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Re-Evaluation of Urban Industrial Heritage Areas: A Comparative Analysis on the Conservation-Usage Balance

Kentsel Endüstriyel Miras Alanlarının Yeniden Değerlendirilmesi: Koruma-Kullanma Dengesi Üzerine Karşılaştırmalı Bir Analiz

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Öz

Sanayi Devrimi; yalnızca sosyal, ekonomik ve teknolojik alanlarda derin değişikliklere yol açmakla kalmamış, aynı zamanda üretim alanlarını kentsel altyapının ayrılmaz bir parçası haline dönüştürmüştür. 20. yüzyılın ortalarına gelindiğinde üretim yöntemlerindeki değişikliklerle evrilen bu alanlar, giderek terk edilmiş ve kullanılmayan bir hal almışlardır. Başlangıçta özellikle şehirlerdeki karmaşık tarihi endüstriyel bölgelerde sağlıksız ve tehlikeli olarak görülen bu alanlar, süreç içerisinde uluslararası anlamda "endüstriyel miras" olarak kabul görmüş ve bu bağlamda 1970'lerden beri gelişim içerisinde olan koruma anlayışı, günümüze yaklaşıldığında bu alanların öncelikle dönüştürülerek aktif olarak yeniden kullanımını vurgulayarak, kent içerisindeki mekansal potansiyellerinin ortaya çıkarılmasını desteklemiştir. Endüstrileşmenin yoğun olarak yaşanmış olduğu ve bu kentlerde buna yönelik atıl alanların yoğunlukta olduğu Avrupa'da bu miras türünün yeniden kullanım uygulamaları incelendiğinde; genellikle müzeler, rekreasyon alanları, sergi alanları, eğitim, konut ve ticaret bölgelerine dönüşüm sağlandığı söylenebilir. Bu dönüşümlerin gerçekleşmesi sırasında göz önünde bulundurulan temel prensip; geçmiş bir zamanda sanayileşmeye aktif şekilde hizmet etmek üzere spesifik işlevlere ev sahipliği yapması amacıyla oluşturulan alanları, günümüz toplum ve kent ihtiyaçları doğrultusunda tamamen başka bir mekansal kimlikle ve çağdaş yaşam standartlarıyla uyumlu şekilde eski aktifliğini geri kazandırmaktır. Öte yandan kültürel miras alanlarının korunmasında temel bir yaklaşım olarak ifade edilebilecek özgünlüğün ve bütünlüğün korunarak miras değerlerinin gelecek nesillere aktarılması olgusu da tarihi endüstriyel alanların yeniden kullanımında bir diğer bir prensip olarak kabul edilebilir. Bu noktada çalışmada,kentsel tarihi endüstri alanlarının dönüşümünde, mekanları çağdaş yaşama uyarlama ve miras sürdürmeye yönelik iki temel prensibi konu edinmekte ve bu iki farklı parametre arasında yaratılması söz konusu olan denge ve yönelimleri incelemeye almaktadır. Bu kapsamda, aktif kentsel alanlara dönüştürülmüş olan Manufaktura (Polonya) ve Ex-Mattatoio (İtalya) gibi iki endüstriyel kentsel alan üzerinden araştırma yapılmakta ve çıkarımlarda bulunulmaktadır.

Anahtar Kelimeler: Adaptasyon-Koruma Dengesi, Ex-Mattatoio, Manufaktura, Tarihi Endüstriyel Kentsel Alanların Dönüşümü

ABSTRACT

The Industrial Revolution not only led to profound changes in social, economic, and technological fields but also transformed production areas into an integral part of urban infrastructure. By the mid-20th century, these areas, which had evolved with changes in production methods, had gradually become abandoned and unused. Initially, these areas, particularly the complex historic industrial zones in cities, were seen as unhealthy and dangerous. However, over time, they were internationally recognized as "industrial heritage." Since the 1970s, the developing concept of conservation has increasingly emphasized the transformation and active reuse of these areas, highlighting their spatial potential

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Bu çalışma, Prof. Dr. Müjgan BAHTİYAR KARATOSUN danışmanlığında Deniz ÇAKAR tarafından hazırlanan "Tarihi Endüstri Yapılarının Yeniden İşlevlendirilmesi Bağlamında Mekansal Sürdürülebilirliğin İrdelenmesi" başlıklı doktora tezinden üretilmiştir.

within urban settings. In Europe, where industrialization was intensely experienced and such derelict areas are prevalent, the reuse of this type of heritage often includes transformations into museums, recreational areas, exhibition spaces, educational facilities, residential areas, and commercial zones. The fundamental principle considered during these transformations is to restore the original activity of these areas, which were specifically designed to serve industrial functions in the past, by adapting them to meet the contemporary needs of society and cities with a completely new spatial identity and modern living standards. On the other hand, preserving the authenticity and integrity of cultural heritage sites, ensuring their values are passed on to future generations, is another key principle in the reuse of historic industrial areas. This study focuses on two main principles in the transformation of urban historic industrial areas: adapting the spaces to contemporary life and maintaining heritage conservation. It examines the balance and orientations created between these two different parameters. Within this scope, research and analysis are conducted on two industrial urban areas that have been transformed into active urban spaces: Manufaktura in Poland and Ex-Mattatoio in Italy.

Keywords: Adaptation-Conservation Balance, Ex-Mattatoio, Manufaktura, Transformation of Historical Industrial Urban Areas

INTRODUCTION:

The relocation of industrial activities from urban centers and the process of decentralization have led to the abandonment of numerous former industrial areas since the Industrial Revolution. This transition has resulted in the spread of disused industrial buildings and vacant industrial spaces within cities. These areas, while often perceived as challenging for urban regeneration projects, also present significant potential for reintegration into the urban fabric through innovative adaptive reuse strategies (Conejos et al., 2011). Zazzara emphasizes that deindustrialization should be understood not merely as an economic transformation but as a process of social and cultural transformation (Zazzara, 2020). From this perspective, industrial heritage must be approached not solely as physical structures but as elements deeply connected with urban memory and identity. A critical observation in the context of contemporary industrial urban areas is their frequent association with adaptive reuse practices (Carroon, 2010; Orbaşlı, 2008). This method enables the preservation of the historical and cultural values of these structures while at the same time responding to modern urban demands (Köksal, 2005; Altınoluk, 1998). However, it is imperative to acknowledge that in this process, the preservation of both the physical integrity of the buildings and their historical and cultural context is essential.

The concept of adaptive reuse, when briefly considered, can be said to have begun to find its place within the theoretical framework of conservation particularly in the late 19th and early 20th centuries (Plevoets and Van Cleempoel, 2019). In this context, the principle articulated by the distinguished restoration theorist Gustavo Giovannoni, stating that "buildings must be used in order to survive," has evolved into what is today known as the "adaptive reuse" approach (Giovannoni, 1946). This method aims to repurpose buildings by assigning them new functions when their original function can no longer be fulfilled. However, it is not sufficient to merely preserve the exterior shell of the building; it is also crucial to maintain the original interior layout, materials, and decorative elements. Failure to do so could compromise the true value of the historic structure (Ashurst, 2005).

A similar approach should be adopted in the preservation and adaptive reuse of industrial heritage. It is not enough to preserve only the structural elements; this process must also encompass social and cultural dimensions. The most critical factor determining the nature of the transformation undergone by repurposed historic industrial sites is the quality of the new function assigned to the area. For a sustainable conservation approach, the new function must be compatible with the environmental and spatial characteristics of the existing structure. The new function should align with the original architecture of the building, and in this regard, the designer must restrict their creative freedom to the data provided by the original structure (Kuban, 2000). Kalman further emphasizes that in the adaptation for reuse, architectural form and function are inseparable elements (Kalman, 2010).

Major spatial transformations can occasionally arise as a result of imposing completely new functions on buildings and implementing extensive interventions. This may result in the failure to consider critical aspects such as the original spatial arrangement, facade design, the ratio of built to open

spaces, fixtures, and the internal street patterns, ultimately leading to the deterioration of the urban fabric. Therefore, it is crucial to assess the impacts of spatial interventions aimed at integrating heritage sites with new functions that involve intensive use. To this end, the study first identifies parameters essential for establishing a balance between preservation and usage by reviewing internationally recognized charters, reports, declarations, and principles related to the conservation of architectural heritage. The study aims to investigate how two rare and functionally distinct approaches to use in selected industrial site transformation projects influence the balance between preserving heritage values and adapting to modern needs. A scoring system was developed to analyze the types of interventions in the two areas based on parameters derived from the literature review, aiming to achieve an objective evaluation. The obtained scores were combined into a preservation-use balance graph, and a comparative analysis was conducted between the two sites.

Based on these findings, the significance of "adaptive reuse" as an architectural conservation strategy that emphasizes both preservation and utilization in the revitalization of historic industrial areas within the city is clearly evident. Such research is highly valuable for guiding the future of areas that have not yet been repurposed.

1. Two Different Approaches to Handling Industrial Heritage Areas

The term "industrial archaeology" was first used by philologist Michael Rix in an article published in the Amateur Historian Journal in 1955 to draw attention to abandoned historic industrial sites (Köksal, 2005). The emergence of this term laid the foundation for the development of various strategic initiatives among public authorities and investors aimed at evaluating these abandoned industrial heritage sites. These strategic initiatives led to the establishment of different parameters for the adaptive reuse and conservation of these sites. In this context, two main approaches have come to the focus in the process of evaluating industrial heritage sites: conservation and adaptive reuse.

The conservation approach aims to preserve the historical fabric, cultural, and architectural values of industrial heritage buildings for future generations. This approach emphasizes maintaining the historical integrity of the structures and preserving their original characteristics. Specifically within the context of industrial heritage, this approach advocates for the preservation of buildings along with their technical equipment, architectural elements, and social contexts. The conservation approach suggests that spatial interventions should be kept to a minimum, and that buildings should continue to function in alignment with their original purposes (TICCIH, 2003; ICOMOS, 1999).

On the other hand, the adaptive reuse approach emphasizes the repurposing of industrial heritage buildings by adapting them to contemporary needs. This approach aims to make the buildings sustainable through new functions while also ensuring that spatial modifications and additions meet modern usage standards. In the process of adapting spaces to new uses, various interventions may be necessary to enhance spatial quality and meet user needs. This approach allows buildings to be revitalized with new functions while respecting the historical fabric (ICOMOS, 1979; Bullen and Love, 2011).

2. Parameters for Achieving a Balance Between Conservation and Re-use Adaptation for New Functions

2.1. Parametre 1: Preservation of Industrial Heritage Values

In the adaptive reuse of industrial heritage, it is crucial to emphasize the preservation of the architectural value, form, and meaning of the structures. The protection of elements such as group value, documental value, memory value, technical and technological value, historical value, identity value, symbolic value, economic value, and functional value, as defined by UNESCO, should be

considered critical in this process. Additionally, the architectural value of industrial heritage, reflected in designs that prioritize functionality and durability while embodying the architectural style of the period (Clark, 2001); its social value, which reflects the past experiences and collective memory of the local community (Nikolić, 2024; Bhatawadekar, 2021); its documental value, providing concrete information about the industrialization process and its social, economic, and cultural impacts (Buchanan, 1972); and its collective value, representing the impact on the collective memory and identity of communities (Fan and Xie, 2023), should also be taken into account.

Moreover, the historical value of industrial heritage includes its reflection of the spirit and social changes of a particular era (Morin, 2013); its technical value stems from its representation of tangible examples of technological advancements from the industrialization period (Stratton, 2000); its functional value consists of elements that must be preserved due to their integration with the original function and spatial characteristics; and its authenticity value is derived from preserving the features specific to the period in which they were built (Palmer and Neaverson, 1998). These aspects are further supported by the scientific and technological value of industrial heritage, which holds concrete evidence of innovative materials and engineering techniques used in the past (Edwards, 2014); and its memorial value, which carries traces shaped by historical events and social conflicts (Macdonald, 2013).

These approaches are in alignment with the emphasis of the Taipei Charter on the importance of preserving the knowledge and experiences of local communities (TICCIH, 2012), the ICOMOS and Nara documents' highlighting of the necessity of preserving authenticity and integrity (ICOMOS, 1999; Ureche-Trifu, 2013), and the Nizhny Tagil Charter's focus on the importance of functional integrity by stressing that technical equipment should not be separated from the structure (TICCIH, 2003). Within this framework, the preservation of industrial heritage values should be regarded as a fundamental parameter in the processes of adaptive reuse.

2.2. Parametre 2: Adapting the Space to Contemporary Needs

In the adaptive reuse of industrial heritage, the adaptation of spaces to contemporary needs is achieved through the repurposing of buildings for new functions. This process requires various spatial modifications driven by the demands of planned activities, current spatial comfort standards, new building regulations, and user needs. The Burra Charter defines this as the integration of spatial modifications and new service areas, aiming to align living standards with modern understandings of spatial quality (ICOMOS, 1979; ICOMOS, 1987).

Bullen and Love describe the adaptive reuse of historic buildings as the addition of a contemporary layer to cultural heritage for future use. These interventions aim to enhance spatial quality while respecting the historical fabric and meeting the needs of modern users (Bullen and Love, 2011). Machado, on the other hand, views this process as a spatial transformation where the past and the future intersect; this approach allows old and new elements to integrate harmoniously (Machado, 1976).

The concept of spatial quality is categorized into four main aspects by Voordt: functional, aesthetic, economic, and technical quality. Madden emphasizes that interventions addressing these four parameters will make spaces more functional, sustainable, safe, and conducive to social interaction. Consequently, spaces can accommodate various functions, be safe and unique, offer green areas, and become accessible in terms of social interaction (Madden, 2000; Voordt, 2005).

Among the key principles that must be considered in this process are ensuring compliance with contemporary regulations when adapting historic buildings to new functions (ICOMOS, 1979; ICOMOS, 1987); enhancing visual appeal (Voordt, 2005); achieving energy efficiency (Madden, 2000); improving

spatial quality (Voordt, 2005); providing economic solutions (Voordt, 2005); and adapting to new functional concepts (Apaydın, 2019). These principles should be fundamental in the process of adapting spaces to contemporary needs.

3. Material and Method

3.1. Material

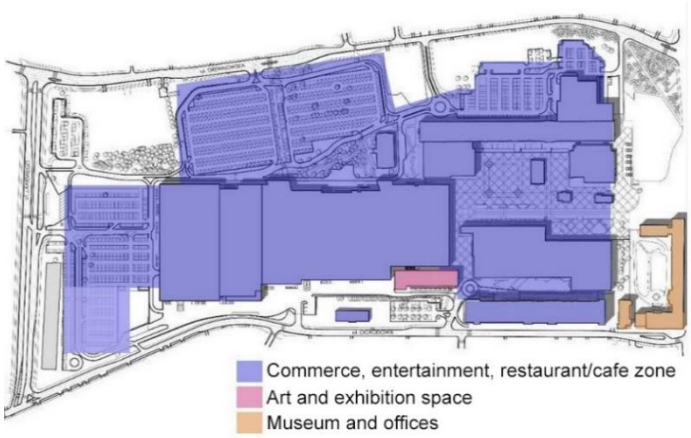
Table 1. Historical Industrial urban areas repurposed with new functions in Europe

First construction year	Site's decline year	Project start year	Original function	New function
Baumwollspinerei, Germany				
1884	1989	2012	Cotton factory	Art center
Zentralwerk, Germany				
1920s	1996	2013	Machine production	Cultural center
Zeche Zollverein, Germany				
1847	1993	2005	Coal and steel plant	Event center, museum, landscape park
Kulturbrauerei, Germany				
1840	1967	2000	Brewery	Cultural center, artistic, commercial areas
Malzfabrik, Germany				
1914	1996	2008	Brewery	Event areas, offices, commercial spaces
Jahrhunderthalle Bochum, Germany				
1902	1968	2003	Gas power plant	Event areas
Landschaftspark Duisburg-Nord, Germany				
1901	1985	1989	Coal and steel plant	Landscape park, event space
Tabakfrabrik Linz, Austria				
1929-1935	2009	2010	Tobacco factory	Office, event areas
WUK, Austria				
1855	1979	2021	Machine production	Culture and event center
C-mine (Winterslag), Belgium				
1901	1986	2005	Coal factory	Offices, education, event areas, restaurant
Textile Factory De Porre, Belgium				
1930	1980	2014	Textile factory	Landscape park and community center
Dolní oblast VÍTKOVICE, Czech R.				
1828	1998	2009-2012	Coal and steel plant	Event areas, museum, restaurant, science center
Aparaaditehas Creative City The Widget Factory, Estonia				
Soviet era	2014	2014	Machine production	Art and event spaces, restaurants, commercial
Cable Factory, Kaapelitehdas, Finland				
1939	1987	2005	Cable factory	Culture center, museum, café
Mattatoio di Testaccio, Italy				
1888-1891	1975	2006-2013	Slaughterhouse	Education, art, event areas
Parco Dora, Italy				
Late 19th c.	1980s	2004-2012	Steel sheet production	Landscape area
Matadero Madrid, Spain				
1911	1996	2005	Slaughterhouse	Art center, event areas
Van Nelle Factory, Netherlands				
1929	1995	1998	Tobacco factory	Event areas, rentable offices, museum
Culturpark Westergasfabriek, Netherlands				
1880	1967	2006	Gas factory	Landscape park and event space
Kulturfabrik (Esch an der Alzette), Luxembourg				
1885	1979	1996	Slaughterhouse	Event areas, concert venue, music studios, café
The University of Luxembourg Learning Centre, Luxembourg				
1909	1990s	2000	Iron-steel	Education and research center and dormitory
Fuzja, Poland				
1907	2003	2018	Textile factory	Residential, restaurant, offices
Manufaktura, Poland				
1850s	1992	2002	Textile factory	Commercial areas, art, restaurants, offices, hotel
EC1 Science Center, Poland				
1906	2000	2008	Electric power plant	Event center, Science / Technology Center,
Fabryka Sztuki, Poland				
1887	1981	2012-2014	Textile factory	Event areas, café
Technopolis (Gazi), Greece				
1857	1984	1999	Gas power plant	Event areas, exhibition spaces, museum

The study is limited to projects conducted in European cities; this limitation is due to the fact that industrialization began in Europe and transformation examples are predominantly applied in this region. Additionally, due to the large number of industrial transformation projects across Europe, the

scope has been confined to projects within continental Europe to enable a focused and in-depth analysis. A preliminary investigation was conducted to select the study areas based on specific criteria, with other selection factors including accessibility, site size, function, and current use. This limitation has kept the number of projects examined at a practical level, allowing for a more detailed assessment.

The list comprises 26 active projects, excluding those converted into museums (Table 1). The exclusion of museum-related repurposings is due to the fact that spatial transformations in areas transformed into museums generally require less intervention compared to other new uses; repurposing for museum functions typically involves less extensive alterations. Conversely, new functions outside of museums often necessitate more comprehensive and intensive spatial transformations. A detailed review of the list indicates that historical and non-operational industrial urban areas are being revitalized with a broad range of new functions, including mixed-use developments, art centers, landscape parks, event centers, commercial spaces, educational facilities, and residential areas. Analysis of the projects reveals that complexes with adaptable usage programs, such as event spaces, landscape parks, and cultural centers, tend to permit relatively less intervention due to the flexibility of their new functions.



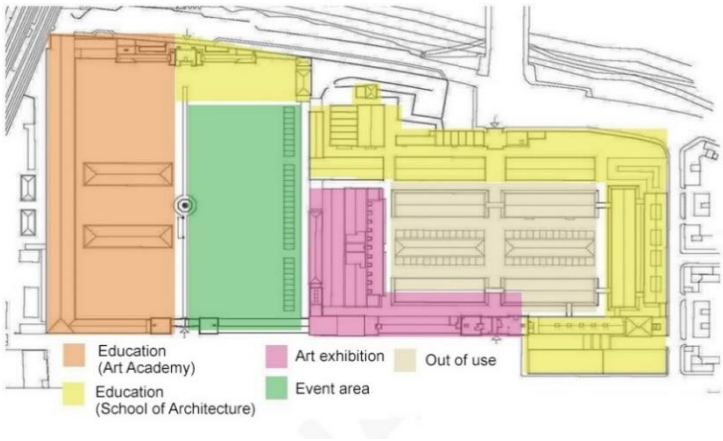


Figure 1: New functions given to the historic industrial complexes in Manufaktura, Poland (Edited from Url-1) Poland (above) and Ex-Mattatoio, Italy (below) (Edited from Url-2)

As an integral aspect of the research scope, two case studies have been emphasized due to their rarity and the intensity of spatial intervention involved. These are the Manufaktura in Łódź, Poland, and the Ex-Mattatoio site in Rome, Italy. Both areas have become multifunctional after acquiring new uses, hosting various functions within the same space. However, the areas transformed for commercial purposes in Manufaktura and those repurposed for educational purposes in Ex-Mattatoio stand out in the project. Given that commercial and educational functions require different spatial arrangements, usage needs, and functional organizations, it is believed that the nature of interventions in these areas and the parameters to be considered have varying impacts. Therefore, they are regarded as requiring comprehensive analysis.

The data collection process for the two researched areas began by conveying general information, starting with the establishment date and purpose of the complexes, their original architectural characteristics, the process of abandonment, followed by decision-making and intervention processes, and details about the new functions given to the areas (Roma Urbanistica, 2004). Subsequently, due to the presence of numerous structures in both areas spread across extensive square footage, the study focused on identifying and examining structures reintroduced for new functions, specifically addressing the basic sub-functions required by each function.

In the case of Manufaktura, which has been repurposed for commercial use, the study delved into (A) a sports facility/entertainment, (B) a shop/recreation/cinema, and (C) a shop/parking area. For Ex-Mattatoio, repurposed for educational purposes, the analysis included applications in three blocks serving as (D) a conference hall, (E) classrooms, and (F) workshop and event space.

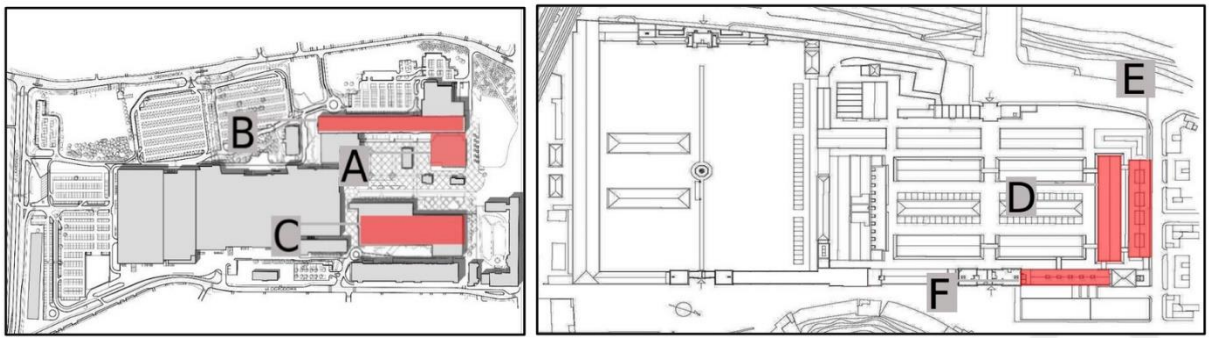


Figure 2. (Right) Manufaktura, Poland - A: Sports facility/Entertainment B: Shop/Recreation/Cinema C: Shop/Parking (Edited from Url-1) (Left) Ex-Mattatoio, Italy - D: Conference hall E: Classrooms F: Workshop and event space (Edited from Url-2)

3.2. Method

The examination of interventions in the areas is categorized into two main headings: at the site scale and at the building scale. At the site scale, the elements subject to intervention include structural occupancy-vacancy, production and transportation traces, and inter-relationships between historical complexes' open/semi-open spaces and structures. These are further subdivided into subheadings such as structural occupancy-vacancy, production and transportation traces, and interconnections between structures. At the building scale, the intervened elements include facade design, interior spatial organization, interior furnishings, structural elements, and other architectural elements (roof, circulation elements, etc.), categorized into respective subheadings.

Table 2. Classification of elements subjected to interventions in the areas

Site Scale
Building Density-Void (S1)
Production and transportation traces (S2)
Connections between buildings (S3)
Building Scale
Facade design (B1)
Interior spatial organization (B2)
Interior furnishings (B3)
Structural elements (B4)
Other architectural elements (roof, circulation elements, etc.) (B5)

After conducting on-site field research, the data obtained at both the site and building scales for both complexes were conveyed through created area analysis tables. In the creation of these tables, interventions in the historical complexes were presented through a schematic representation, color-coded to depict the before-and-after conditions at the site scale. The transformation included demolished structures, preserved structures, new constructions, and, in addition, roads/parking and open spaces/squares. At the building scale, the analysis involved photographs and architectural drawings illustrating the pre- and post-intervention states of the examined structures within the historical complex.

Table 3. Parameters considered in the adaptive reuse of industrial heritage

Principle 1: Parameters for preserving industrial heritage values
Architectural Value
Social Value
Documental Value
Collective Value
Historical Value
Technical Value
Functional Value
Authenticity Value
Scientific and Technological Value
Memorial Value
Principle 2: Parameters for adapting space to contemporary needs
Meeting contemporary regulatory requirements
Ensuring visual appeal
Ensuring energy efficiency
Enhancing spatial quality
Creating economic solutions
Adapting to new functional concepts

In this field study, spatial interventions on industrial heritage structures have been analyzed within the framework of two distinct approaches, focusing on two primary parameters. As outlined in Table 3, a classification has been established to serve as a basis for the study. The first approach, referred to as "Principle 1: Parameters for Preserving Industrial Heritage Values," addresses the preservation parameters for the historical, architectural, social, technical, and documentary values of industrial heritage structures. These values comprise the architectural significance of the structures, their impact on social and collective memory, their documentability, their historical context, and their capacity to reflect technological advancements.

Secondly, under the heading "Principle 2: Parameters for Adapting Space to Contemporary Needs," evaluations have been made within the framework of adapting spaces to contemporary requirements. These parameters include the alignment of structures with current regulations, ensuring visual appeal, energy efficiency, improvement of spatial quality, development of economic solutions, and adaptation to new functional concepts. These two core principles have guided the evaluation of spatial interventions in the field study and have defined the scope and direction of the relevant interventions.

4. Case Study

4.1. Manufaktura, Łódź, Poland

The research area, Manufaktura, is a complex located in the city of Łódź, spreading over a 27-hectare area where the former cotton industry factory of Izrael Kalmanowicz Poznański, which began construction in 1871, is situated. During its period of operation, the area achieved significant success in textile production and processing, eventually expanding to become one of Poland's and later Europe's largest textile production centers.

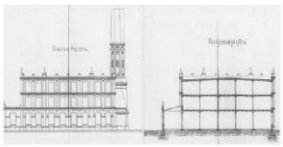
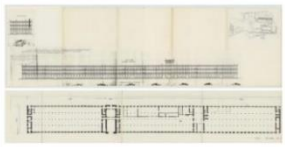
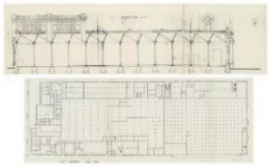
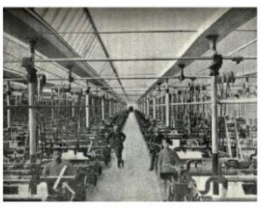
Despite the long-standing success of the production facility, the company operating the factory began to decline slowly with the outbreak of World War I, and after the end of the German occupation during World War II, the complex continued its function for some time following nationalization. However, the company declared bankruptcy in 1991 and was closed in 1992. Although the area was completely abandoned and left in a derelict state, it remained attractive for new investments and contributions to urban life. As part of the city revitalization plans of the local government, the area was evaluated by foreign investors and, starting from 2002, efforts were made to revitalize it with a new function.

According to Ebel's documentary on Manufaktura under the management of Apsys, the design process primarily focused on two issues. The first was the removal of all non-qualified structures to cleanse the area, and the second was to determine the focal point of the project. In this sense, the large void in the center of the area would be transformed into a square, and service buildings would be created around this center, which became the focal point. (Ebel, 2006). The creation of this square and the related arrangements were based on the concept of "Rynek," a wide square representing the center of every city in Poland historically, which is open and accessible only to pedestrians, and was accepted by the local community in this way (Museum official, interview, 2022). The renewal of the area and its reopening for commercial use took place on May 17, 2006, and it started to host an average of around 17 million visitors annually (Apsys Group, 2009).

The new functions created after the transformation of the historical area include commercial spaces such as shops, an entertainment center, restaurants/cafés, cinema, exhibition and event spaces, a museum, offices, a hotel, and recreation areas in all open spaces. To achieve this, commercial areas were largely resolved within the new structure built to the west of the area, and the historical fabric took on other functions with varying degrees of intervention. Additionally, importance was given to the arrangement of the square, designated as the focal point due to the project's "Rynek" concept, aiming for users to spend time there frequently.

The building masses in Manufaktura complex, varying in size and mostly consisting of long volumes, have created an internal street pattern and a courtyard for internal communication and material/product movement for the function. During the registration studies in 1993, the structures in the complex were classified as preserved qualified structures and late-period structures. The red brick material used on the facades of the qualified structures, high ceilings, large windows, and wide openings create a unique atmosphere for the complex's architecture. The spaciousness of the interiors was achieved through the innovative construction techniques of the period, such as the use of steel structures. Late-period additions, built in the 1910s, differ in terms of facade and structure, incorporating elements of the modern era. Large workshops where machines and production equipment were placed are located at the heart of the factory, and these areas are organized to support industrial production processes.

Table 4. Intervention analysis form of Manufaktura (Url-3 – pre-intervention photos and architectural drawings)

	Pre-Intervention	Post-Intervention		
Site scale			S1	Due to the removal of existing structures and the construction of new ones, there has been a significant change in the density-gap ratio in the area.
			S2	Traces of production and transportation in the open area have not been preserved.
			S3	Bridges providing connections between structures have been removed, considering them as additions from a different period.
Building scale New Function: Sports Hall/Entertainment	 	 	B1	The facade material and arrangement have been preserved with minimal intervention, staying true to the original design.
			B2	The interior layout has changed significantly. The glass roof elements dominating one side of the structure have been removed, converting the space into a semi-open terrace.
			B3	Equipments and machineries have been removed.
			B4	The load-bearing elements have been mostly preserved in terms of both technical aspects and materials.
			B5	Many architectural elements have not been preserved.
Building scale New Function: Store/Recreation/Cinema	 	  	B1	The facade material and arrangement have been preserved with minimal intervention, staying true to the original design.
			B2	The interior layout has not been preserved due to the removal of original floorings, which were replaced with a redesigned structure.
			B3	Interior furnishings are partially displayed in the museum. They are not encountered in their original locations.
			B4	Structural elements have not been preserved, except for the external load-bearing walls. They have been reproduced using contemporary techniques.
			B5	Many architectural elements have not been preserved.
Building scale New Function: Store/Parking	 	 	B1	The facade material and arrangement have been partially preserved with minimal intervention. However, partial preservation has not been possible due to contemporary additions.
			B2	The interior layout has not been preserved. Apart from the facade, the structure has been removed, and it has been redeveloped with a new arrangement in view.
			B3	Equipments and machineries have been removed.
			B4	Except for some exterior walls, it has not been preserved.
			B5	The significant architectural element, the glass roof, has been removed. Apart from that, the other elements are no longer present today.

Demolished buildings Preserved buildings New buildings Vehicles and parking areas Open spaces and squares	**Intervention-affected elements in the site scale:** **S1:** Building density-void **S2:** Production and transportation traces **S3:** Connections between buildings	**Intervention-affected elements in the building scale:** **B1:** Facade design **B2:** Interior spacial organization **B3:** Interior furnishings **B4:** Structural elements **B5:** Other architectural elements

4.2. Ex-Mattatoio, Rome, Italy

The former slaughterhouse facility known as Mattatoio di Testaccio, or commonly referred to as Ex-Mattatoio Matadero today, was constructed between 1887 and 1892 based on the architectural design by Gioacchino Ersoch. It is located on the left bank of the Tiber River, in the southern part of the historical center, covering a total area of 105,000 square meters. The complex holds notable historical and architectural value in Roman industrial archaeology, distinguished by innovative structures of iron and cast iron with modern organizational systems, marking the transition between classic and modernism. Over the years, the complex has undergone adaptations and changes, and in 1975, due to the inability to meet the city's needs, Mattatoio di Testaccio was closed (Stabile, 2019).

It is known that the original complex consisted of two different functional areas. The first is known as the slaughterhouse, typically comprising pavilions and covered sections, and the second is known as the animal market, referred to as Boario Forum, characterized by large open spaces. The structures referred to as pavilions have a relatively simple structure: rectangular volumes with brick and tuff wall construction, regular window openings, and two-sloped roof coverings supported by iron Polonceau roof beams. Originally, there were numerous iron structures inside and between the blocks for processing animals. In addition to these, there were several open spaces for housing animals (Mulazzani, 2010).

After the abandonment of the area, it was declared an monumental and environmental property in 1988. However, due to a long period of vacancy, it became quite inactive and gained a negative image among locals. Consequently, a lengthy decision and discussion process took place regarding how to utilize such a large area close to the city center. Over the next twenty years, several projects and real estate assessment initiatives were launched to provide liquidity by leasing some parts of the property to private actors. However, these were generally temporary solutions. Unable to be fully embraced, the local city administration took control of the area's usage rights to initiate a process for its evaluation.

In the initial stages, this area transformed into a vibrant and meaningful space where ethnic communities and alternative groups conducted marginal activities. By 1995, it was recognized as part of the "Ostiense-Marconi" urban planning initiative for the region. Over time, various institutions showed interest in evaluating the complex. The first concrete planning took place in 2000, when the local government collaborated with the Rome Tre University Faculty of Architecture and the Academy of Fine Arts to plan the use of some blocks for educational purposes. It was decided that the blocks to the south and southwest would be used by the Faculty of Architecture, and those to the south and southeast would be designated for the Academy of Fine Arts.

Subsequently, the transformation of the area involved the participation of various actors, and a series of projects were implemented. One such initiative, starting restoration work in 2002, led to the creation of the MACRO museum in the northern part of the area. Additionally, restoration work that began in 2004 in the central part of the area, hosting temporary local markets, was carried out by the Città dell'Altra Economia organization.

Table 5. Intervention analysis form of Ex-Mattotoio (Url-4, Url-5, Url-6 – pre-intervention photos)

		Pre-Intervention	Post-Intervention		
Site scale				S1	The structural density-void ratio has been largely preserved in the area.
				S2	The open-air animal feeding and housing areas, as well as the iron structures related to slaughter and product circulation, have been largely preserved.
				S3	The roof coverings between the buildings have been largely preserved and, where necessary, renewed.
Building scale	New function: Conference Room	 	  	B1	The originality of the facade design has been preserved with minimal intervention. The structural elements related to the facade have been retained.
				B2	The interior space has been reconfigured.
				B3	Interior fittings have been partially preserved.
				B4	Structural elements have been mostly preserved.
				B5	It has been partially preserved. Roof elements in specific areas of the building have been renewed, and roof windows have been utilized to provide natural lighting.
Building scale	New function: Classrooms		 	B1	The facade design has been preserved with minimal intervention, remaining true to its originality. The structural elements attached to the facade have also been preserved.
				B2	The interior space has been reconfigured, and glass partition elements have been used between classrooms to maintain spatial integrity.
				B3	Interior fittings have not been preserved.
				B4	Except for the exterior walls, nothing has been preserved. The roof structure has been removed and replaced with concrete prefabricated load-bearing elements.
				B5	It has been partially preserved. Roof elements in specific areas of the building have been renewed, and roof windows have been used to provide natural lighting.
Building scale	New function: Workshop and Activity Area	  	 	B1	The facade design has been preserved with minimal intervention, staying true to its originality. The structural elements attached to the facade have also been preserved.
				B2	It has been reconfigured. The space has not been partitioned, and temporary dividing elements have been installed to maintain volume integrity.
				B3	The fittings have been largely preserved and transformed into decorative elements where lighting and other components are placed.
				B4	Structural elements have been preserved.
				B5	It has been partially preserved. Roof elements in specific areas of the building have been renewed, and roof windows have been used to provide natural lighting.

Demolished buildings Preserved buildings New buildings Vehicles and parking areas Open spaces and squares	**Intervention-affected elements in the site scale:** S1: Building density-void S2: Production and transportation traces S3: Connections between buildings	**Intervention-affected elements in the building scale:** **B1:** Facade design **B2:** Interior spacial organization **B3:** Interior furnishings **B4:** Structural elements **B5:** Other architectural elements

5. Results and Evaluation

After the examination of historical complexes, an analysis has been conducted by preparing tables for each of the two areas, focusing on adapting the interventions to contemporary needs as parameters and subsequently evaluating them within the scope of heritage preservation parameters. In this context, the impact of implemented spatial interventions on each parameter has been provided through a value system of "0 - no effect, 1 - negative impact, 2 – partial impact, 3 - positive impact." Thus, parameters considered ineffective receive zero points and are excluded from the evaluation, while the quantity of points aims to provide data on the extent to which the intervention in terms of area or structure contributes to adapting to contemporary needs or preserving heritage values. The higher the score, the more positively the contribution of the implemented application within the spatial/structural element can be evaluated in relation to the parameter under consideration. This approach is intended to yield results regarding the balance between adapting the space to contemporary needs and preserving heritage values in the direction in which the weight is inclined. To obtain accurate results, for each complex, an average value is calculated by evaluating three separate structures/blocks with the formula "(Y1+Y2+Y3) / 3."

Table 6: Evaluation of interventions in the Manufaktura within the scope of adapting the space to contemporary needs parameters

	Site Scale			Building Scale														
	S1	S2	S3	B1			B2			B3			B4			B5		
P(1)	3	2	1	3	3	2	3	2	1	2	2	2	2	1	1	2	2	1
P(2)	0	0	0	0	2	2	2	2	0	0	0	0	0	0	0	2	2	0
P(3)	3	3	2	2	2	2	3	1	2	3	2	2	2	2	2	2	2	2
P(4)	2	2	0	2	3	2	2	2	2	2	2	2	2	2	2	2	2	2
P(5)	2	1	1	2	2	1	2	1	1	2	1	1	2	1	1	1	1	1
P(6)	0	0	0	2	3	2	2	0	2	2	0	0	0	0	0	2	2	2
				A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
				A: Sports facility/Entertainment			B: Shop/Recreation/Cinema						C: Shop/Parking					

Table 7: Evaluation of interventions in the Ex-Mattatoio within the scope of adapting the space to contemporary needs parameters

	Site Scale			Building Scale														
	S1	S2	S3	B1			B2			B3			B4			B5		
P(1)	2	3	3	3	3	3	3	3	3	2	2	3	2	2	3	2	3	2
P(2)	0	3	3	2	2	2	2	2	3	0	0	3	0	0	3	3	3	3
P(3)	3	3	3	3	3	3	3	3	3	2	2	3	2	2	3	3	3	3
P(4)	0	2	2	2	2	2	3	3	3	2	2	3	0	0	2	3	3	3
P(5)	2	3	3	3	3	3	3	3	3	2	1	3	2	2	3	3	3	3
P(6)	0	2	2	2	2	2	2	2	2	0	2	2	0	0	2	3	3	3
				D	E	F	D	E	F	D	E	F	D	E	F	D	E	F
				D: Conference hall			E: Classrooms						F: Workshop and event space					

P(1) Enhancing spatial quality
P(2) Creating economic solutions
P(3) Adapting to new functional concepts
P(4) Meeting contemporary regulatory requirements
P(5) Ensuring visual appeal
P(6) Ensuring energy efficiency

0 - no effect 1 - negative impact 2- partial impact 3- negative impact

Table 8: Evaluation of interventions in the Manufaktura within the scope of heritage preservation parameters

	Site Scale			Building Scale														
	S1	S2	S3	B1			B2			B3			B4			B5		
Historical Value	1	1	1	2	3	2	1	1	1	1	1	1	2	1	1	2	2	2
Technical Value	1	1	1	2	2	2	2	2	1	1	1	1	2	1	1	1	2	1
Functional Value	2	2	2	2	3	2	1	2	2	2	2	2	2	2	2	2	2	2
Authenticity Value	1	1	1	2	3	2	2	1	1	1	1	1	2	1	1	2	2	2
Scientific and Technological Value	1	1	1	2	3	2	2	1	1	1	1	1	2	1	1	2	2	1
Architectural significance	2	2	2	2	2	2	2	1	1	1	1	1	2	1	1	2	1	1
Social significance	1	1	1	2	3	2	1	1	1	1	1	1	0	0	0	2	2	2
Documental significance	1	1	1	2	3	2	2	1	1	1	1	1	2	1	1	1	2	1
Collective significance	1	1	1	2	2	1	1	1	1	1	1	1	2	1	1	2	2	2
Memorial significance	1	1	1	2	3	2	1	1	1	1	1	1	2	1	1	2	2	2
				A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
				A: Sports facility/Entertainment			B: Shop/Recreation/Cinema						C: Shop/Parking					

Table 9: Evaluation of interventions in the Ex-Mattatoio within the scope of heritage preservation parameters

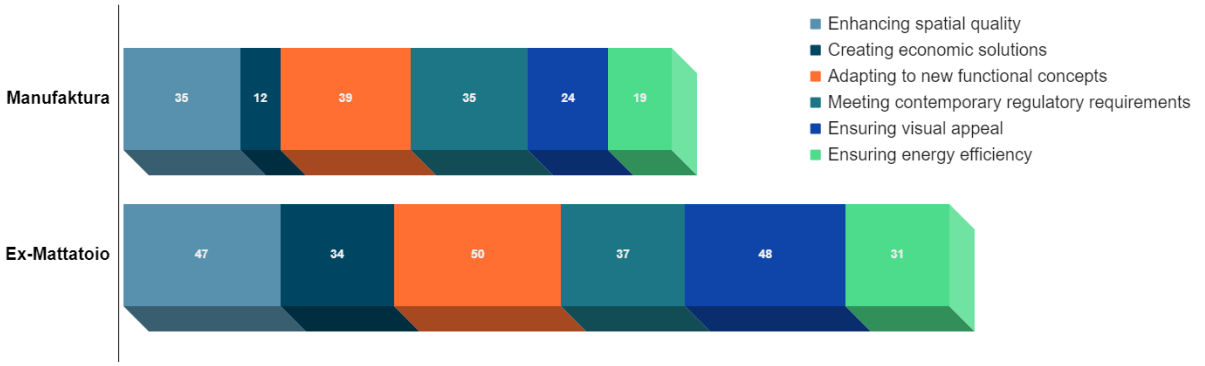
	Site Scale			Building Scale														
	S1	S2	S3	B1			B2			B3			B4			B5		
Historical Value	3	3	3	3	3	3	2	2	2	2	1	3	2	2	3	2	2	2
Technical Value	3	3	3	3	3	3	2	1	2	1	1	3	2	1	3	2	2	2
Functional Value	3	2	3	2	2	2	2	2	3	2	2	3	2	2	3	2	3	3
Authenticity Value	2	3	3	3	3	3	2	2	2	2	1	3	2	1	3	2	2	2
Scientific and Technological Value	3	3	3	2	2	2	2	1	2	1	1	3	2	1	3	2	2	2
Architectural significance	2	2	3	3	3	3	2	2	3	2	2	3	2	2	3	2	2	2
Social significance	3	3	2	2	2	2	2	0	0	2	0	2	2	0	2	2	0	0
Documental significance	3	3	3	3	3	3	2	1	2	2	1	3	2	1	3	2	2	2
Collective significance	3	3	3	3	3	3	0	0	0	0	0	0	2	0	0	2	0	0
Memorial significance	3	3	3	3	3	3	2	1	2	2	2	3	2	2	3	2	2	2
				D	E	F	D	E	F	D	E	F	D	E	F	D	E	F
				D: Conference hall				E: Classrooms					F: Workshop and event space					
0 - no effect 1 - negative impact 2- partial impact 3- negative impact																		

In order to assess the data obtained within the scope of the study, data tables have been prepared initially for the comparison of the two research areas for each parameter. Subsequently, individual evaluations for each research area have been conducted by analyzing the data within their respective contexts.

When analyzing the table of interventions for adapting the space to contemporary needs in the Manufaktura and Ex-Mattatoio complexes (Table 10), it is evident that the interventions carried out in Ex-Mattatoio have a more positive impact on the adaptation of the space to contemporary requirements. Upon closer examination of the parameters, particularly in terms of providing visual appeal, it is observed that Ex-Mattatoio experiences a twice as positive effect. This can be attributed primarily to the greater preservation of facilities in the complex compared to Manufaktura.

In addition, while interventions in Manufaktura resulted in the elimination of many architectural elements that enriched historical spaces visually, such as the glass workshop roof, internal circulation elements, and original flooring, the additions in Ex-Mattatoio for new functions were implemented with a more conservative approach towards spatial integrity and authenticity.

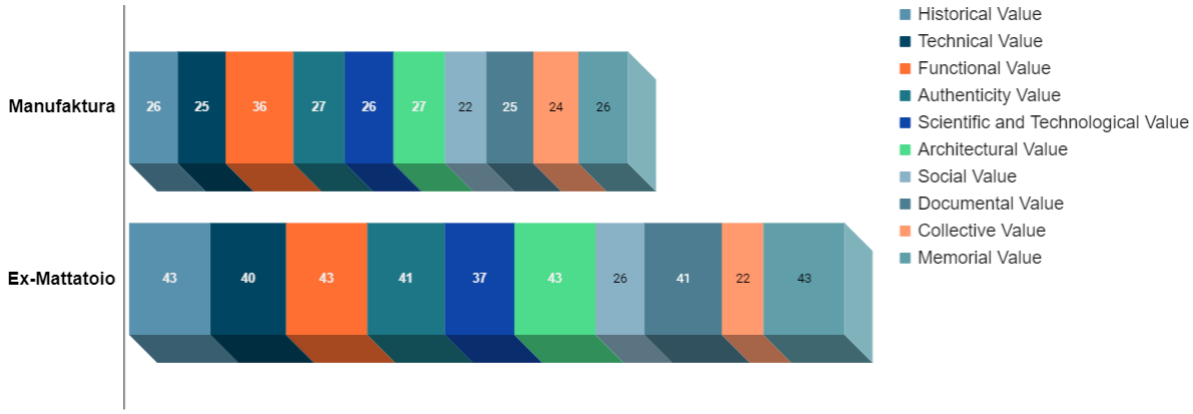
Table 10: Analysis table for adapting space to contemporary needs in the Manufaktura and Ex-Mattatoio complexes



Notable examples of this approach in Ex-Mattatoio include the use of transparent separating architectural elements in the segmentation of the large building block to create classrooms, preserving the spatial perception created by the long block volume, and adapting numerous facilities in the activity area to the new function while maintaining spatial integrity.

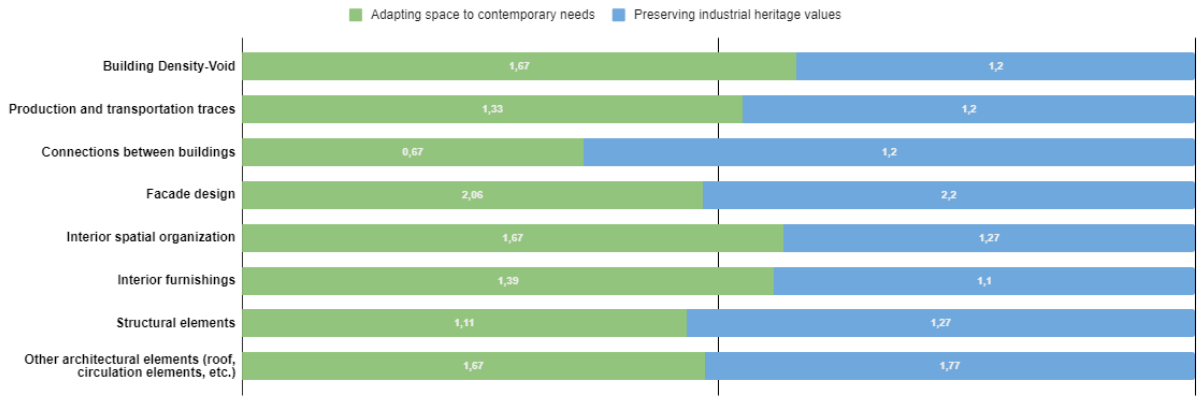
When examining the analysis table regarding the preservation of heritage values in the Manufaktura and Ex-Mattatoio complexes (Table 11), it is observed that spatial interventions carried out in Ex-Mattatoio have a more positive impact on the preservation of heritage values. When the table is examined specifically for heritage values, it is particularly evident that cultural values have a more positive effect in Ex-Mattatoio compared to Manufaktura.

Table 11: Analysis table for the preservation of heritage values in the Manufaktura and Ex-Mattatoio complexes



The primary reason for this is the relatively greater preservation of architectural elements that define the identity of the space in its past function as a slaughterhouse when it was transformed into a space largely focused on educational functions. The interventions and contemporary additions implemented do not dominate the space to the same extent. When evaluated in the context of Manufaktura, the functionality value is emphasized, as the complex has been revitalized from a dormant state to become an attractive and lively area. Additionally, considering the minimal interventions on the facade, the preservation of authenticity and integrity throughout the complex is evident, highlighting the prominence of uniqueness and architectural value.

Table 12: Data analysis for adapting space to contemporary needs and preserving heritage values in the Manufaktura



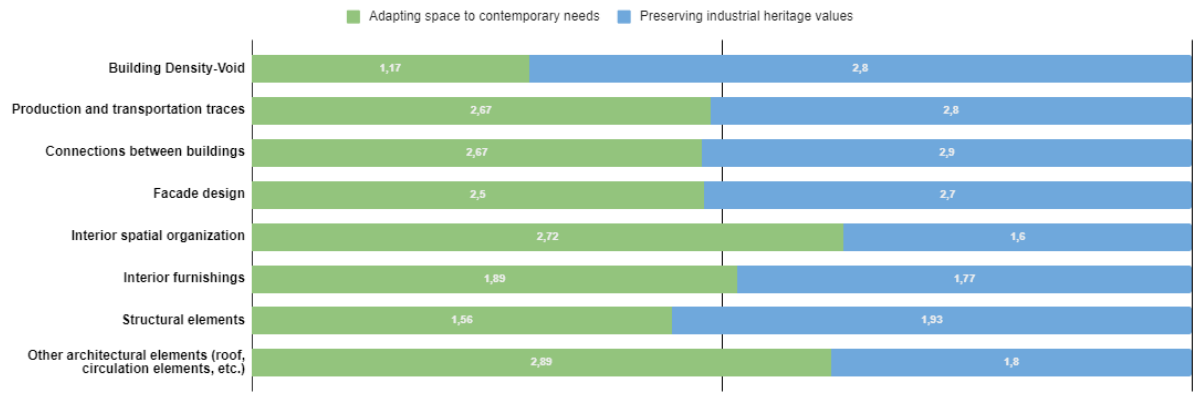
When evaluating each complex independently, and firstly considering how a balance is maintained between adapting the space to contemporary needs and preserving heritage values through interventions in Manufaktura, it is observed that, on a spatial scale, modifications to built-up areas and void spaces, as well as the removal of production and transportation traces, contribute more positively to adapting the space to contemporary needs. On a structural scale, interventions concerning interior spatial organization and furnishings also enhance the adaptation of the space to contemporary requirements.

When considering Manufaktura, on the spatial scale, the predominance of built-up areas and void spaces are primarily seen as interventions aimed at enhancing spatial quality and adapting to a new functional structure through the removal of 20th-century structures. Similarly, the removal of production and transportation traces in this manner suggests that the goal of preserving heritage values is somewhat sidelined. On the structural scale, the reorganization of interior spatial organization to adapt to a new function, create economic solutions, and enhance spatial quality by removing interior walls, while intervening with a focus on shell preservation, indicates a prioritization of adapting the space to contemporary needs rather than strictly preserving heritage values. Similarly, the removal of interior furnishings for similar reasons has led to a secondary consideration of preserving heritage values.

In interventions related to inter-structure connections, facade design, structural elements, and other architectural features, it is observed that greater emphasis is placed on preserving heritage values. The elimination of inter-structure connections on the spatial scale, carried out with the aim of purifying the area from these elements by evaluating them as period additions, is prioritized. While contemporary requirements are addressed through the use of new opening elements in facade design, the preservation of architectural and authenticity values in the area has remained paramount.

Structural elements and other architectural features in areas with intense new functional programs have undergone transformation or removal to adapt to contemporary needs. Although this transformation has, in some cases, led to the partial loss of technical value, the overarching consideration has been to preserve heritage values as much as possible.

Table 13: Data Analysis for Adapting Space to Contemporary Needs and Preserving Heritage Values in Ex-Mattatoio



When evaluating how a balance is achieved between adapting the space to contemporary needs and preserving heritage values through interventions, specifically focusing on the Ex-Mattatoio complex, as presented in Table 13, it becomes evident that interventions in the spatial scale, including structural fill-void, production and transportation traces, inter-structure connections, and on the building scale, particularly in facade design and structural elements, contribute more positively to the preservation of heritage values.

In the context of the spatial scale, an assessment reveals a conscientious approach to preserving values such as history, authenticity, architecture, documentation, social values, especially by conserving areas that may not be adaptable to new functions due to their original use, such as those originally used for animal housing or feeding. Even though these areas may not be adaptable to new functions in their original spatial form, there is a commitment to preserving them within the overall complex.

Similarly, the preservation and adaptation of original elements, such as facade components and structural elements, for entirely new functions, rather than their removal, have significantly contributed to sustaining heritage values. A prime example is the conservation of steel structures used for animal transportation on building facades, which have been repurposed with minimal intervention to serve as overhead covering in their new usage.

In the interventions related to interior spatial organization, interior furnishings, and other architectural elements, it is observed that the parameter of adapting the space to contemporary needs is given priority. As an example, in areas intended for educational functions, the addition of roof windows in many spaces can be examined under subheadings such as lighting, ventilation, and usage, aiming to enhance spatial quality. Additionally, the forefront emphasis on shaping spatial design with a focus on new functional structures is evident, incorporating roof windows for economic solutions, energy efficiency, and spatial quality improvement.

Furthermore, the adaptation of interior furnishings is carried out with a focus on enhancing spatial quality, aligning with new functional structures, meeting contemporary regulatory requirements, and providing visual appeal. This may involve the removal or adaptation of interior furnishings with the primary goals of improving spatial quality, accommodating new functional structures, complying with contemporary regulations, and ensuring visual attractiveness.

CONCLUSION:

Historical industrial sites, which not only convey the architectural, social, historical, and technical knowledge of the industrial era but also contribute significantly to urban spatial use and economic potential, have emerged as a key area of interest in cultural heritage studies. The discourse surrounding how these sites should be sustained in the present and how their heritage values can be transmitted to future generations has frequently led to debates. The most widely accepted approach resulting from these discussions has been "adaptive reuse." These debates offer various recommendations regarding *what, why*, and *how* to preserve elements of historical heritage and how to approach these elements during the adaptation process. However, it is not always possible to accurately assess the extensive and complex process of evaluating urban industrial heritage sites solely based on these recommendations. In this context, one of the most instructive resources is the evaluation of completed projects and the observation of their outcomes. Considering the numerous implementations that have taken place since the late 20th century, the data derived from these applications are of great importance in understanding how the balance between conservation and utilization is achieved in the adaptive reuse of historical industrial sites.

Within the scope of this study, the former textile factory Manufaktura and the former slaughterhouse Ex-Mattatoio were examined. Due to their strategic locations and the extensive areas they occupy in their respective cities, these sites were subject to urban development plans and went through comprehensive transformations. The vast areas covered by both complexes and the numerous buildings they encompass led to their transformation into mixed-use spaces. However, while Manufaktura was transformed into a commercial space by a private investor, Ex-Mattatoio was repurposed for educational functions by educational and public institutions. The site analysis conducted in this study reveals that the choice of these different functions led to varying interventions and, consequently, different approaches to balancing conservation and utilization based on different parameters.

The interventions carried out in Ex-Mattatoio demonstrate a successful preservation of the site's built-to-open space ratio, avoidance of new construction, retention of original interior volumes, selection of simple and compatible materials, and the functional integration of existing fittings into new spatial needs. These elements collectively enhance the usability of the historic site while respecting its historical fabric. These interventions have successfully aligned the spaces with the new functional concept, improved spatial quality, and achieved visual enhancement, all while maintaining a balance in preserving cultural heritage values.

On the other hand, the intensive new functional organization in Manufaktura, including the adaptation of interior spaces to new functions, the removal of late-period constructions, and the extensive new construction, resulted in some compromises in the sustainability of cultural values. While the adaptation of interior spaces to the new functional concept, compliance with necessary standards, and visual improvements were successfully achieved, the balance between conservation and utilization was not fully realized in this process.

The primary reason for these differences lies in the varying spatial requirements and modern additions necessitated by the chosen functions. Commercial functions often require more intensive spatial arrangements and additions, which can lead to a departure from the original character of the spaces. In contrast, educational functions offer the opportunity to make spaces more flexible and adaptable, often resulting in a more conservation-oriented approach. These findings underscore the importance of making more informed and balanced decisions in future projects.

In conclusion, the adaptive reuse of historical industrial sites necessitates a comprehensive consideration of spatial requirements, historical values, socio-cultural context, and design flexibility. This study demonstrates that, in addition to the selection of different functions, a thorough analysis of spatial and cultural values, combined with a flexible design approach, is crucial for achieving a balance between conservation and utilization. Based on this study, the following recommendations have been developed:

- **Accurate Analysis of Functional Requirements:** At the outset of the project, the spatial requirements of the chosen function should be carefully analyzed, and interventions should be planned accordingly.
- **Detailed Analysis of Spatial and Cultural Values:** To preserve the cultural and spatial values of historic sites, a detailed analysis of these elements should be conducted, and interventions should be shaped based on this analysis.
- **Flexible and Adaptable Design:** During the function selection and design process, approaches that preserve the flexibility and adaptability of the spaces should be adopted, ensuring that the spaces remain responsive to contemporary needs while staying true to their historical context.

By following these recommendations, more informed and balanced decisions can be made in the adaptive reuse of urban historical industrial sites, ensuring not only their preservation but also their integration into the contemporary dynamics and needs of the city. This approach will help these sites become vibrant spaces that contribute to the urban fabric while offering sustainable solutions for heritage conservation.

Compliance with the Ethical Standard Conflict of Interest: *The author(s) declare that they do not have a conflict of interest with themselves and/or other third parties and institutions, or if so, how this conflict of interest arose and will be resolved, and author contribution declaration forms are added to the article process files with wet signatures.*

Ethics Committee Permission: *Bu makalede etik kurul iznine gerek yoktur, buna ilişkin ıslak imzalı etik kurul kararı gerekmediğine ilişkin onam formu sistem üzerindeki makale süreci dosyalarına eklenmiştir*

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