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Railway Corridors in Croatian Cities as Factors of Sustainable Spatial and Cultural Development

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Abstract: Transport and mobility in cities are important factors in the sustainability of the urbanized world. This article investigates one type of intra-urban transport: railway transport and the surrounding areas along the railway, i.e., whether railway corridors can be a factor in the sustainable development of cities in the 21st century. The aim of the article is to determine specific characteristics of railway corridors and identify problems and cultural-historical specifics related to the industrial cultural heritage of the railway. The article examines the importance of an integrated approach to the planning of railway corridors and emphasizes the importance of multicriteria analyses in the decision-making process for corridor areas. As a case study, the city of Osijek is selected because in the past the railway strongly influenced its economical and urban development. Concretization and specification methods applied to the city of Osijek prove that railway corridors can become factors of the sustainable development of cities. The article proves that railway corridors have the potential to transform sustainable urban development because they pass through central, often historical, city areas, they occupy large surfaces and have a long linear spatial continuity. The scientific contribution of the article is the identification and systematization of the contribution of the transformation of railway corridors to the sustainable development of cities.

Keywords: sustainable urban development; transformation of railway corridors; cultural heritage

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1. Introduction

According to United Nations forecasts, in 2050, 68% of the world's population will live in cities, hence the sustainability of urban spatial growth is inextricably linked to the total sustainability of the urbanized world. Reflecting on the development of cities in the 21st century goes beyond planning the functional needs of its inhabitants. Cities are becoming globally relevant to issues of environmental protection and resilience to climate change. The key question is how to achieve the spatial, ecological, economic and social sustainability of cities and, thus, the sustainable development of mankind. The consensus in the scientific and professional references is that there are three basic sustainability indicators (three pillars) in urban planning: economic sustainability, social welfare and environmental sustainability [1,2]. The following features of a sustainable city are emphasized by many authors: intensive land use, higher and/or lower population density, centralization, compactness, diversity of uses, social justice and quality of urban life. The assumption is that the physical form of the city and its spatial structure can be improved to be less harmful to the environment [3]. The concept of a sustainable city is also linked to the concept of a Sustainable Smart City, in which the primary aim is the intelligent and instantaneous exchange of data between city services and citizens, made possible by an intensive and interactive use of information and communication technology (ICT). The purpose of employing ICT technology in a Sustainable Smart City is the flexible use of resources, energy savings, more efficient management and raising the quality of life in cities [4,5].

Due to the intensification of traffic and mobility at the end of the 20th century and the beginning of the 21st century, the approach to traffic planning within cities changed significantly. Transport systems, including rail, cannot be planned only sectorally, separately from the purpose of the surrounding area, but rather multidisciplinary and integrally with other purposes in the city and with special care for the environment [6]. The European Union established a traffic strategy aimed at encouraging the use of railway networks due to the fact that the railway traffic system is spatially, ecologically and economically more sustainable than the road [7,8]. Railway systems are widely acknowledged to be environmentally sustainable and energy-efficient because they are electric-powered, and energy consumption per passenger is even lower than that of other electric-powered vehicles, such as electric cars [9]. Exhaust pollution in railway transport is almost insignificant compared to road transport, so the use of railway significantly contributes to the reduction of pollutants of exhaust gases and particles (carbon (II) oxide, nitrogen and sulfur oxides, and solid particles) [10].

The first railway in Croatia was built in 1860. The construction of railways during the 19th century and the beginning of the 20th century initiated the development of industry and trade, as well as the economic and urban development of Croatian cities. The railway network established during that time, in its spatial form within the cities, still exists today. At the beginning of its construction, the railway was ahead of the growth dynamics of cities, then the growth dynamics of cities and railways was proportional, and after World War II this relationship became disproportionate, which continues today (Figure 1).

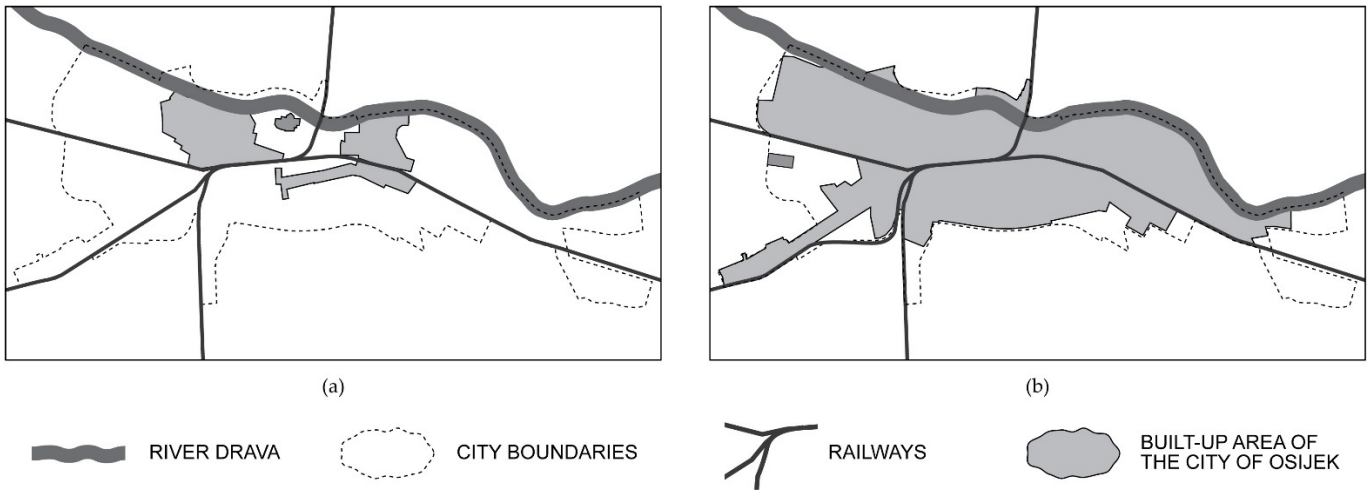

Figure 1. Schematic representation of the spatial relationship between the built-up area of the city of Osijek and the railway: built railways and the built-up area of the city of Osijek, situation in (**a**) 1912; (**b**) 2019.

In many cities, railways, as a rigid inherited infrastructure, represent a physical obstacle to the integration of the city, and while the areas along the railway are not fully built and urbanized, it is necessary to reuse existing inadequate purposes (for example: Zagreb, Rijeka, Osijek, Vinkovci) [11,12]. Although the Republic of Croatia is far from the construction of high-speed trains in terms of the level of economic and traffic development, it is necessary to consider existing railway routes that have been unchanged in Croatian cities for more than a century. Railway corridors should be planned for future spatial and traffic situations when high speed trails are developed, including whether current railway lines will be retained or abandoned, and how to integrate these areas into the city structure in both scenarios.

Corridor planning, the integrated planning of the linear transport system and the surrounding space, as an applicable model of sustainable spatial development of cities is pointed out by various authors [13–15]. The definition of a corridor includes infrastructure, economy, space and environment, and a large number of stakeholders are involved in

the planning and decision-making process [16–18]. Corridors are defined as areas of infrastructural development of the network of passenger transport and the transport of goods [19], and can become an urbanization axis depending on their importance and impact [16].

In addition to the three basic indicators (pillars) of sustainable development, culture is emerging as a fourth indicator [20]. Culture brings "thoughtfulness and openness, and contributes to a world with complementary, pluralized visions of development" [20]. Industrial heritage is a part of cultural identity, and a great part of industrial heritage is railway heritage. The research also analyzes the role and the impact of railway corridors to sustainable cultural development of Croatian cities.

This paper investigates whether the railway transport system that generated the spatial development of Croatian cities in the 19th century and early 20th century can serve, once again, as the carrier of new sustainable urban development of cities in the 21st century. It is our hypothesis that the transformation of existing railway corridors can contribute to the sustainable development of Croatian cities. The article investigates the role of railway corridors in achieving higher densities and activities along linear lines and the role of corridors in the (dis)integration of urban space. The aims of the paper are to determine specific characteristics of railway corridors, identify the problems in areas of railway corridors and determine the most adequate methods to be used in making decisions about the areas of railway corridors.

The structure of this paper is as follows. The first section discusses the characteristics of the corridor as a spatial concept, explains the need for an integrated approach to the planning of railway corridors and advocates the use of multicriteria analysis in decision making. In the second section, in the central part of the article, the spatial and traffic specifics of railway corridors are presented, problems are identified and the specifics of railway cultural heritage are presented. In the final part of the article, the researched specifics of railway corridors are discussed, the set hypotheses are proven on the example of the city of Osijek, and conclusions and guidelines for further research are given.

2. Materials and Methods

Corridors are spaces in which transport, economic and demographic processes are linearly articulated [19] and integrate infrastructure, urbanization and economic development [16]. The primary goals of corridor planning within the city are:

- Sustainable (linear) composition of the city along traffic routes.
- Public (intercity and suburban) transport within the corridor.
- Formation of different purposes along the main traffic routes.
- Residents meet most needs without using a car.

2.1. The Area of Railway Corridors

For the purposes of this article, the area of railway corridors in cities was determined as follows. They were structurally divided into three types of space (Figure 2): space required for infrastructural traffic functioning, space adjacent to abandoned railways due to railway technology advancement or abandoned due to industrial relocation and joint space to rail reached or may be affected by railway influences (spatial, traffic, safety, sensory) [21].

The railway corridors identified in this way indicated a multidisciplinary integrated approach to solving traffic problems in cities. The transport system is redefined as a set of transport infrastructure, mode of transportation and organizational structures designed to provide accessibility and connections between activities in space, including the mutual influences of the transport system and its environment [22]. In other words, the transport system cannot be viewed isolated from the total activities of an area, because traffic not only arises from the need to satisfy these activities, but it also has a reciprocal influence on them [22]. An integrated approach to traffic-spatial planning implies knowledge and insight into several aspects of urban planning: traffic, ecology, social relations, management and institutional organizations.

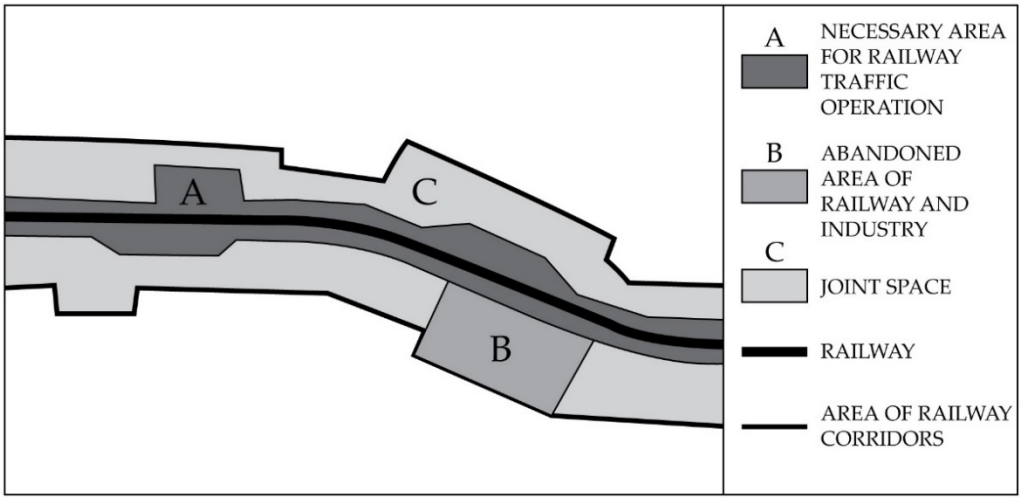

Figure 2. Schematic representation of the determination of the area coverage of railway corridors in cities.

An integrated approach to railway corridor planning includes three key characteristics: comprehensive, continuing and coordinated, which is known in planning practice as "3C" planning. Integral traffic planning is characterized by a complex process that can be divided into five main groups of activities: setting goals and constraints, analyzing the current situation, anticipating future development, evaluating alternative solutions, choosing the best solution and implementation [17].

Arguments in support of the corridor as a planning concept emphasize the integrated planning of the transport system and the surrounding land, as well as the traffic, spatial, institutional and economic level of the corridor. An integrated approach ensures the synergy of transport and other purposes, which provides additional development value.

2.2. Decision-Making Process about the Areas of Railway Corridors

Cost–benefit analysis (CBA) is considered insufficient for decision making on railway corridors. A more modern multidisciplinary approach is required, one that is based on a methodology that views problems integrally. The goals of the decision-making process are first identified on the basis of the present situation, then variant solutions are developed, evaluated and tested, and finally the best option is approved, which is then elaborated economically and in stages. Due to the multidisciplinary nature of railway corridors, it is assessed that contemporary methods are applicable for decision making on the transformation of corridors, which enable structured decision making based on several criteria and selection of the best solution between several variants. These methods are called multicriteria analysis methods (MCA) because they consider both quantitative and qualitative criteria. The multicriteria analysis method is a mathematical technique for analysis and decision making that is appropriate for issues with complex, frequently ambiguous, or uncertain goals. The decision-making method based on multi-territorial analyses is consistent with the contexts of sustainable urban development of urban mobility [23]. The most commonly used methods in making decisions about transport infrastructure in urban areas are AHP and PROMETHEE [24]. When deciding on the transformation potential of railway corridors in cities, scientifically based techniques of multicriteria analysis are considered appropriate for application, since it determines between several alternative options based on numerous qualitative and quantitative criteria. Methods of multicriteria analysis contribute to improving the quality of the decision-making process on urban spaces, ensure objectivity, transparency and the ability to control the decision-making process [24].

Multicriteria decision making should include cultural and historical values of the railway. In the first decades of the 20th century, the approach to protecting cultural heritage, including industrial heritage, was modified to include significance, symbolic and aesthetic

values, as well as new uses of historic urban spaces. In literature, this approach is referred to as a values-centered planning approach [25].

3. Theoretical Background

Transport corridors of land transport (roads, railways) are, or tend to be, as linear as possible. Therefore, the transport corridor is generally defined as a linear transport space in which the transport of people and goods takes place. In a broader sense, it is defined as a unified common space of the transport system and the surrounding land (Figure 2). Corridors are spaces in which transport, economic and demographic processes are linearly articulated and integrate traffic infrastructure, urbanization and economic development [19]. The limitations of the spatial development of the corridor are precisely in its emphasized one-dimensionality (linearity), which can become a spatial and traffic obstacle within the city.

The research procedure focused on the specific spatial and traffic characteristics of railway corridors within Croatian cities. Based on the determined specifics, the basic problems in the areas of railway corridors were identified and the goals that were to be achieved by the transformation of railway corridors were determined.

3.1. Spatial Specifics of Railway Corridors within the Cities

The details of railway corridors spatially follow the basic linear form of the railway transport system as well as the surrounding space [21]:

- The railway has a pronounced linear or radial extension in the structure of the city, from the center to the edges (Figure 3a–d).
- Railway corridors occupy significant areas in cities and occupy city central real estate.
- Stations and railway facilities are located in the central city areas.
- The railway has generated multiple (spatial, traffic, social, mental) barriers to the connection of parts of the city (Figure 1a,b).
- The railway generated the location of industrial plants next to it.
- In the second half of the 20th century and at the beginning of the 21st century, the retention of the entire system of the existing railway in cities was not sustainable from the safety and technological point of view of traffic (Figure 1a,b).
- Changes along the railway, even on a smaller scale, are visible and affect the image of the city.

3.2. Traffic Characteristics of Railway Corridors

The transformation potential of railway corridors is also influenced by the following traffic characteristics of the railway as a transport system:

- Fast, safe, economically and environmentally friendly transport system.
- High-capacity rail transport system.
- Transport system with the possibility of separating freight and passenger traffic and the possibility of building a suburban light rail.
- Land transport system independent of weather conditions.

3.3. Cultural-Historical Specifics

Railway heritage is the legacy of railway industrial culture that includes tracks, locomotives, buildings, amenities, districts and villages [26]. Modernization of the railway infrastructure and dislocation of the railways outside of cities may result in many lines leaving a series of railway buildings (which are architectural and civil engineering elements of great value), with their use already obsolete or without the main function they were intended for [27].

The following are cultural and historical aspects of railway heritage in cities:

- During the 19th century and at the beginning of the 20th century, the railway initiated the location of industrial plants next to it, typically in city centers. Today they

are partially abandoned areas (brownfields) with the potential to be converted into cultural facilities.

– Railway heritage is part of industrial heritage (historical, urban, architectural), with a pronounced memory of the place and linear provision in city structure.

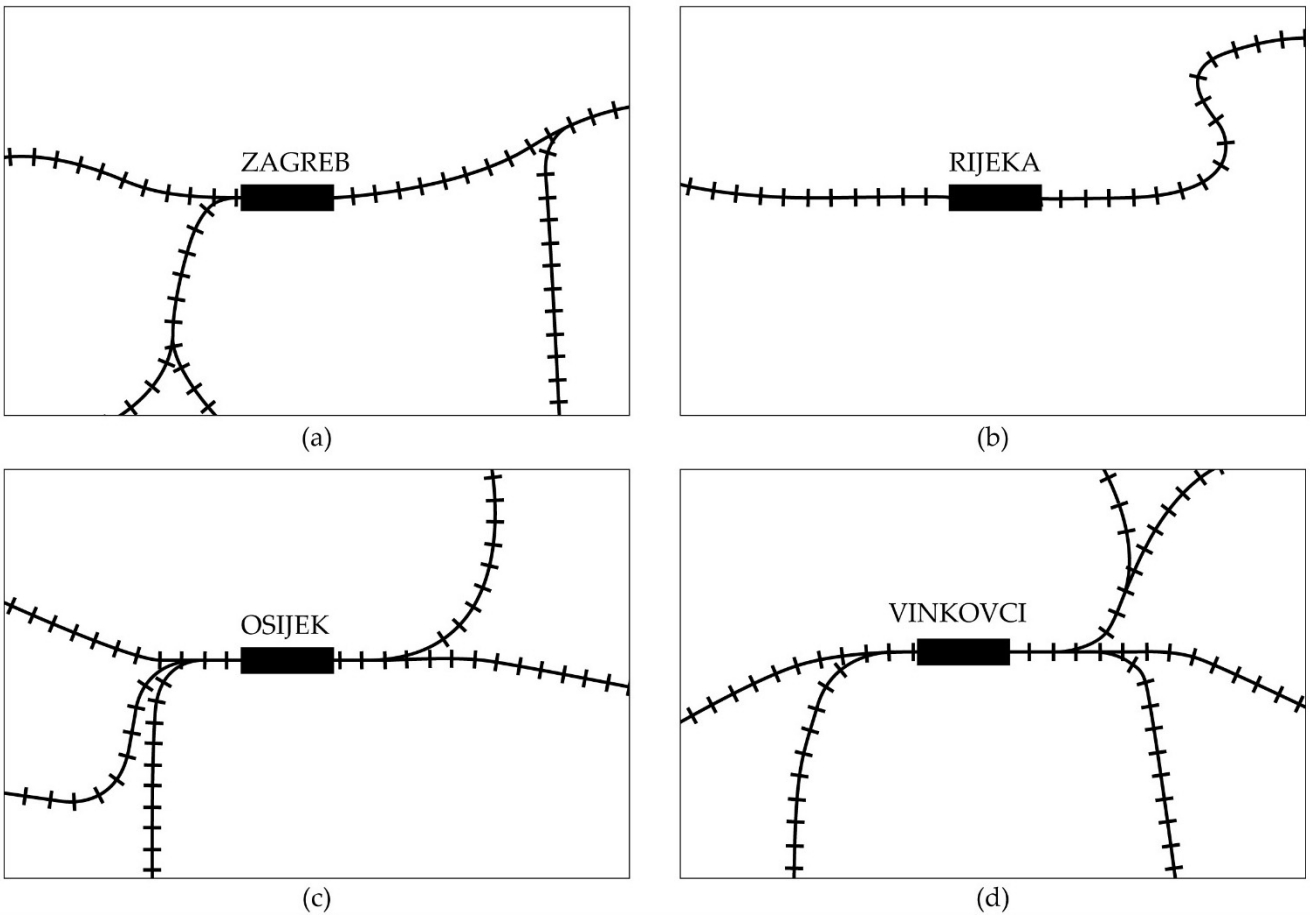

Figure 3. Railway hub scheme: (**a**) Zagreb; (**b**) Rijeka; (**c**) Osijek; (**d**) Vinkovci.

The definition of industrial archeology complements the concept of industrial heritage. It defines industrial archeology as an interdisciplinary method of studying all tangible and intangible traces, documents, objects, structures and stratigraphy, human settlements and natural or urban landscapes created for, or by, the industrial process. It covers periods from prehistory, the pre-industrial period, the era of the industrial revolution to the present day, and uses the history of technology, labor and working techniques in its study. Industrial heritage is part of the national cultural heritage. Industrial heritage includes the tangible and intangible parts, such as technical knowledge, skills, work organization and the social and cultural context of industrial heritage [26]. In the segment of industrial (technical) heritage, railway heritage has great potential as both a movable and immovable cultural good. The specificity of railway heritage is that this heritage is located in railway complexes that occupy larger areas or are located in important locations.

Railway cultural heritage may bring value to the city's cultural and tourism offerings, but it must be maintained sustainably [27], therefore railway heritage must be included in the city's development and urban planning.

The historical and cultural significance of the railway, its tangible and intangible heritage, should be integrated into sustainable urban strategies and plans.

3.4. Identification of Problems within Railway Corridors

Based on the previous research [21] and relevant literature [13–18], two types of problems can be identified in the areas of railway corridors within the cities. The first group of problems is related to technologically obsolete equipment and devices used by the railway as a transport system, such as problems of safe traffic, insufficient financing and maintenance of the railway. The second set of problems is spatial and environmental. Existing railways within Croatian cities usually have negative effects on the urban environment and land development, railways block traffic and divide urban space (Figure 4) and quality of life near the railways is poor [11].

Figure 4. Conflicting linear direction of the railway and the housing estate Sjenjak in Osijek, Croatia.

3.5. Aims of Railway Corridor Transformations

The aims of sustainable railway corridor transformation have been formed based on previous research and relevant literature [2,7,20,21] and can be divided into general and specific aims.

The general aims are economic, socio-cultural and physical-ecological:

- Reconstruction and revitalization of parts of the city according to the principles of spatial, traffic and environmental sustainability.
- Connecting separate parts of the city.
- Solving traffic and safety problems (conflict points).
- Restoration and revitalization of neglected brownfield areas.
- Construction of new public facilities next to railway stations and railway stations that are becoming new urban centers.
- Infrastructural and technological renewal of the railway as a transport system.

The specific objectives of railway corridor transformation are related to the linear railway transport system's uniqueness [28]:

- Ensuring the permeability of railway corridors, in which the railway ceases to be a barrier to the connection of parts of the city, whether it is the relocation of railways to other locations, its burial or lifting on poles.
- The transport corridor becomes the development corridor of the city, the corridor of sustainable urban mobility and the linear urban connector.
- Connection with other city transport systems (road, bicycle).

– Preservation of railway cultural (industrial) heritage.

If the benefits of the transformation of railway corridors are accompanied by appropriate social interaction activities, the quality of life inevitably increases. There are two main contributions to the transformation of railway corridors to improve the city's quality of life:

– Strengthening public transport by intra-city and intercity railways as an environmentally friendly means of transport.
– Annulment or reduction of the influence of the railway as a barrier to the connection of separated parts of the city.

4. Results

The city of Osijek was chosen as an example for a case study since it was characterized by spatial and economic processes as a result of the construction of the railway. Osijek is a railway traffic hub (Figure 3c), the construction of the railway influenced the industrialization and growth of the economy, and today the railway is a barrier to connecting the separated parts of the city.

Determining the Railway Corridors of the City of Osijek

The area of railway corridors was determined by geographic, morphological and planning factors. The area is depicted via cartography (Figure 5a) and tabular data, as previously discussed (Table 1) [21]. The area of the city of Osijek's railway corridors was drawn on a map from the General Urban Plan of Osijek (GUP Osijek), which was adopted in 2006, and had been updated multiple times since.

Table 1. Quantified indicators of Osijek railway corridors (RC) area, 2019.

Total Area of RC	% Coverage of the Area of GUP-a	Total Linear Length of RC	Average Width of RC
486.85 ha	14.93%	16.5 km	350 m

By analyzing the planned purpose of the space within the railway corridors from the GUP of the city of Osijek (Figure 5b), as well as the railway, road (motor) and public urban and suburban traffic, and based on quantified indicators (Table 2) [21], it was possible to conclude that in corridors:

– The most represented areas were residential, mixed and industrial use.
– The least represented were public and social purpose, greenery, sport and recreation and natural lakes.
– The purposes were not uniformly distributed. In the western and central parts of the city, along railway lines, residential and mixed purposes were more prevalent, while only the intended economic purpose was planned in the eastern part.

Table 2. Quantified indicators of the purpose of the space of railway corridors (RC) in accordance with the GUP Osijek, 2019.

Residential Areas	Mixed Purpose Areas	Public and Social Purpose	Industrial Areas	Business Areas
129.50 ha	53.15 ha	3.98 ha	83.72 ha	63.93 ha
26.59% of RC	10.91% of RC	0.81% of RC	17.19% of RC	13.13% of RC
Sport and recreationareas	**Green areas**	**Cemeteries**	**Infrastructure**	**Natural lakes (water areas)**
10.74 ha	11.93 ha	7.15 ha	119.92 ha	2.83 ha
2.21% of RC	2.45% of RC	1.46% of RC	24.67% of RC	0.58% of RC
Total area of Osijek railway corridors: 486.85 ha (100%)				

This data can be a guide for the transformation of corridors. Namely, the lack of public and social use and greenery, sports and recreation were visible. GUP of the city of Osijek

was not planned in the manner of integrated planning of the city and transport system, nor along the railway, where in the immediate vicinity of future railway stations, public and business purpose was planned (city subcenters, railway stations as new urban points, etc.).

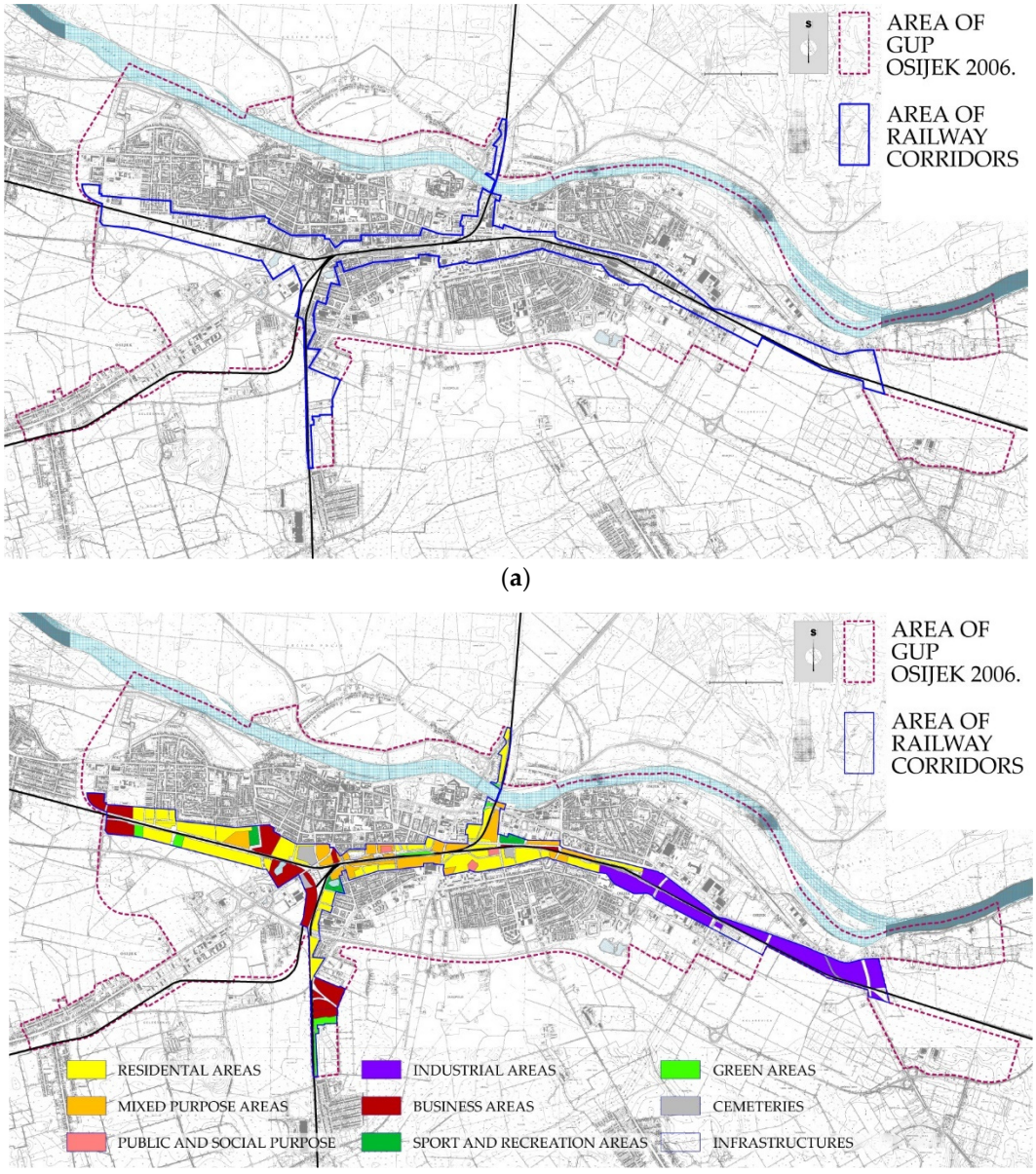

Figure 5. GUP Osijek, 2019: (**a**) area of railway corridors; (**b**) purpose of space of railway corridors.

In the second half of the 19th century and the beginning of the 20th century, the railway was the initiator of industrialization, transport connections and urbanization of Osijek. Railways played an important role in shaping the spatial whole of the city and its urban formation.

Industrial heritage is part of the national cultural heritage. Part of the railway corridor is located in the historic urban ensemble of the city of Osijek, and part in the archaeological area of ancient roman town called Mursa (Figure 6).

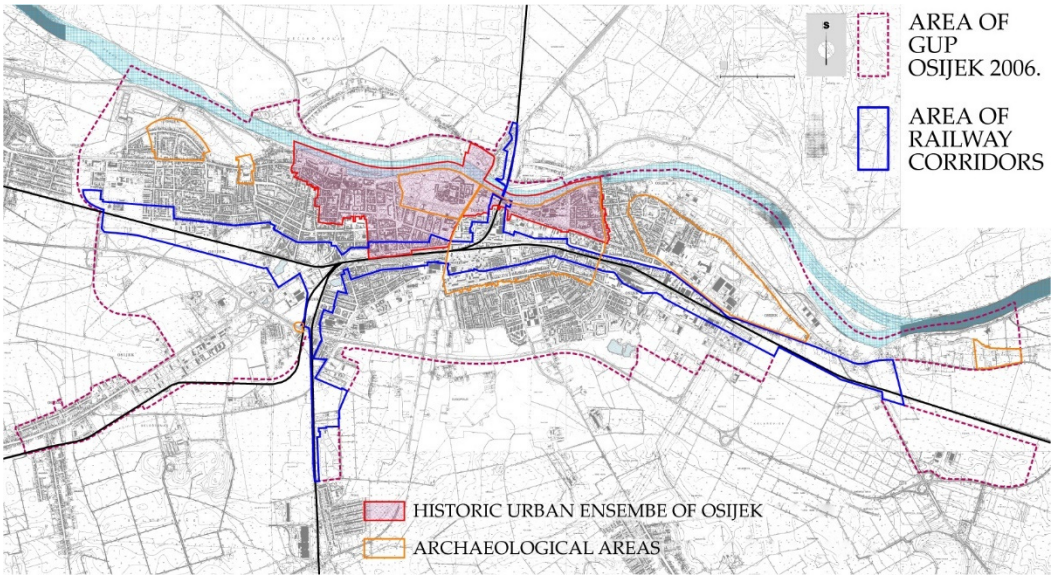

Figure 6. Spatial relationship of protected historical-urban areas and railway corridors, 2021.

The railway heritage in Osijek, regardless of whether it is formally protected or not, includes:

- Station buildings: Gornji grad Station (1870, 1898), Donji grad Station (1872), Dravski most Station (1911), Gutmann Narrow Gauge Railway Station (1908) (Figure 7).
- Water tower (1908).
- Residential buildings.
- Warehouses and workshops.
- Traces of Gutmann Narrow Gauge Railway: material and intangible traces.

Figure 7. Historic Gutmann Narrow Gauge Railway Station today-east façade.

It can be established that the cultural heritage of the railway in Osijek was not fully valorized, in the historical and architectural, as well as in the social and cultural sense. The

railway heritage was not activated for a new (public, social, cultural) purpose nor was it part of the tourist offer.

In conclusion, the railway corridors of the city of Osijek, determined according to the given spatial and planning criteria, occupy 14.93% of the area covered by the GUP of the city of Osijek. The spatial distribution of the corridor in the city structure was radial in five directions that intersect at the former Gonji grad Station. Railway corridors were located in the central and peripheral parts of Osijek. The transformation potential of Osijek's railway corridors arises from the large area they occupy in the structure of the city and from the specifics and characteristics of the space of the railway corridors in the city of Osijek:

- Radial provision of railway corridors in five different directions (Figure 3c).
- Railway corridors located in the city center.
- The areas along the railway, from its construction until today, were not completely urbanized or architecturally completed and consolidated [21].

It was determined that the transformation potential of the railway corridors of the city of Osijek was manifested in:

- Possibilities of establishing public inner-city and suburban public railway transport, which contribute to the reduction of road (motor) traffic and contribute to the mobility of the population.
- Variety of possible sizes, shapes and scales of interventions within the space of railway corridors (individual transformations, transformations of linear strokes and territorial transformations) [21].
- Possibilities of staged urban, traffic and architectural interventions within the railway corridors.
- Possibilities for the Gornji grad Station and railway stations to become new points of urbanity and the formation of the identity of certain parts of the city.
- Creating a new cityscape along the corridor, changing the image of the city along the railway.

5. Discussion

Scientific articles list many areas of Europe and the world where railways have been a factor in the spatial transformation of cities and regions, e.g., Cinque Terre in Italy in history or Chinese Urban Agglomeration nowadays [28,29]. Many scholars focus on the transformation potential of railways, whether the railway is relocated (abandoned lines) or the railway remains, but the spaces along it need to be regenerated and redeveloped to become an integral part of the city. For abandoned railways, the most common transformation strategy has been to transform it into trails for cycling and walking or transform it into parks and public spaces. The most famous project in the United States was the High Line Park, the conversion of abandoned elevated railways into parkways for pedestrian usage. After the success of High Line Park in New York, the missions and visions of Rail-to-Trails Conservancy [30] spread across the World, from Europe to China.

Due to the economic situation in Croatia, it is not realistic to expect the construction of high-speed trains soon. However, it is necessary to start a scientific approach to the research of the potential of the railway corridors in Croatian cities, in order to be ready for the future revitalization of railway traffic. According to the results of theoretical and practical research, the most important contributions of the transformation of railway corridors to the sustainable development of cities can be identified (Table 3).

Table 3 shows that the transformation of railway corridors has the greatest potential in solving environmental problems, increasing the quality of intra-city railway traffic and improving the life in the city in general. The contribution of the transformation of railway corridors is the smallest in relation to solving the social issues of citizens. Table 3 proposes a contemporary approach to understanding the historical significance of the railway industrial heritage and its present-day potential [25].

In the last year, the possibility of forming sub-centers with common functions along railway corridors can be added to these contributions. This potential for polycentric organization of cities services is assessed as an important factor in post-COVID-19 cities [31,32].

Table 3. Contribution of the transformation of railway corridors (RC) to the sustainable development of cities.

Sustainability Indicators (Four Pillars) in Urban Planning	Contribution of the Transformation of RC to the Sustainable Development of Cities
economic sustainability	increase in land prices along RC achieving higher building density and higher population density the railway is a high-capacity intra-urban transport system
environmental sustainability	the railway is an environmentally friendly means of transport residents meet most of their needs without using a car corridor planning implies an integrated approach
social welfare	increasing the quality of life along railway corridors involvement of citizens in decision making on the premises of RC
cultural sustainability	preservation of railway cultural heritage revitalization and reconstruction of brownfield areas presentation of cultural heritage for tourist purposes

The use of interactive matrices is proposed for the further research of complex relations within railway corridors. Matrices can be used to determine the intensity of the relationship between problems and goals, and the correlations between sustainability indicators set out in the Table 3.

Railway corridors as a potential for sustainable development of cities were analyzed theoretically. The spatial framework of the practical research was limited to one city as a case study, the city of Osijek. Hence, it is proposed in further research that the theoretical setting is checked practically in other cities that are also railway hubs (Figure 3a,b,d). It is also proposed as further research to provide a synthetic interpretation of the results for major Croatian cities that are railway hubs (Figure 3a,b,d), resulting in the synthetic interpretation of the results for the main Croatian towns.

The research was also limited to theoretical analysis and practical verification of one type of linear transport system: railways. The results of our research can be further used for analysis of other linear transport systems (road, river) as development corridors of cities. We therefore propose to analyze the potential that other linear transport systems can have in the sustainable development of cities (road, river) in further research.

Further research, especially in post-COVID-19 urbanization (post-COVID-19 cities), should focus on exploring sustainable urban mobility within rail corridors.

6. Conclusions

The railway, as part of the infrastructure system and the urban environment, generates an urban standard, accessibility and quality of public transport, promotes mobility, and affects the safety of road and pedestrian traffic. The peculiarities of the necessary transformation of railway corridors are in the traffic and technical characteristics of the railway as a transport infrastructure, as well as in the consequent processes that the railway has generated in the spatial and economic development of Croatian cities since its construction. As a consequence of the spatial, traffic specifics and characteristics of the railway, the most important possibilities for the transformation of railway corridor areas are those that contribute to the sustainable development of cities. The article identifies the specifics of the corridor space, the most important spatial and traffic issues, and the transformation's goals.

Given the multiple impacts caused by the railway in the area, it is deemed important to apply multicriteria analysis methods when making decisions on railway corridor areas.

The findings provide insights for future research of procedures that will contribute to the sustainable transformation of the space of railway corridors. Further research is pro-

posed to investigate the types, scales and types of urban and architectural transformations that will contribute the most to city sustainability within the space of railway corridors.

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