" airport, which is located outside the city (see Figure 2). The buildings have dimensions that can be easily perceived from a distance. In terms of its location and characteristics (transportation system, infrastructure, ample space for development), this area is considered a region open to development (see Figure 3). This area allows for new urban development in the formation of the city center. When its historical essence and symbolic value in the city's history are added, it can be characterized as an area with special opportunities that can lead the development axis to shift to this region and transform it into a commercial center (see Figure 4). Therefore, around the Gasometer structures, extensive office and business centers, entertainment, and shopping centers have been designed to spearhead transformation.

Figure 2. The overall view of the Gasometer structures, planned in conjunction with their immediate surroundings (Himmelb(I)au C., 2003, photo: Peter Korrak).

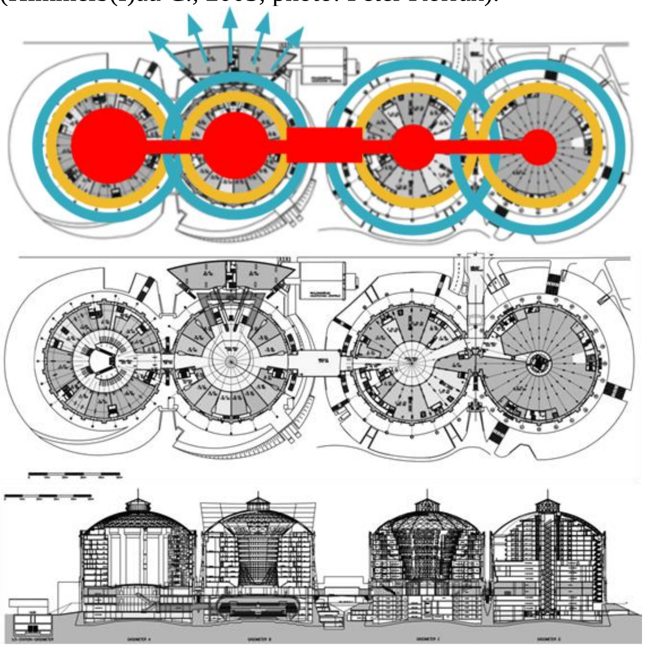

Figure 3. Ground floor plan and longitudinal section; plan and section drawings illustrating the spatial uses and the horizontal to vertical relationship of the Gasometer structures (www.gasometer.org, June 2005).

The structures were situated longitudinally on a site of approximately 300,000 m^2, adjacent to the Austria-Hungary railway. This arrangement facilitated the optimal transportation of coal, a necessary component for gas production. The four Gasometer structures were designed as part of an entire production complex, with variations in color and voids in the flat brick walls attempting to introduce dynamism while also striving to create a unity across all the buildings.

Figure 4. The silhouette view of the four conserved Gasometer structures with preserved exteriors, creating a self-contained city center (www.gasometer.org, June 2005).

These four monumental gas containers are the visual focal point of the entire complex. They are arranged in a row with a brick wall structure and grouped in pairs. These structures, resting on a cylindrical base, have a height of 64.9 m. Their dome-shaped top covers provide a cross-section diameter of 43.5 m and 13.33 m height arch. In each structure, a brick wall is placed on a concrete foundation that is 1.7 m deep, forming water tanks with a height of 12 m and an inner diameter of 62.8 m. This wall tapers upward to 1.65 m from a base section of 5.4 m. Above this, the wall continues upward to create the actual gas containers, tapering from 1.6 m to 0.9 m. The dome-shaped top cover spans 63.6 m. This iron-framed structure is placed on wooden cushions within zinc sheets (see Figure 5).

Figure 5. Layout arrangement within Gasometer Building A in transparent blocks (www.gasometer.org, June 2005).

Inside the structures with brick-covered exteriors, there were gas storage tanks made of steel. Each tank had a diameter of approximately 62.85 m and its widest internal height was about 72.5 m.

Within each Gasometer structure, there are container boilers made of iron, with a height of 33.6 m, placed inside a water-filled tank. These boilers are nested within each other and consist of three cylindrical sections with diameters of 58.2 m, 59.1 m, and 60 m. For control and maintenance purposes, there are iron stairs and galleries surrounding the inner part of the Gasometer structures' outer walls. To facilitate repairs on the interior of the roof, a mechanism with movable platforms has been installed. The rails of the moving mechanism, attached to one side of the roof, are integrated into the base of the roof. Between these two pairs of Gasometer structures, the pressure regulator structure that was responsible for conveying and distributing gas to the city still stands.

3.2. Gasometer Project: Conservation and adaptive reuse approach.

The Gasometer project is a redevelopment initiative that imbues new meanings (functional, structural, spatial) into four historical industrial monuments that were no longer in use. Each Gasometer building has been assigned distinct and complementary functions, creating an independent yet interdependent monumental integrity. These assigned functions were evaluated within an effort seeking answers to three significant themes reflecting the city's architectural character: residential structures, monumental conservation, and urban planning.

The fundamental approach to preserving monumental architecture within the city is based not so much on the architectural values of the buildings but on the symbolic value they bring to the city. The symbolic value in these structures lies in their representation of the city's infrastructure development. In order to preserve this symbolic value, only the external facades of the buildings were conserved, while internally, a self-contained urban center was constructed. In other words, the facades were preserved as the shell of the new structure, thereby delineating the boundaries of the city center. Strategically located to intercept the main artery coming from the city center, the Gasometer structures, constructed using modern building techniques and materials, serve as a symbolic curtain denoting the presence of the new development. Pedestrian bridges were established to gather people from the city's main artery and direct them into the Gasometer structures, thus establishing a connection between the city and the redevelopment.

The height, dimensions, and character of the Gasometer structures have served as a determining factor in shaping and guiding new architectural forms. While preserving and perpetuating the existing character, they establish the theme of the new construction, with their defining quality central to the formation. Therefore, in terms of construction and illumination, the relationship between old and new has been achieved through the intermediary buffer space created.

The concept of the Gasometer project carries a distinctive feature symbolizing the dynamic transformation of Vienna's iconic architecture within the realm of contemporary life. While monuments undergo transformation within their inner core, the outward reflection of this transformation has been achieved through modern designs integrated into the monumental structures (Blüscher, et. al., 2000) This suggests that the renewal of the buildings might have been symbolically expressed through an outward manifestation.

Each of the four Gasometers has been individually designed by different architects, following distinct concepts and architectural projects. The creation of functions (event halls, shopping centers, etc.) to meet the requirements of urban life, along with their interconnections, and the development of various types of office and residential units associated with these functions, make it feel like a central hub catering to diverse needs has been established.

4. DISCUSSION AND CONCLUSIONS

4.1. DISCUSSION

As a former imperial city, Vienna, in addition to its historical and cultural significance, distinguishes itself from other cities by consciously developing and modernizing while simultaneously preserving certain values and character.

In the nineteenth century, it was a common approach to use the forms and styles of historical buildings in industrial structures. Gas containers and production facilities often featured a design reminiscent of medieval churches and other central structures. They were characterized by their appearance, which included rounded arches and arched windows.

Today, the four Gasometer buildings have undergone significant alterations and have been adapted to incorporate the latest advancements in complex technology and innovations. The complex, which suffered damage during World War II, was restored. However, with the advent of natural gas methods, the buildings became redundant. On June 14, 1985, Gasometer No. 2 was decommissioned, followed by the others on May 20, 1986.

Even before being decommissioned, they had been placed under protection by the Federal Monument Agency. Gasometer B has been converted into an exhibition space open for visitors. In accordance with preservation regulations, the Vienna City Gas Co. decided to carry out further renovations in 1987. Today, these structures serve as a reminder of the architectural encasing of functional structures of the past.

4.1.1. The general concept and design approach of the Gasometer project

Determining the heights between reinforced concrete layers, establishing their relationship with the old historic walls, and constructing pedestrian bridges between the two structures required attention to construction speed, accuracy, and safety. The harmony between the old and new buildings was carefully considered in terms of elevation transitions. Along the walls of each cylindrical structure, multi-story new units were constructed, and their upper parts were gradually stepped, aiming to maximize the flow of light into the spaces.

This gasometer project, where the impact of natural light on the design is maximized, stands out as a work in which the historic wall defines the project's perimeter and is reflected in the spatial organization. In the overall approach, the flow of daylight into the spaces has been achieved by either retreating the lower-level spaces through historic wall windows and gaps left between the wall and the new structures, or by creating setbacks on the upper floors, where the new structures lean against the historic wall, and setbacks form terraces and reverse conical shapes with transparent roofs (Figure 6). To facilitate this spatial arrangement and ensure the functionality of circulation spaces, horizontal setbacks and vertical circulation elements have been inserted between mass units. As a result, the passage of light to the inner courtyard is provided both through the transparent roof and the lateral vertical circulation units. Placing symmetrical plan schemes within the circular perimeter form serves this purpose and ensures continuity in transitions between repeating units. The horizontal placement of circulation units has been carried out to maximize the use of natural light and prevent monotony.

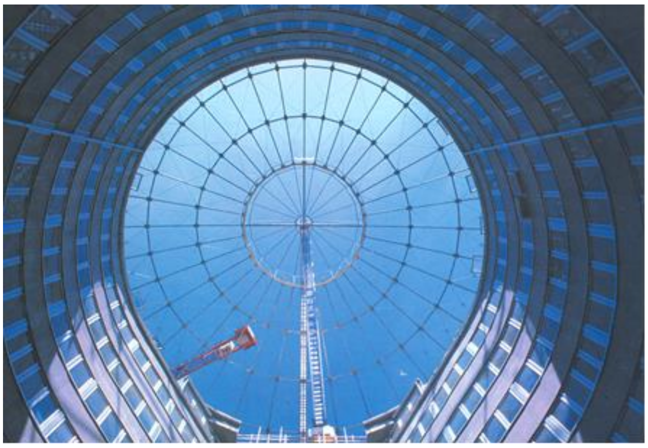

Figure 6. The view of Gasometer B structure's transparent roof (Himmelb(I)au C., 2003, photo: Toni Rappersberger).

These structures, along with the city formation known as UN City and the Millennium Tower in their vicinity, add a modern skyline to the city center, defining the urban landscape of Danube City.

Thanks to its robust infrastructure, the intersection of a fast transit route connecting to the city center via U3 and a motorway directly linked to the airport, these structures, especially Gazometre B, have become the meeting point and the liveliest space, akin to Austria's bank (Schwarz, 2000). Of course, it is undeniable that the decision made during the transformation of these historical structures also holds a significant place in terms of the functions assigned.

Establishing the relationship between the structures occurs at the elevation level, with Gazometre a directing the main circulation area leading from the subway, while in Gazometre B, it extends towards the newly constructed structure outside the shell. In the case of C and D structures, bridges constructed outside connect the two buildings, directing towards the exterior space.

The most prominent structure from the north is a new building connecting new to historic structure with a significant gap added in between. In Gasometer B, the foyer of the Concert Hall created within the structure is connected in a way that accommodates the metro entrance in Gasometer A, and the foyer is directly linked to the metro entrance. Vertical circulation elements (stairs, ramps, and elevators) have been integrated between the metro entrance level in A and the circulation level, shaping the continuity of circulation and transitions between elevations (Figure 7).

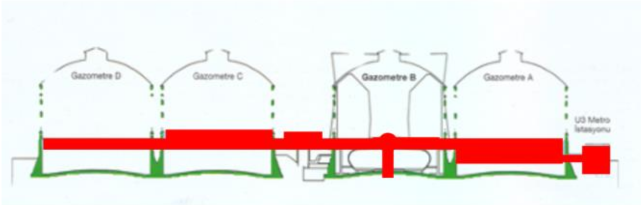

Figure 7. Section diagram illustrating the horizontal circulation relationship of the Gasometer structures (Himmelb(I)au C., 2003).

Gasometer A

French architect Jean Nouvel aimed to create a different spatial arrangement and a unique appearance concerning the old-new relationship while designing the interior of Gasometer A without accentuating the building's massive effect within his concept. To achieve this goal, he divided the interior into blocks, adding a third dimension to create a different spatial layout and maintain harmony between the old exterior walls of the gasometers and the new structures. Maximizing the use of available natural light while preserving the synergy or unity between the old gasometer walls and the new construction was a crucial aspect of the design.

In this context, the lower levels of the building feature a reinforced concrete structure, while the upper levels, where offices and residences are located, exhibit a dominant use of steel and glass, as shown in Figure 8. The choice and application of reflective materials effectively facilitate the flow of light into the spaces. Creating openings between the outer wall surfaces of these blocks and introducing vertical elements for the new units, despite limited space, can be regarded as a method employed in the project's design to maximize the quality of living.

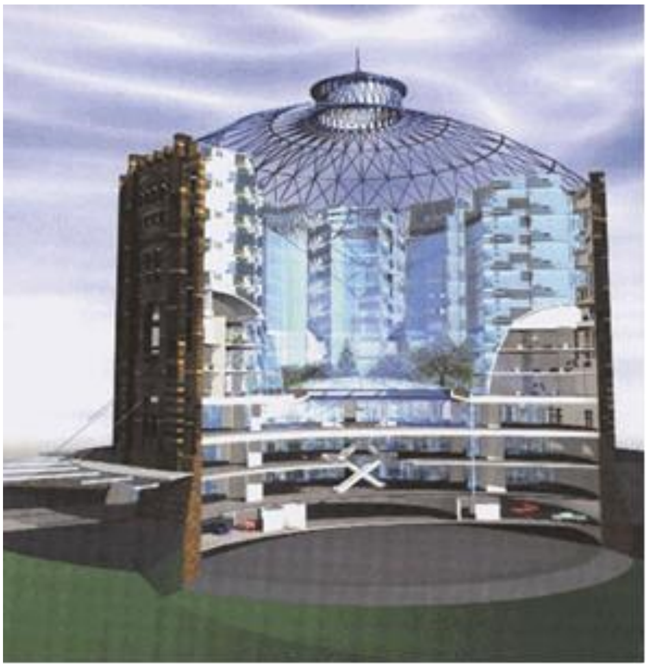

Figure 8. Sectional view of the three-dimensional model of Gazometre A structure (www.gasometer.org, June 2005).

Gasometer B

Gasometer B structure, along with its shield-like additional construction, has been designed with an understanding of form that evokes the street-building relationship within the city. The preserved walls and the inner courtyard created in the central space are structural elements that determine the lighting system of the historical structure (Figure 9). The shield-like structure, much like the new cortex of a brain, serves as a display of innovation, fulfilling its visionary role both physically and functionally, and structurally. In this context, the brain's gray matter can be likened to the gasometers' interiors, while the spirals inside them and the central parts can be seen as the core of the brain that directs the entire spinal cord.

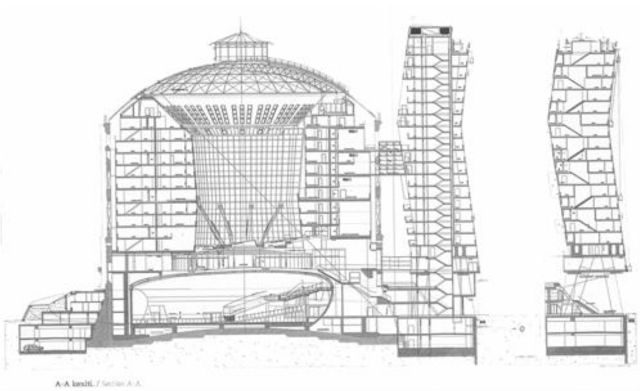

Figure 9. Cross-section view of Gazometre B structure with its shield-like new additional construction (Himmelb(l)au C., 2003).

The "Event Hall", which has an independent structural system, possesses a structure that deviates from the general geometry in both its form and structure. While its sides take on an arched shape, the upper part is amorphous (unstable), slightly inclined, and gains visual complexity in the third dimension in a radial manner. The stage side is flat (static), while the other three sides focus on the arched form of this structure. Its upper cover, which stands independently and forms an egg-shaped figure, draws a formal resemblance to the original upper covers of the gas storage tanks. In its original state in the old structure, the upper cover relied on the main structural walls and transmitted its load to these load-bearing walls.

In the front part of Gazometre B structure, a modern extension has been designed to obstruct the perception of this structure. Several reasons contribute to this design choice. Firstly, the architects aimed to develop a new accent (design language) for this valuable historic building (See Figure 10). On the other hand, there was a desire to create a structure that would accommodate a specific number of special residential units. However, the circular-plan gasometer structures did not allow for the placement of the required number and quality of residential units. These structures dominate the cityscape from every angle due to their circular shape and scale, offering panoramic views of Vienna and its surrounding shores. In other words, this reflective new structure is strategically positioned to provide the most open view of Vienna's skyline. When viewed from each individual residence, it can be said that 270 different panoramic views of Vienna are perceptible. Besides its openness to the Vienna panorama, this new extension gains a unique quality by being the only structure that allows the observation of all four gasometer structures together (four structures) (See Figure 11).

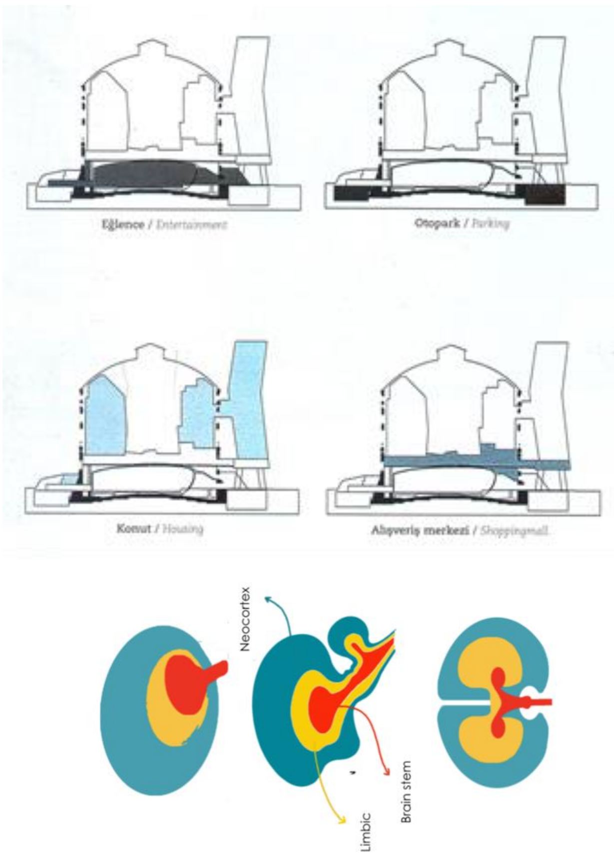

Figure 10. Section diagrams depicting the usage status of Gazometre B structure (Himmelb(l)au C., 2003) and brain model.

Figure 11. The relationship between Gazometre B structure and the shield-like new extension (Himmelb(I)au C., 2003).

The structure, connected to the Gazometre buildings via bridges, serves as a symbol and representative of the new development, arousing curiosity in terms of its design. For visitors, it has become a building that prompts them to question the reason behind this fusion of old and new while also allowing them to learn about the city's history. The structure stands freely on four main supports located on the edges of Guglgasse.

Gasometer C

Gazometre C and D are multifunctional structures designed with an internal height of approximately 70 meters from the base level to the top of the dome. The reconstructions for the entire Gazometre C were based on the simple principle of redesign by architect Manfied. The design principles are grouped under three main headings:

1) Clear organization of new functions,
2) Maximizing the quality of life,
3) Utilizing simple architectural styles (forms).

In terms of functions, the main goal was to create a five-story parking garage, a two-story hall, three-story offices, and six-story residential layers. Gasometer C was constructed with respect to the traditional Viennese urban development method, focusing on creating more green spaces, neighborhood relations, and ease of use. An inner courtyard, planned with top lighting and intermittent gaps, is located in the center of the building (Figure 12). Gasometer C holds a special place among the gasometers in terms of preserving the historical main entrance. Inside, a new entrance integrated into the residential spaces has been created (Figure 13).

Figure 12. The inner courtyard, residential layers, and terraces created within Gazometre C structure (www.gasometer.org, June 2005).

Figure 13. The overall views of the transparent superstructure created in the inner courtyard of Gazometre C structure from the inside and outside (www.gasometer.org, June 2005).

Gasometer D

Gasometer D is designed in the form of a three-armed star. The new structure achieves natural lighting through the organization of units on the upper floors, the central focus of three intersecting axes, and the creation of inner courtyards that face the outer shell, maximizing surface area. Additionally, the courtyard is considered as green space, serving recreational purposes and aiming to visually convey the outer shell (Figure 14). The creation of green areas signifies an attempt to implement "Green House" living criteria throughout the project to maximize gains in water and energy use.

In the approach of this project, which aimed to largely preserve historical and cultural values, a discussion emerged between the historical outer shell and the new interior life. The emphasis on the interior is created with a simple architectural expression, characterized by white-colored and classic Viennese house typology, a design concept with terraced living spaces, and at the same time, a building style where cultural influences are observed (Figure 15).

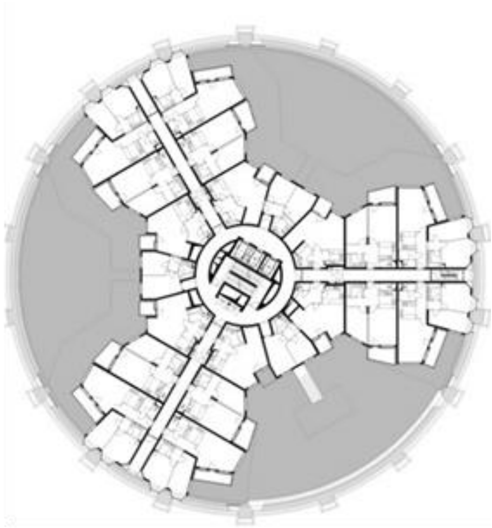

Figure 14. Plan drawing showing the inner courtyards created by the new structure designed in the form of a three-armed star for Gazometre D (www.gasometer.org, June 2005).

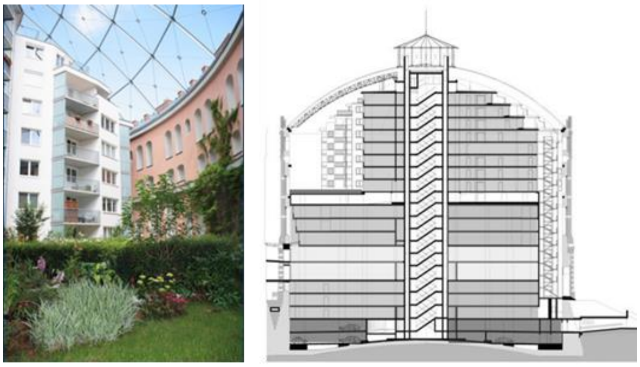

Figure 15. A sectional drawing of the new structure designed in the three-armed star form of Gazometre D, and a view from one of the interior courtyards looking towards the outer shell in the upper floors of the living spaces, showing the intersection of the three axes (www.gasometer.org, June 2005).

The placement of residential spaces to maximize the available area was an important design criterion for the design of the housing units. However, this has resulted in weak circulation spaces. While the central core area is linearly distributed in the form of a three-armed star horizontally, it is not considered an optimal solution in terms of its connection to the vertical circulation area.

4.1.2. The conservation approach in Europe (Vienna) through the Gasometer structures.

Vienna preserve its existing cultural heritage while also embracing contemporary developments and adding new dimensions to its cultural richness. It seeks to reinterpret old buildings, and when a new structure is planned within the context of the urban plan, Vienna strives to ensure that this new building reflects contemporary trends. The Gasometer building complex can be seen as an interesting example of this effort. Vienna demonstrates the continuity and tangible evolution of its culture. In the modern era, Vienna is evolving while preserving its identity and utilizing technology to safeguard its cultural heritage.

Vienna exemplifies the idea that neither of these values is less important than the other, and both are indispensable elements for a city to be contemporary. Vienna, with its essentially geometric urban layout, is also an important example among Central European cities due to its various squares.

In Vienna, the old historical fabric has been meticulously preserved, and the grand, often neo-baroque style buildings have endured, akin to precious gems, untouched by any form of intervention. While the functions of these structures have evolved to meet contemporary needs, some streets and avenues have been transformed into pedestrian zones for recreational purposes. Throughout this process, the existing facade texture and urban elements have been faithfully preserved, with no alterations to the window proportions in the architecture of these buildings. Changes have been made in terms of elevation to accommodate new units and functions as per contemporary needs. However, the architectural elements themselves have remained unchanged, and elements like granite curb stones bear the traces of centuries. This approach allows old Vienna to continue as a significant cultural heritage, carrying its historical importance forward.

In Vienna's architectural approach, the aim for monumental buildings is to make them accessible to the public, functional, and serve as gathering spaces.

Vienna's activities in its oldest buildings and the new arrangements around these structures provide significant clues to the positive development of the "conservation" approach. Vienna preserves its streets and buildings by keeping them alive. While the functions of the buildings change, their historical qualities remain unchanged, and Vienna's streets and avenues continue to maintain their physical textures and traces of history in terms of appearances. In conservation, there is an approach that comprehensively considers reality and all its social dimensions.

Vienna, like other global metropolises, has undergone certain changes in recent times. These changes necessitate an examination of whether they are alterations that truly disrupt the city's historical image or contributions made to the city in accordance with the requirements of the time. For instance, the introduction of a modern rail system (metro) integrated with the existing rapid rail system (Stadtbahn) and railways has led to a significant portion of urban transportation being placed underground. The influence of a series of service structures considered symbols of the era, such as skyscrapers, on historic buildings is materialized through the addition of multi-story structures. In the design of the Gasometer buildings, the rhythmic patterns on the facades have been aimed to be reflected in the interior design. Spatial organization has been attempted to be organized based on the proportions of solids and voids on the facades. This way, enhancing the perception from both the inside and outside, internal-external connections, and the play of light and shadow have been integrated into this design.

While the window rhythm created to break the effects of massiveness may evoke architectural column capital arrangements from ancient times (doric, corinthian, ionic), the presence of functional efficiency cannot be denied. In the lower sections, the existence of openings that decrease in size from bottom to top and an increase in their quantity, as well as the occasional creation of a slender and elongated form, aim to enhance vertical effectiveness (Figure 16).

Figure 16. A view of Gazometre D from the south, showing the arrangement of openings and their relationships within the Gazometer structures (www.gasometer.org, June 2005).

The transformation of these industrial structures has been achieved by converting them into spaces where a large number of people live or engage in activities. Therefore, dynamic elements have been created within these spaces, unlike their previous industrial use. These structures are now open for human use. The attempt to crown the structure with elements like a dome or tower signifies a concern for creating space in a modern approach that is connected to the future rather than the past. In this context, it is essential to preserve the historical facade and architectural characters for the ability to trace the past.

While the structures have a defined form, great effort has been made to create a highly dynamic mass through the effects of light and shadow, both from the interior and exterior. The building presents different appearances depending on the time of day and weather conditions. The spatial uses in the residential typology are designed as places that fulfill various new needs emerging from a completely modern understanding. During the construction process, the requirement for constructing a shell structure in the construction program has led to cutting and demolishing processes in some areas of the historical shell.

4.2. CONCLUSIONS

The massive four gasometer structures located in the Simmering district in the eastern part of Vienna have transformed this area into a residential and commercial center. The decision for the transformation of this area was made after analyzing the data related to the area and assessing its potential suitability. Within the scope and boundaries of this study, the examination of architectural features is significant as it initiates both theoretical arguments related to preservation and assists in reflecting the preservation approach in architecture. The investigation of the practical implications of the preservation approach plays a substantial role in the creation and shaping of preservation plans.

When looking at the gasometer structures, it is evident that certain specific solutions have been attempted to facilitate the flow of daylight into the spaces. The outer shell opens outward like a new cortex of the brain, guiding perceptual and visionary experiences, while the core inside manages the functions and structural experience like the brainstem. The internal-external connection of the structure is achieved by advancing the white structure in between like the axons of the brain and establishing the internal-external balance.

In a, a block layout arrangement with gaps between the massing units has been created to allow the interior spaces to receive natural light. In B, the masses are gradually placed, and gaps are left between the main wall and the new units. In C, terraces have been designed to resolve the issue. In D, three-part cross layouts have been used to create inner courtyards and maximize light intake. In A, the gaps left aim to enhance the perception of historical structures in addition to allowing daylight into the spaces. In B, the goal is to direct attention to the new structure, while in C, it focuses on creating an inward atmosphere, and in D, it enhances the perception of the surroundings. In other words: In A, daylight flows into the spaces through the gaps, and transparent materials cover the surfaces facing the center. In B, light intake is achieved by leaving buffer gaps between historical wall windows. In C, gaps between walls and massing units are created at the lower levels, and terraces are left at the upper levels, shifting the floors on top of each other to allow light to flow into the spaces. In D, staggered gaps between walls and masses are designed at the lower levels, while circulation gaps are created on the other side. Cross-layout plans and inner courtyards are formed on the floors with residential units. The placement of the main circulation space is provided from the center.

In the central space, A and C structures have shopping centers placed within them, and to make use of natural light, the upper covering of these units has been resolved with transparent material in the form of a dome. This situation has led to an inward-oriented spatial arrangement. In B, with the presence of an independent congress center and the new additional unit, the solution is both interrelated and outward-oriented. In D, the circulation spaces are oriented towards the created inner courtyards, allowing the spaces to have views towards the city.

The study, which evaluates the architectural aspects of historical monuments subject to conservation in Vienna, Austria, aims to propose an alternative method for the preservation of historical buildings. By systematically examining the project prepared for the preservation of historical buildings through an architectural analysis approach, this study can serve as an example in the evaluation of similar historical structures. The identification and preservation of architectural features of historical buildings are possible through appropriate and accurate analyses. Creating analyses for the entire complex and each individual building will provide significant advantages in the process of determining conservation approaches and decisions. Furthermore, emphasizing architectural features will assist in the proper examination of specific intervention strategies and forms. This examination, when strategically aligned with the analogy of the brain and the city, will shed light on the strategic dimension of the fundamental decisions to be made.

In urban development as well as in structural development, the analogical significance of the connections between the existing, i.e., the genotype, and the developmental, i.e., the phenotypic structure can only be achieved with awareness developed at the decision-making stage. This, in turn, provides a technical roadmap for guiding strategies at the level of detail, with a broader vision in mind.

In conclusion, the expected benefit of this study is to systematically generate process data in an exemplary conservation approach and serve as a reference for similar applications. The Vienna example represents a departure from a formalist approach in shaping the object, emphasizing not the object but its symbolic value for the purpose of conservation. In this example, there is no formal reflection of the building's character; instead, it expresses its existence with a completely new, material, and technically modern attitude. This approach goes beyond venerating the old; while respecting this value, it extends beyond the building itself to prevent the totemization of these structures by emerging as a new presence.

The city is a brain, and considering heritage structures as a new phenotype to adapt to the changing era with a fresh vision is important for urban development. It allows for developmental significance, adjusting to the requirements of a different era, and opening up new possibilities with a vision that is in tune with the times.

Acknowledgements

Ethics Committee Approval
N/A

Peer-review
Externally peer-reviewed.

Author Contributions
Conceptualization: Ö.H., K.R.; Investigation:, Ö.H., K.R.; Material and Methodology: K.R., Ö.H; Supervision: Ö.H., K.R.; Visualization: K.R., Ö.H;; Writing-Original Draft: Ö.H., K.R.; Writing-review & Editing: K.R., Ö.H;; Other: All authors have read and agreed to the published version of manuscript.

Conflict of Interest
The authors have no conflicts of interest to declare.

Funding
The authors declared that this study has received no financial support.

REFERENCES

Blüscher, M., Mogensen, P., Shapiro, D., Wagner, I. (2000). The Manufaktur- Supporting Work Practice in (Landscape) Architecture. DESARTE- The Design of Artefacts and Spaces.

Douet, J. (ed.) (2013). Industrial heritage re-tooled: The TICCIH guide to industrial heritage conservation. Routledge. DOI: https://doi.org/10.4324/9781315426532

Enichlmair, C., Kranabether, M., Stein, D. (2005). Economic Transformation and Urban Planning in Vienna: Emergence of the Service Sector and its' Implications for Urban Regeneration. 10th International Conference on Information & Communication Technologies (ICT) in Urban Planning and Spatial Development and Impacts of ICT on Physical Space, Proceedings, reviewed paper, Ed. by Manfred SCHRENK, Tagungsband, 261-266.

Himmelbauer, C. (2003). Apartment Building Gasometer B, Yapı Magazine (Yapi Dergisi), No. 259, Istanbul, 70-78.

Madran, E., & Kılınç, A. (2007). New Definitions, New Concepts in Conservation: 'Industrial Heritage'. Publication of the Chamber of Architects Ankara Branch, 44, Ankara, 146-149.

Mérai D. and Kulikov V. (2021). From Burden to Resource: Uses of Industrial Heritage in East-Central Europe. Introduction (eds. Dóra Mérai, Zsuzsanna Sidó, Hanna Szemző, Volodymyr Kulikov). Budapest: Archaeolingua, 2021, 5-12. ISBN 978-615-5766-52-7

Schwarz, M., Wehdorn, M. (2000). 101 Restaurierungen in Wien. Arbeiten des Wiener Altstadterhaltungsfonds 1990-1999, Vienna- Austria.

Tekeli, D. (2001). Industrial Structures. Arrademento Architecture, 2, 62-73.

TICCIH (2023). Charter: The Nizhny Tagil Charter for the Industrial Heritage (2003). https://ticcih.org/wp-content/uploads/2013/04/NTagilCharter.pdf. (Accessed: August 27, 2023).

Wehdorn, M. (2000). Social and Economic Integration of Cultural Heritage in Austria. Technical University of Vienna, Vienna- Austria.

Gazometers (2005). www.gasometer.org, June 2005.

Gazometers (2023). https://www.gasometer.at/de/architektur, August 2023.