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PRESERVATION OF RAILWAY STATION ARCHITECTURAL HERITAGE IN SERBIA THROUGH REVITALIZATION AND ADAPTIVE REUSE: INSIGHTS FROM EUROPEAN CASES

Abstract:

Railway infrastructure played a significant role in the economic, spatial, and social development of Europe, while stations built after 1880 in Serbia today represent an important part of its architectural and cultural heritage. With the ongoing decline in railway transport, many stations are being abandoned and deteriorating, which highlights the need to examine opportunities for their revitalization and adaptive reuse. This paper analyzes their architectural value, their position within the urban structure, and their spatial capacities, together with a comparative overview of successfully implemented examples of adaptive reuse in European countries, with the aim of identifying their potential for future use.

Keywords: railway station, architectural heritage, revitalization, adaptive reuse

ЗАШТИТА АРХИТЕКТОНСКОГ НАСЛЕЂА ЖЕЛЕЗНИЧКИХ СТАНИЦА У СРБИЈИ КРОЗ РЕВИТАЛИЗАЦИЈУ И АДАПТИВНУ ПРЕНАМЕНУ – ОСВРТ НА ПРИМЕРЕ ИЗ ЕВРОПЕ

Сажетак:

Железничка инфраструктура имала је значајну улогу у економском, просторном и друштвеном развоју Европе, а станице подигнуте након 1880. године у Србији данас представљају важан део архитектонског и културно-историјског наслеђа. Тренутним опадањем железничког саобраћаја напушта се и пропада велики број станица, стога је неопходно испитати могућности њихове ревитализације и адаптивне пренамене. Рад се бави анализом њихове архитектонске вредности, положаја у урбаном ткиву и просторних капацитета, уз компаративни преглед успешно реализованих примера адаптивне пренамене у европским земљама, са циљем сагледавања потенцијала за њихову будућу употребу.

Кључне ријечи: железничка станица, архитектонско наслеђе, ревитализација, пренамена

1. INTRODUCTION

Railway stations, as an inseparable part of railway infrastructure, represent a significant segment of Europe's architectural and industrial heritage. Their role goes beyond the basic function of receiving passengers and trains - they serve simultaneously as urban landmarks and as symbols of technological and cultural development. In Serbia, the earliest station buildings were constructed alongside the first railway lines, with their architecture and spatial organization following the stylistic tendencies and technical standards of their time, while being adapted to local conditions and needs. However, technological progress, changes and extensions of railway routes, as well as the decrease in railway traffic, have led many stations to become abandoned or insufficiently used. Their present state poses risk of losing both the material and intangible values, as well as the historical spirit they embody. Given that many of these stations occupy attractive urban locations and have considerable spatial potential, there is a growing need for their revitalization and adaptive reuse, with special attention to preserving authenticity and historical identity. Beyond the general approaches to preservation, this opens the question of how the adaptive reuse potential of historic railway stations can be systematically assessed in relation to their architectural characteristics, urban context, legal status, and realistic functional capacities.

This paper describes and analyzes railway stations in Serbia, with a particular focus on their architectural and cultural-historical significance. The stations in Belgrade, Jasenov, Bela Crkva, and Vršac were analyzed. The stations in Belgrade, Jasenov, and Bela Crkva are protected as cultural heritage, while the station in Vršac continues to operate within regular traffic. The selected examples represent different urban contexts - the Belgrade station is located in the center of the capital, while stations in smaller settlements, such as Jasenov and Bela Crkva, illustrate the importance of adaptive reuse regardless of the size or position of the town. By selecting stations with different protection regimes, levels of use, and urban significance, the paper introduces a comparative perspective that allows the identification of context-specific constraints and opportunities for adaptive reuse. In addition, the paper discusses examples of station adaptation in Paris and Milan, to present successfully implemented strategies of revitalization and reuse.

The methodological approach relies on an examination of the stations' current state, along with an overview of their historical and architectural value. The research includes a case study and a comparative analysis of two European examples: the former Orsay railway station in Paris and the Bullona station in Milan. Since the Belgrade station is planned to be repurposed into a museum, the Musée d'Orsay was selected as a relevant model of successful revitalization, as it represents a large station located along a riverbank that was successfully adapted into a museum while preserving its architectural qualities and enabling a new public function. The example of the Bullona station in Milan demonstrates the possibility of commercial reuse of a smaller railway station as a restaurant, while retaining its unique architectural character. Through the comparison of Serbian and international cases, the analysis is structured around a set of evaluation aspects, including heritage significance, urban context, degree of intervention, new typology, and local impact. Based on these case studies, the paper identifies general advantages and strategies for the adaptive reuse of railway stations, both for public and private purposes.

The aim of this study is to present the challenges and benefits of such transformations through the analysis of implemented examples of railway station reuse, as well as to outline opportunities and guidelines for future revitalization projects and functional repurposing of railway infrastructure in Serbia. The primary purpose of the paper is to develop and apply a context-specific, comparative, framework for assessing the adaptive reuse potential of abandoned and historic railway stations in Serbia, while addressing heritage conservation principles and contemporary urban and functional challenges. At the same time, the study encourages reflection on the impact of refurbished stations on urban and socio-economic aspects, emphasizing the importance of considering the history, architecture, function, and urban context of each station prior to any intervention, while also respecting established conservation principles.

2. THE IMPORTANCE OF PRESERVING RAILWAY INFRASTRUCTURE AS CULTURAL HERITAGE

Cultural heritage in Serbia is defined by the Law on Cultural Heritage as "a set of material and immaterial resources inherited from the past, representing an expression of continuously evolving values, knowledge, traditions, and spatial arrangements over time" [1]. Industrial heritage encompasses sites, buildings, complexes, areas, and landscapes, as well as machinery, artifacts, and

documents that testify to industrial processes of production, extraction of raw materials, their processing, and accompanying energy and transportation infrastructures. Heritage includes both tangible assets and intangible dimensions, such as technical expertise, work organization, and the transformation processes that have shaped social communities [2].

Railway infrastructure, as part of industrial heritage, is recognized as a significant cultural resource by UNESCO, ICOMOS, and TICCIH. Railway stations are complex urban spaces whose location and function influence the urban ambiance and structure of the city. Due to the variety of structures and infrastructural elements they incorporate, as well as their broader urban context, their preservation requires a multidisciplinary approach. However, the significance of their preservation is not fully recognized, as only two European railway lines, that is, only individual segments of the route located in Austria, Switzerland, and Italy, are included on UNESCO's World Heritage List. The preservation of railway stations involves numerous challenges, such as ensuring the technical functionality of the infrastructure, adapting spatial configurations to modern needs, protecting the authenticity of architectural elements, and coordinating the requirements of various users [3].

Several countries have recognized the importance of railway heritage and taken specific measures for its preservation and reuse. In the United Kingdom, the "Railway Heritage Preservation" movement developed in the 1950s, and in 1994, a document for local authorities was adopted to promote more sustainable transport development. In France, historical stations began to be utilized for tourism purposes after the 1960s, managed by non-profit organizations. In Germany, the first associations for the preservation of railway heritage were established in the 1960s, leading to the reuse of around 100 historical buildings. The United States introduced the "National Register of Historic Places" in the 1970s, along with legislative measures that facilitate and encourage the reuse of stations, supported by volunteer organizations [4].

Technological advancements and changes in transportation and service systems have led to the abandonment of many railway segments, especially those connecting low-density or economically underdeveloped areas, indicating the necessity for their revitalization and repurposing. In the following sections of this paper, successful examples of railway station revitalization will be presented as a model for a sustainable approach to preservation and adaptation.

3. THE HISTORICAL DEVELOPMENT OF RAILWAYS AND RAILWAY STATIONS IN SERBIA

Following the end of the liberation wars against the Ottoman Empire, Serbia was granted independence at the Congress of Berlin and subsequently invested in the development of its railway network in order to strengthen its connections with Europe. The construction of the first railway line in the territory of present-day Serbia began in southern Banat, within the territory of the former Austro-Hungarian Empire - the Oravica – Jasenov - Bela Crkva - Bazias railway line was opened to freight traffic in 1854 and to passenger traffic in 1856 [5].

The first railway line within the territory of Serbia at that time was built between Belgrade and Niš. Construction lasted three years, and the line was officially commissioned in 1884. The project was a result of obligations accepted at the Congress of Berlin, where the Great Powers mandated that Serbia provide a rail link between Europe, Bulgaria, and Turkey. Simultaneously, through the construction of the bridge over the Sava River, Belgrade was connected to the Austro-Hungarian railway network. In this way, Serbia established links with major economic and cultural centers such as Vienna and Budapest, as well as with other European capitals. Recognizing the importance of the railway system for economic growth, Serbia continued to expand its infrastructure. By 1917, the network comprised 700 km of standard-gauge track and 610 km of narrow-gauge track. Alongside the expansion of the railway network, the construction of railway stations began as a new architectural building type. These structures followed the development of the railway system and soon became landmark buildings within urban centers. These stations served as the primary sites of interaction between arriving passengers and the city, standing as representative examples of urban architecture that shaped their first impressions [6].

4. ARCHITECTURAL CHARACTERISTICS OF RAILWAY STATIONS IN SERBIA: SELECTED CASE STUDIES

4.1. BELGRADE RAILWAY STATION

In accordance with the Law on Cultural Heritage, the Belgrade Railway Station is listed as a cultural property of great importance, thereby formally recognizing its architectural value [7]. Although the railway played a pivotal role in the development of late 19th-century Serbia, the Belgrade Main Railway Station, one of the most significant public and architectural structures of that period, remained neglected for a long period. The authorship of the building has not yet been conclusively determined. In the literature, the architects Wilhelm von Flattich and von Schlicht are most frequently mentioned, while the technical design was developed by the engineer Dragutin Dragiša Milutinović. The site chosen for the station was the area known as Bara Venecija (Venice Lagoon) along the banks of the Sava River. At the time, this location was outside the city's urban fabric, and the construction site required extensive reclamation and landfilling of the marshy terrain.

The building was designed following classical architectural conventions, consistent with the building practices of the time as a synthesis of classical elements and technological progress. It modeled after monumental railway station buildings of major European capitals. Its architecture reflects a synthesis of 19th-century stylistic and technological aspirations, combining elements of Neo-Renaissance, Neo-Baroque, and other styles characteristic of European railway architecture of that period [8].



Figure 1. The appearance of Belgrade Railway Station after construction [9].



Figure 2. The present appearance of Belgrade Railway Station [9].

4.1.1. Architectural design of the building

The Belgrade main railway station was designed as a terminal (dead-end) station, featuring an L-shaped floor plan. This complex layout resulted in a dynamic mass composition, with prominent central and lateral pavilions on the main facade facing Sava Square. The architecture was executed in the spirit of Academicism, employing a classical architectural language and compositional principles characteristic typical of public buildings from the second half of the 19th century [8].

The exterior treatment of the facades follows a clear zoned gradation, ranging from a rusticated base, through ashlar masonry at the ground-floor level, to smoother wall surfaces on the upper floors. The openings are designed in the Renaissance style, featuring triangular tympanums, profiled

architraves, and biforas (double-arched windows). The central risalit dominates the main front, with a monumental portal designed as a stylized replica of a Roman triumphal arch. The architrave, frieze, and tympanum rest on paired pilasters, while the symmetry of the composition is further emphasized by an aedicule with a clock positioned along the facade's axis. The lateral pavilions frame the composition, directing the visual focus toward the central portion of the facade. In accordance with the regulations of that period, every public building was required to display a heraldic symbol; in this case, it was the coat of arms of the Kingdom of Serbia, held by winged lions executed in relief [8], [10].

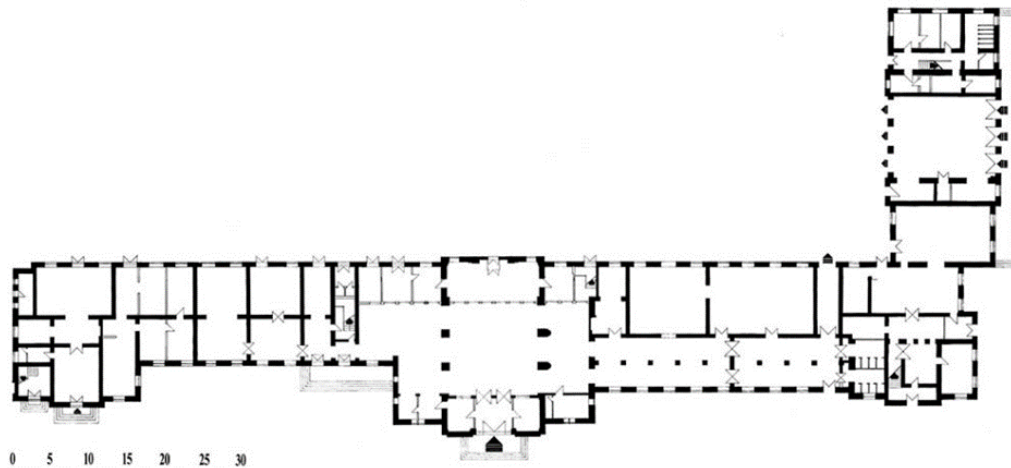


Figure 3. Floor plan of the Belgrade Railway Station [9].

The facades facing the platforms were treated more modestly, repeating motifs from the main facade. While an eclectic approach is evident in the architectural treatment, the overall composition remains harmonious, forming a coherent architectural whole. The station represented as a symbol of a new entrance to the city, and its architecture reflected urban ambitions and European influences characteristic of the period of modernization. Although the station's location was thoughtfully selected from a visual and aesthetic perspective, Branko Tanazević pointed out as early as 1919 that the chosen location proved to be functionally suboptimal over time. This was due to poor connectivity with the city's commercial district and the steep, traffic-congested access streets. Consequently, the Belgrade Main Railway Station was later relocated to a new site [10].

4.1.2. Present condition and planned adaptive reuse

In the previous period, the building has already been subject to certain interventions and reconstruction works. The existing windows are in good condition, crafted from wood and finished with a translucent glaze coating. These are box-type windows (double-casement), where the outer sash features double-pane glazing, while the inner side consists of a single pane of glass.

The planned adaptive reuse involves repurposing the building for the use of the Historical museum of Serbia. As the building has been declared a cultural property of great importance, all reconstruction, rehabilitation, and adaptation works must be carried out strictly within the existing footprint and volume, without compromising the original architectural values. The position and dimensions of the facade openings must be strictly maintained. Furthermore, it is mandatory to preserve the interior decorative elements and finishes that date back to the building's original construction [10].

4.2. RAILWAY STATIONS IN JASENOVO, BELA CRKVA, AND VRŠAC

The railway stations of Jasenovo and Bela Crkva were part of the aforementioned Oravița-Jasenovo-Bela Crkva-Bazias route. The station in Jasenovo served as the central hub of the network, a significance reflected in its architectural design. The plans for all station buildings and their landscaping along the route were developed by an Austrian team of engineers and architects [5].

The present appearance of the Jasenovo station dates back to 1873, when the building was extended. The main station building is symmetrically designed with an elongated rectangular floor plan, featuring a single-story central section and two projecting lateral annexes rising to two stories, articulated as risalits. The central ground-floor section was intended for railway services and passengers, comprising the station master's office, train dispatchers, a ticket office, separate first-

and second-class waiting rooms, a waiting room for mothers with children, a restaurant, a buffet, and a freight warehouse.

The upper floors of the lateral volumes accommodated apartments for railway employees along with service rooms. Hotel rooms for passengers were located above the restaurant and buffet. The side roofs are hipped (four-sloped), each featuring three prominent ornamental chimneys. The main entrance is accentuated by a triangular pediment with a circular window. Decorative elements made of clinker brick frame the windows and doors and are also found at the building's corners and along the cornice. The interior finishes included tongue-and-groove flooring and wooden joinery. In addition to the main station building, the complex included auxiliary facilities such as furnaces, workshops, a water tower (essential for steam locomotives), a coal mill, and a turntable [11].

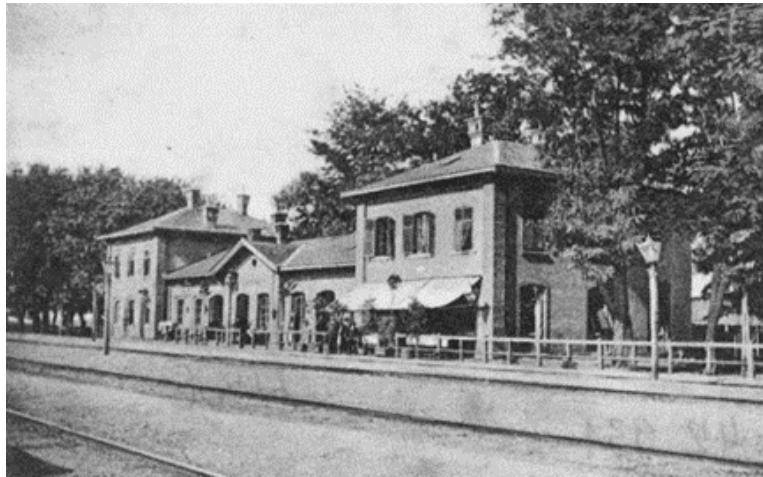


Figure 4. The former appearance of the Jasenovo railway station [5].



Figure 5. The present appearance of the Jasenovo railway station [5].

The railway station in Bela Crkva was designed following a similar concept. Although it also features a rectangular floor plan, this building has a projecting central section accentuated by a triangular pediment, while the lateral annexes are single-story. The facade design leans more toward Classicism, with a limited use of decorative elements and reliefs, although the facade openings remain visually emphasized [12].



Figure 6. The former appearance of the Bela Crkva railway station [5].



Figure 7. The present appearance of the Bela Crkva railway station [12].

In the post-war period, the railway line was gradually decommissioned, culminating in the complete removal of the tracks. The station buildings have since deteriorated and been neglected, remaining entirely without functional purpose, despite the fact that the station building in Jasenovó has been officially listed as a protected cultural heritage site [5].

Taking the aforementioned examples into consideration, it is imperative to highlight the significance of the Vršac railway station. Although it is still operational, the station has experienced a constant decline in passenger numbers, leaving several structures within the complex abandoned and no longer in use. During the Austro-Hungarian period, this station served as an important transportation hub, connecting several routes of strategic importance. The remaining station buildings and technical infrastructure continue to evoke and preserve the historical spatial character and ambience of the site. Among other preserved structures are large railway and freight warehouses. In terms of its architectural composition, defined by a five-volume division and a rhythmic facade, the station exhibits a partial resemblance to the previously analyzed station in Belgrade. It is distinguished, however, by the absence of a triangular pediment above the central volume [13].



Figure 8. The present appearance of the Vršac railway station [13].

In addition to the analysed examples, there are numerous other culturally and architecturally significant railway stations in Serbia that are currently facing degradation or total devastation. Notable examples include the railway station in Kragujevac, the Tamiš station in Pančevo, the Naumovićevo and Palić stations in Subotica, the Horgoš–Kamaraš station, and the Old Railway Station in Valjevo. These examples highlight the importance of the issue regarding the preservation of railway heritage within the national context.

At the same time, there are successful examples of the adaptation and repurposing of railway stations in the region that should be mentioned as models of good practice. The old Austro-Hungarian railway station in Banja Luka, a representative structure built in 1891 in the spirit of Historicism, was repurposed in 1981 into the Museum of Contemporary Art, following an adaptation that met museum standards. Furthermore, the Ravno and Zavala railway stations in Herzegovina, located along the former Dubrovnik line, have been transformed into hospitality facilities: the 1903 Zavala station building was adapted into a restaurant, while the Ravno station became a hotel as part of an international cooperation project between Croatia and Bosnia and Herzegovina. The following sections of this paper present selected examples of the revitalization and adaptive reuse of railway stations in European countries, further illustrating different approaches to the preservation of this specific type of cultural heritage [14].

4.3. COMPARATIVE EVALUATION FRAMEWORK FOR SERBIAN RAILWAY STATIONS

In order to enable a consistent comparison of the Serbian railway stations, the analysis applies a unified set of evaluation criteria. This criteria-based framework allows the identification of limitations and potentials for adaptive reuse, while capturing the context-specific conditions of each station.

Table 1. Comparative assessment of selected Serbian railway stations

	Belgrade	Jasenovo	Bela Crkva	Vršac
Heritage value	Significant example of late 19th-century architecture, symbol of modernization and technological development	Example of Austro-Hungarian railway architecture	Example of Austro-Hungarian architecture with elements of classicist composition	Significant example of Austro-Hungarian architecture and historic transport hub with preserved railway and freight warehouses
Integrity	Facades and interiors preserved, minor restoration works already carried out, including improvements in energy efficiency	Buildings are neglected and require rehabilitation	The building is abandoned and deteriorated, requiring extensive restoration and structural repair	The station is still operational, although several buildings are abandoned; preserved technical equipment contributes to the historic ambiance
Spatial adaptability	Complex composition, adaptation possible with attention to protected elements and in accordance with conservation requirements	Rectangular layout and elongated volumes allow a more flexible and relatively easier adaptation	Simple rectangular layout allows spatial reorganization, with limitations in structural terms	Composed of five cubes with facade rhythm, allows spatial reorganization and adaptation with attention to structural limitations and respect for the original architecture
Legal Constraints	Protected cultural heritage of high importance, restrictions on building volume, protected facade and interior elements	Designated cultural heritage, all interventions subject to heritage protection regulations	The building is not officially protected, allowing more flexible and less restrictive interventions	The station is still in use, with ongoing train services, and no adaptive reuse is planned in the near future
Urban connectivity	Currently located in the city center, good position and accessibility	Location outside the urban settlement with limited accessibility	Located at the edge of the urban area, with moderate accessibility	Located outside the city center, but well connected
Feasible reuse typologies	Historical museum and exhibition space that provides cultural content accessible to a wider public	Educational facilities, commercial or business spaces that support the local community and contribute to local economic development	Educational, cultural, or small-scale commercial uses that can support local activities and contribute to community life	In the future, due to its significance and location, the station could be adapted for any public-oriented function

5. EXAMPLES OF REVITALIZATION AND ADAPTIVE REUSE OF RAILWAY STATIONS IN EUROPE

The revitalization and adaptive reuse of railway stations in Europe represent an important aspect of urban and cultural heritage preservation and adaptation. The adaptive reuse of these structures, whether partial or entire, enables their alignment with the evolving demands of contemporary society while extending their lifespan. Through repurposing or revitalization, railway stations acquire new functions and significance while simultaneously retaining their historical and architectural value. The successful implementation of such projects necessitates an interdisciplinary approach that integrates historical, economic, and social aspects, alongside a responsible treatment of these sites as developmental resources for urban environments.

5.1. THE ADAPTIVE REUSE OF THE PARIS ORSAY RAILWAY STATION INTO A MUSEUM: HISTORICAL SIGNIFICANCE, TRANSFORMATION PROCESS, AND CONTEMPORARY FUNCTION

The Paris Orsay railway station was constructed on the site of the former palace of the same name and Cavalry Barracks, which had been destroyed by fire. Situated in the very center of Paris on the left bank of the Seine, the station was designed by architect Victor Laloux. The architect was tasked with creating an elegant structure that harmonized with its urban surroundings, concealing the entire iron framework, which is a significant example of the Industrial Age, behind a monumental stone cladding. Completed in 1900, the station served as the hub for the southwestern railway network until 1939, when it began to be used for suburban lines. Following the modernization of railway infrastructure, the platforms proved too short for the lengths of new trains and consequently, the station lost its primary function and was subsequently abandoned. The implementation of electric trains, which produced no steam or smoke, had originally enabled the installation of a glass roof over the platforms. Furthermore, the station incorporated the most advanced technological innovations of its time, such as elevators. Its interior, characterized by high vaulted ceilings, monumental arches, and large windows adorned with metallic rosettes, creates a spacious and light-filled space [15].

After the discontinuation of railway services in 1950, the station was repurposed for alternative functions until 1961, when a decision was made to demolish the structure in order to construct a large-scale hotel. In 1973, in response to widespread public protests against its demolition, the station was declared as a national monument and four years later, a formal resolution was passed to preserve the building and adapt it into a museum. At the same time, a need for a new museum space emerged, as the Musée du Jeu de Paume housed a world-renowned Impressionist collection that had become the most visited in the world relative to its floor area. Furthermore, many 19th-century masterpieces from the Louvre were either on loan to other institutions or held in storage, necessitating a new exhibition space. This project represents as one of the pioneering examples of industrial heritage adaptive reuse, where a former railway station was transformed into a major museum, aiming both to revive its historical significance and to meet modern functional requirements [16], [17].

In 1979, the architectural competition for the building's redevelopment was won by the firm ACT-Architecture, led by architects Colboc, Bardon, and Philippon [17]. Their design approach focused on preserving the building's architectural character while introducing new interior structures, specifically additional levels and smaller exhibition galleries that were designed in accordance with the original spatial layout and structural elements, thereby maintaining the structural integrity of the hall. A team of more than one thousand craftsmen worked on the restoration, reinstating the vaulted rosettes to their original state and integrating modern HVAC and acoustic systems. ACT's vision, aligned with the government's requirements of that time, aimed to restore much of the original station and to preserve decorative elements such as gilded ornamentation, chandeliers, and ornamental crests on the roof, while creating a functional and pleasant museum environment.

According to the ACT project, pedestrian footbridges were proposed to connect two levels, leading to an amphitheatre at the end of the main hall. Colboc envisioned the transformation as the creation of a 'new space within an old shell,' where visitors begin their journey at the quay level, experiencing the full height of the central main hall to feel a strong visual impression without a sense of overwhelm. Both sides of the hall were used for exhibition galleries, while the central hall remained largely unobstructed. The exhibition area was further expanded into the former ticket offices and hotel premises, providing optimal natural light for the Impressionist masterpieces. They were displayed in intimate galleries, described by Jean-Paul Philippon as 'small museums within a large museum' [18].



Figure 9. The original interior appearance of the Orsay railway station in Paris [15].

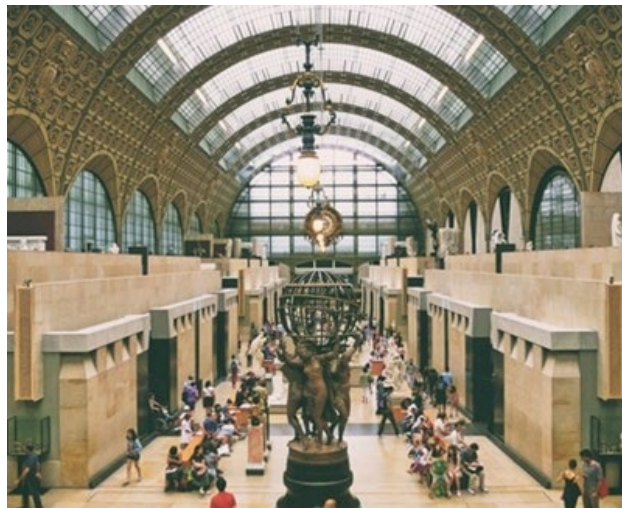


Figure 10. The interior appearance of the Orsay railway station after adaptation in Paris [15].

The museum is organized across three primary levels: on the ground floor, galleries are on both sides of the central hall, which are overlooked by terraces on the middle level and these, in turn, open into additional exhibition galleries. The upper floor is situated above the lobby and extends into the uppermost sections of the former hotel [15]. In total, over 18,500 square meters of new floor area were added, distributed across four levels [16].

Gae Aulenti had a significant influence on the final interior aesthetic of the museum, removing certain elements of the original ACT concept, such as the winter garden, pedestrian bridges, and the amphitheatre, while introducing postmodern details that altered the atmosphere of the space. Aulenti transformed the central hall into an open exhibition space using contemporary industrial materials. The original iron beams and plaster rosettes were juxtaposed with metal mesh partitions and roughly hewn stone walls, where now is the collection of French art from the 1848–1915 period [18], [19]. Today, the Orsay Museum houses an extensive collection of artworks, far exceeding the capacity of its current exhibition space. Consequently, a comprehensive transformation of the entire building into a more publicly accessible space is planned. The latest renovation plans outline the adaptation of former offices into exhibition spaces, while a 1,200 m² section in the southern wing, previously used for administration, is being repurposed into expanded galleries dedicated to Impressionist and Post-Impressionist works. Additionally, a new centre for arts education is being integrated on the fourth floor [16].

5.2. THE ADAPTIVE REUSE OF THE BULLONA RAILWAY STATION IN MILAN AS A RESTAURANT: HISTORICAL SIGNIFICANCE, TRANSFORMATION PROCESS, AND CONTEMPORARY FUNCTION

The Bullona station was named after the Italian term for rice husk (Bulon), referencing the agricultural processing that took place in a rural farmhouse formerly situated on the site. The railway station was constructed between 1925 and 1928, and was officially opened a year later. Designed by architect P. Farina, the structure represents one of the final examples of early 20th-century railway architecture in the region. The station's original wooden shed was replaced by a more permanent construction of reinforced concrete, metal, and glass. In terms of architecture, the building exhibits the formal characteristics of the transition between the Liberty (Italian variant of Art Nouveau) and Rationalist styles. Its facade is decorated with late Liberty friezes, pilasters, capitals, and moldings that extend into the interior, further emphasizing the building's structural framework [20], [21].

The station belongs to the "bridge" type in the terms of structure, as the street level was positioned above the tracks. The complex consists two interconnected volumes. The primary rectangular volume, situated directly above the railway lines, originally accommodates the entrance, ticket office, and kiosks. A second, parallel volume contained the waiting room, bar, sanitary facilities, and the station guard's apartment. This configuration, with the elevated main building and an upper floor for auxiliary functions, allowed for a clear functional separation between public passenger areas and the operational railway systems [22]. Following the expansion of the rail network and the construction of a new station nearby, the Bullona lost its primary function and remained neglected until 2003 [23].



Figure 11. *The former appearance of the Bullona railway station in Milan [22].*

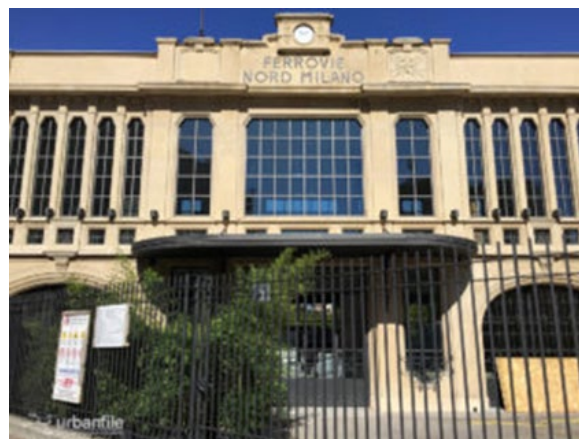


Figure 12. *The present appearance of the Bullona railway station in Milan [23].*

A contemporary intervention, completed after nine years of conservative restoration in collaboration with the Italian Institute for Archaeology, Fine Arts, and Landscape of the City of Milan, has restored the building's joinery nearly to its original state. The facade of the renovated and illuminated structure preserves the inscription 'FERROVIE NORD MILANO,' serving as an indication of its former function and the historical identity of the site. The interior is defined by a monumental chandelier of metal and glass, measuring 10 meters in length and 3 meters in width, dominates the space, following the geometry of the original windows. The halls are organized into two distinct counters: one dedicated to a bar service and the other to seafood specialties. This adaptive reuse has ensured the preservation of the building's Liberty-style architecture while reflecting the legacy of Milanese 20th-century art. At the centre of the space is positioned a sculpture by Arnaldo Pomodoro,

complemented by works of renowned Italian artists displayed on the walls, which collectively transform the building into an open space for art and exhibitions [24], [25].

6. DISCUSSION AND CONCLUSION

In addition to the mentioned cases, many good-practice examples in the adaptive reuse of former railway infrastructure demonstrate how such interventions prevent demolition and ensure the preservation of historical heritage. Revitalized structures often become significant factors or drivers for the urban renewal of the surrounding area [26]. It has been established that the successful implementation of these projects requires an interdisciplinary approach, that integrates historical, architectural, economic, and social dimensions.

The analysis of case studies from Serbia, specifically the stations in Belgrade, Jasenovo, Bela Crkva, and Vršac, indicates that railway stations are not only elements of transport infrastructure, but also important cultural assets that preserved the historical context of former states and local communities. A comparative analysis with European examples reveals the potential for implementing similar principles of protection and adaptation to historical railway buildings. Although revitalization efforts often prioritize tourism-oriented functions, in cases where the tracks have been decommissioned or removed (as in Jasenovo and Bela Crkva), future uses may be primarily educational, cultural, or commercial (such as hotels or restaurants), provided that architectural integrity is consistently maintained.

The Serbian railway stations were evaluated alongside selected European examples using the same set of criteria, ensuring a consistent comparative framework and highlighting similarities and differences, as summarized in the following table.

Table 2. Comparative overview of adaptive reuse of selected Serbian and European railway stations

	Belgrade Main Station	Orsay	Jasenovo	Bullona
Heritage significance	Important cultural and historical landmark, widely recognized		Locally significant railway heritage reflecting the historical development	
Urban context	Located in the city center, near the river, historically conceived as a representative urban entrance and the final station on the line		Smaller local stations, formerly functioning as through-stations	
			Located outside the small urban settlement, with limited accessibility	Located within the urban area of Milan, well connected to the surrounding neighborhood
Degree of intervention	Minimal interventions on the facade, preserving its original form		Buildings currently abandoned and degraded	Moderate intervention through conservative restoration and interior adaptation
	Minimal interior interventions are planned	Extensive interior transformation with additional levels to accommodate the new function		
New typology	The building is planned to function as the History Museum of Serbia	Art museum	No current function; potential for educational, cultural, or commercial reuse	Restaurant with exhibition elements
Local impact	Strengthens identity, makes the site more accessible to the wider public, and supports tourism development		Potential to support local community development	Contributes to neighborhood regeneration and cultural life through mixed-use programming

Based on the evaluation of both Serbian and European railway stations, the following SWOT analysis summarizes the general strengths, weaknesses, opportunities, and threats associated with their revitalization and adaptive reuse.

Strengths:

- preservation of the architectural value and cultural heritage of railway stations
- strengthening of local identity and community awareness
- contribution to the urban regeneration of the wider area
- potential for economic development
- well-positioned spatial location of the buildings
- prevention of further degradation of the site and station structures

Opportunities:

- involvement of the local community in the implementation of the project
- encouragement of cultural and educational activities
- application of circular economy principles through the reuse of existing buildings
- potential for public-private partnerships and investments
- development of new functions aligned with contemporary societal needs and specific requirements of the local community

Weaknesses:

- high costs of restoration and implementation

- technical and functional constraints in adapting buildings to new uses
- privatization may limit public accessibility to the site

Threats:

- restrictive conservation requirements and regulations
- poor structural condition and material deterioration
- insufficient institutional support and lack of awareness
- challenges in achieving contemporary energy efficiency standards

The analysis of international case studies demonstrates that a consistent preservation of the exterior, combined with the sensitive adaptation of the interior for new functions, allows for the safeguarding of cultural heritage without compromising architectural identity. Furthermore, the adaptive reuse of these structures should aim to preserve the memorial heritage inherent in abandoned railway buildings, as, in the context of Serbia, these sites represent more than 150 years of human interaction and reflect the technological achievements and societal context of their time. A similar methodology can be applied to railway stations in Serbia, where the revitalization of railway stations offers an opportunity to regenerate urban environments, strengthen local identity, and stimulate new public and private investment. To sum up, such projects not only prevent the loss of historical values but also contribute to the socio-economic development of the community, the formation of public spaces, and the overall improvement of the quality of life.

ACKNOWLEDGMENTS

This research was supported by the Ministry of Science, Technological Development and Innovation of the Republic of Serbia, under the Agreement on Financing the Scientific Research Work of Teaching Staff at the Faculty of Civil Engineering and Architecture, University of Niš - Registration number: 451-03-33/2026-03/200095 dated 05/02/2026, and under the Agreement on Financing the Scientific Research Work of Research Staff at the Innovation Center of the University of Niš - Registration number: 451-03-33/2026-03/200371.

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