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THE ANALYSIS OF ACCESSIBILITY OF TOURISM INFRASTRUCTURE IN THE CONTEXT OF X-MINUTES CITIES: A CASE STUDY OF THE CITY OF ZABRZE

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Purpose: The aim of the study is to examine the accessibility of selected attractions and tourist services in Zabrze, in the context of the transformed concept of a x-minute city, and to orient it towards the tourist perspective.
Design/methodology/approach: The goal was achieved through the analysis of urban infrastructure, publicly available maps, and software used to study the range of pedestrian traffic.
Findings: The potential of Zabrze to become an x-minute tourist city was identified. All necessary services are within a 15-minute reach, similar to half of the identified tourist attractions.
Research limitations/implications: From the perspective of tourism managers, it would be interesting to conduct an analysis of the surroundings of tourist attractions. This would allow for the identification of what tourist services are available within the x-minute radius of the facility. Research on the walkability of the area can also play a significant role.
Originality/value: Looking at the idea of an x-minute city from a tourist's perspective is interesting. This viewpoint can be a starting point for creating and developing tourist-friendly cities.

Keywords: Tourist attractions, Guido mine, Tourist infrastructure.

Category of the paper: Case study.

1. Introduction

In recent literature, increasing attention is given to the concept of x-minute cities as an approach to spatial planning (Lu, Diab, 2023). This is because cities worldwide have undergone significant transformations in recent decades, becoming more complex and dynamic places where people live, work, and spend their leisure time. In public discourse, considerable focus is placed on sustainable urban development, particularly in terms of environmental protection, the necessity of limiting human impact on the environment, expanding public

transportation, urban modernization, and energy efficiency (Augustyn, 2023). The need for an integrated approach to urban planning has also been a topic of political discussion, as seen in the informal ministerial meeting in Leipzig in the early 21st century, resulting in the Leipzig Charter on Sustainable European Cities (2007).

One theory associated with sustainable urban development proposes restricting car access to city centers in favor of pedestrian traffic (Abdelfattah et al., 2022). This is manifested in the concept of "clean air zones", where restrictions may include technical aspects of vehicles and the establishment of intermodal hubs to promote public transportation.

Implementing comprehensive environmental protection measures and thoughtful policies for sustainable development, along with a cautious approach to limiting car traffic, holds particular significance in tourist cities. Nowacki (2015) demonstrated in his research that 23.05% of individuals choose not to visit museums and paramuseal institutions due to inconvenient (difficult) access (a structural barrier). Therefore, it is important to monitor the accessibility of key services not only for residents but also for tourists. This is especially relevant for those who, being aware of the changing world and the need to care for the natural environment, opt for public transportation and walking.

This paper attempts to adapt the concept of the 15-minute city, originally focused on residents, to tourists visiting the city. The study area was the city of Zabrze, with a specific emphasis on tourist attractions, particularly those related to industrial heritage. The article aims to explore the accessibility of selected tourist attractions and services in Zabrze, within the context of the transformed concept of the 15-minute city, with a focus on the tourist perspective. To achieve this goal, the study addressed the following research questions:

1. Are the key industrial heritage tourism sites accessible on foot for a tourist arriving in the city using public transportation?
2. What tourist infrastructure is available within the x-minute radius for a tourist arriving in the city using public transportation.

The achievement of the goal began with a literature review, considering the concept of the x-minute city and identifying services crucial from the tourist's perspective.

2. Theoretical background

The concept of the 15-minute city is not new (Pozoukidou, Chatziyiannaki, 2021). It is an idea based on chrono-urbanism as the foundation for a city creation model (Murgante et al., 2023). Essentially, it posits that residents should have access to urban functions (housing, healthcare, education, entertainment) crucial for improving their quality of life through active means of transportation, such as walking or cycling (Moreno et al., 2021). In its fundamental premise, it pertains to designing urban spaces in a way that essential services, amenities,

and intentional places are within a 15-minute walk or bike ride from people's residences. This concept implies a compact and well-connected urban structure where residents have easy access to their daily needs without the necessity for long commutes (Abdelfattah et al., 2022). According to Murgante et al. (2023), the 15-minute city model is based on four criteria: density, diversity, proximity, and digitization. The density criterion pertains to the optimal number of residents aimed at reducing pollution and providing services in a given area. Providing services is also associated with the proximity criterion, which involves the decentralization of services and their distribution at the neighborhood level. This especially applies to fundamental aspects of life such as housing, employment, healthcare, education, entertainment, and commerce. Digitization, on the other hand, is linked to the use of ICT (Information and Communication Technology) to optimize service delivery.

In addition to the availability of specific services, researchers emphasize the importance of the location of services (Ferrer-Ortiz et al., 2022). This is related to the concept of "Walkability", which comprises features of a place that determine whether a person is willing to engage in pedestrian activities (Southworth, 1997).

In the literature, numerous examples of services that should be considered when assessing the level and attractiveness of a city in the context of the 15-minute concept can be found. Literature analysis has identified fifteen different categories of services. These include attractions, commerce, culture, education, employment, entertainment, finance, gastronomy, healthcare, post office, public administration, public transport, recreation and sports (Graells-Garrido et al., 2021; Gaxiola-Beltrán et al., 2021; Pozoukidou, Chatziyiannaki, 2021; Weng et al., 2019; Knap et al., 2023).

The mentioned service categories focus on the needs of city residents and may not always align with the needs of tourists. Meeting the needs of tourists requires essential tourist infrastructure, considered crucial for tourism growth and destination competitiveness (Wall, 2022). A similar analysis was conducted to identify service categories necessary to meet the needs of tourists. The recognized categories include attractions, car services, commerce, culture, finance, gastronomy, healthcare, petrol stations, public transport, recreation, sports, and tourist information (Jasion, 2023, Szpilko, Ziółkowski, 2010; Widz, 2019; Wiktorówna et al., 2019; Smith, 1994; Crouch, Ritchie, 2000).

Taking into account significant services in the context of the 15-minute city and tourist needs, numerous common features have been observed, which can be used to assess the accessibility of tourist infrastructure (Fig. 1.)

Category of services to satisfy tourist needs	Category of services for both categories	Category of services in the 15-minute city concept
Accommodation	Commerce	Attractions
Car services	Culture	Education
Petrol stations	Finance	Employment
Tourist information	Gastronomy	Entertainment
	Healthcare	Post office
	Public transport	Public administration
	Recreation	
	Sports	

Figure 1. Category of services to satisfy tourist needs and in the 15-minute city concept.
Source: own work.

Due to the focus on pedestrian movement, identified services related to car servicing and petrol stations were excluded from further analysis.

In the literature, it is also noted that the concept of the 15-minute city is merely a starting point for analyzing urban spaces. This is confirmed by Jasion (2023), who approached the concept of the 15-minute city by using a fan (tourist) visiting a stadium as a reference point for assessing the accessibility of key tourist infrastructure.

More commonly, cities are referred to as x-minute cities (Logan et al., 2022), where x is a variable calculated based on selected criteria (Duany, Steuteville, 2021). Examples include 20-minute neighborhoods in Melbourne and Portland, the 15-minute city in Paris, or Utrecht's ambition to become a 10-minute city. Therefore, the analysis did not focus solely on the 15-minute range but also considered other time frames.

3. Methods

The subject of the analysis was the city of Zabrze. The research process began with identifying managed tourist attractions related to the industrial heritage of Zabrze. For this purpose, a geospatial analysis was conducted, taking into account Google Maps, the website of the Zabrze City Office, the website of the Technical Monuments of the Silesian Voivodeship, the TripAdvisor application, and the Google search engine. The identified attractions included Maciej Shaft, Guido Mine, City Museum, Water Tower, Coal Mine Museum, and three locations of Queen Luise Adit. Unmanaged monuments, such as Steel House or the Zandka and Borsigwerk post-industrial settlements, were not included in the analysis.

In the next stage of the research, a literature analysis was conducted to establish the essential 10 categories of services affecting residents and tourists. Subsequently, the locations of selected services and attractions were mapped. For this purpose, the QGIS application with the installed QuickMapServices and ORS Tools plugins was utilized. The railway and bus stations were then marked as the starting points to generate isochrones with a range of 5 to 45 minutes for a person traveling on foot. This allowed for addressing the research questions and achieving the research goal, which was to examine the accessibility of selected tourist attractions and services in Zabrze, within the context of the transformed concept of the 15-minute city, oriented towards the perspective of tourists.

4. Results

Firstly, the industrial heritage tourist attractions were plotted on the map, and isochrones with a range from 5 to 45 minutes were delineated from the main railway and bus station. In the studied area, it can be observed that out of eight objects, seven are within the 45-minute range. The only inaccessible object is Maciej Shaft. Within a 5-minute range, the City Museum is accessible. In the 10-minute range, there are two industrial heritage tourism objects, namely Queen Luise Adit – Port and Coal Mine Museum. In the 20-minute range, there are Water Tower and Queen Luise Adit – Park, and within the 25-minute range, there are Guido Mine and Queen Luise Adit – Carnall. The map is presented in Fig. 2.

The analysis of the surroundings of attractions revealed that most objects are located along the main arteries of the city. Tourist attractions are also well-connected. The furthest distance from a public transportation stop to an attraction is in the case of Maciej Shaft, where one would need to walk approximately 680 meters, estimated to take about 7 minutes. Additional analysis showed that a tourist traveling from the railway station (PKP) to Maciej Shaft by public transport would need at least 29 minutes (source: https://rj.metropoliaztm.pl/). These observations prompted the author to limit the analysis area to a 25-minute radius from the station.

During the conducted research, an analysis of the accessibility of basic tourist infrastructure for a tourist visiting the city using public transportation was also carried out. The subject of the study was the identified categories of services.

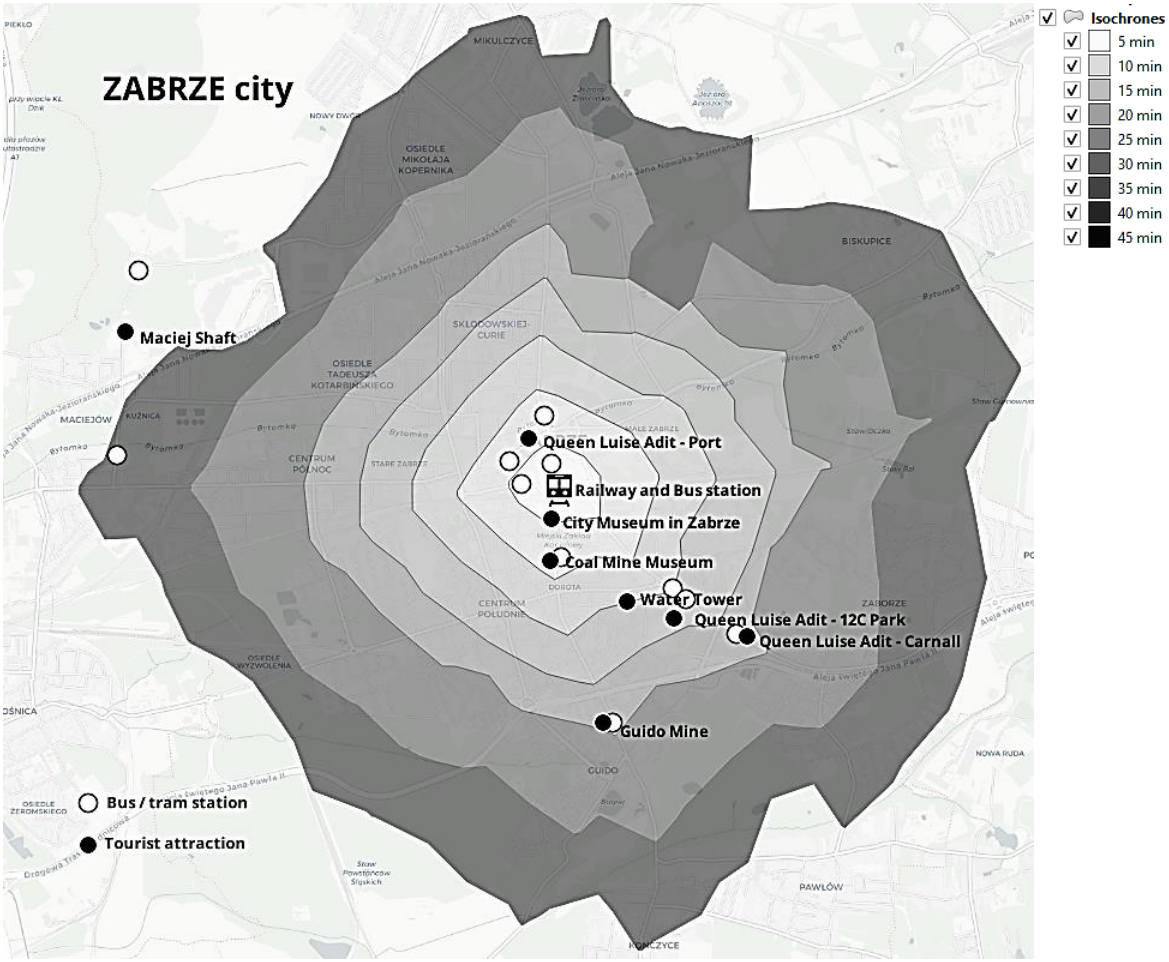

Figure 2. Tourist attractions of Zabrze's industrial heritage and pedestrian reach displayed using isochrones, measured from the central City Station.

Source: own work.

In the accommodation category, the analysis revealed that there are 7 standardized accommodation facilities in the studied area. Additionally, there are also private accommodation facilities that were not considered. For the gastronomy category, 43 places were identified. A significant diversity of gastronomic facilities was observed. In the studied area, there are both restaurants and fast-food bars. It is worth noting the relatively high concentration of establishments in the eastern part of the surveyed area, which may be attributed to the lower level of industrialization in that part of the city.

In the category of sports-related services, the decision was made to divide the infrastructure into facilities offering services related to providing spaces for sports activities and services related to watching sports competitions. In the 25-minute area, 10 services for active tourists and 3 for passive tourists were identified.

Regarding recreation available in the studied area, there are four zones. These include city parks and one managed facility that is part of an industrial heritage attraction – Park 12C. A significant portion of the infrastructure consists of commercial establishments. It should be noted that, apart from shops near tourist attractions, there are no shops exclusively for visitors.

The entire offer is primarily oriented towards residents. The analysis was limited to large retail stores for map clarity, and 11 such stores were identified.

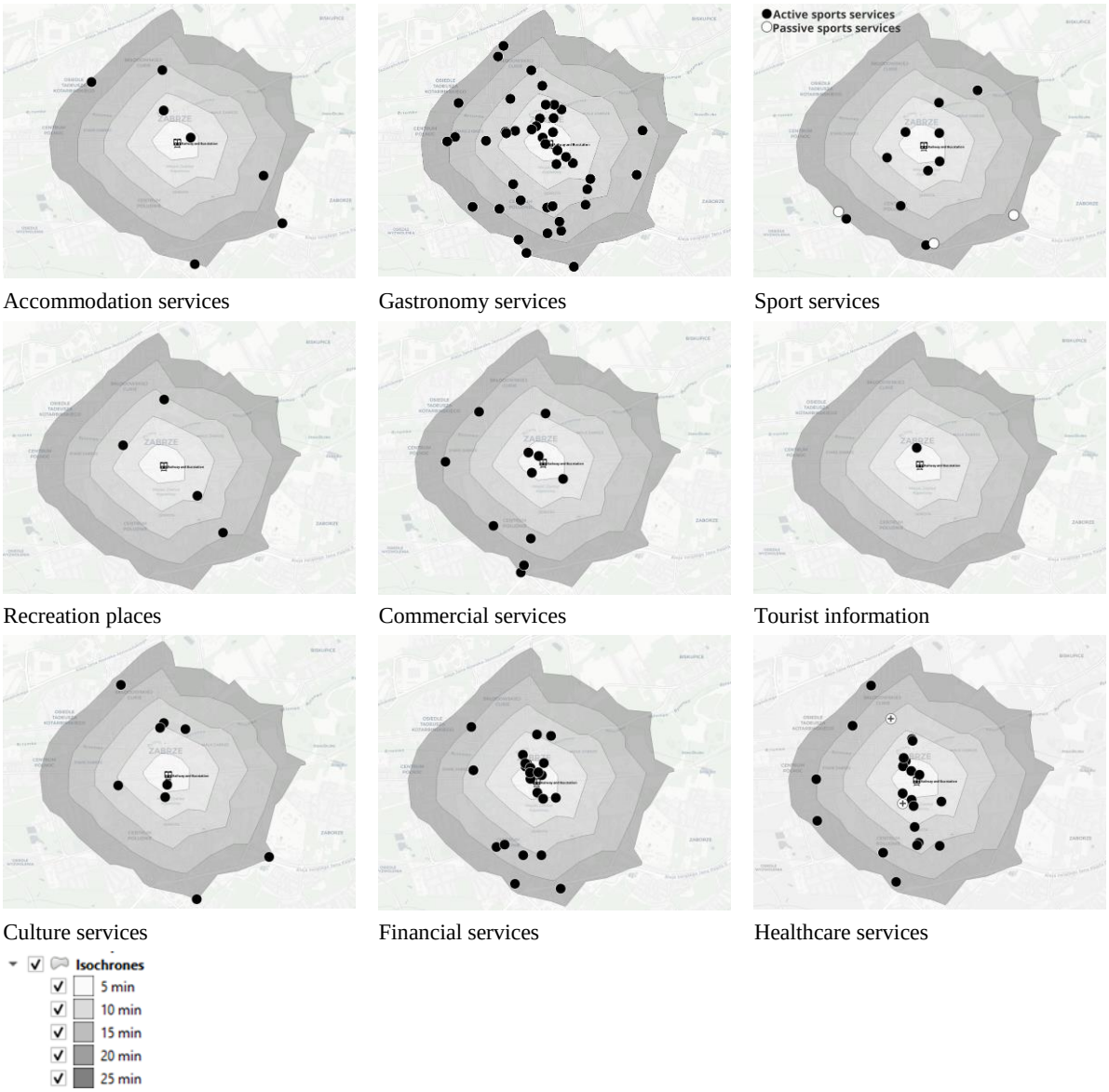

Figure 3. Identified services categorized.

Source: own work.

In the analyzed area, there is only one tourist information point. However, it is good practice for all tourist facilities to provide support to tourists as much as possible. Another aspect examined was cultural facilities. Among the 9 identified facilities are a theater, cinemas, music venues, and cultural centers. As many as 7 of them are accessible within a 15-minute distance from the city center. Regarding financial services, both banking institutions and ATMs were taken into account. 23 units were identified, with most of them located in the city center.

The last examined aspect was access to healthcare services. A total of 23 healthcare facilities were identified, including 21 pharmacies and two hospitals.

The conducted analysis allowed answering the research questions. It was observed that although the main industrial heritage tourist attractions are concentrated in the central part of the city, only four out of eight attractions are accessible within 15 minutes from the central station. The next 3 are within the 25-minute range, and one is beyond the 45-minute range.

Examining the accessibility of infrastructure beyond recreational aspects, all identified services are available within a 5-minute range. As the isochrone range expands, there is an increasing variety of services.

These observations indicate a significant potential for the city of Zabrze to become an x-minute tourist city. However, determining the extent to which it is one requires further, more detailed research.

5. Discussion and summary

While the concept of the 15-minute city has been recognized as a fundamental tool in designing healthier and more sustainable urban spaces (Allam et al., 2022), it is seldom applied to existing cities. More often, though not always consciously, the ideas embedded in this concept are utilized to redesign already existing cities, especially through the revitalization of public spaces. An example is the demolition of a road to expose the Cheonggyecheon River in Seoul (Kim, Jung, 2019). This intervention, primarily aimed at improving environmental quality, also enhanced the public space, making it more appealing to residents. Similar actions are taken by the authorities in Utrecht, transforming a road in the city center into a canal (Stolk, 2022), simultaneously restoring the historical character of the area.

Simply examining whether services are available for residents or, as in the case of this analysis, for tourists, is not sufficient to classify a city as a 15-minute city. The crucial factor is whether a tourist decides to cover the required distance on foot. In this context, the concept of walkability is also significant. Although this term is primarily associated with city planning and the public health field, it can have considerable importance in other research areas as well. According to Spoon (2005), walkability at its basic level simply means an area that promotes walking.

There are numerous variables that determine whether a given area is pedestrian-friendly (Southworth, 1997; Shriver, 1997), as well as methods and approaches for measuring pedestrian-friendliness (Manzolli et al., 2021; Taleai, Amiri, 2017). Distefano et al. (2023), in their research, list 25 factors conducive to walkability. These include, among others, the quality of pedestrian pathways, the sense of safety, travel comfort, and aesthetic perception of the surroundings. Generally, the criteria for assessing pedestrian-friendliness encompass usability, safety, comfort, and attractiveness (Abdelfattah et al., 2022).

In conclusion, despite the research indicating that essential services for tourists are available within a 15-minute radius, the decision of whether a tourist will choose pedestrian activities requires further investigation into walkability. Undoubtedly, the local government plays a significant role in shaping the city's image. Whether the city will strive to be recognized as an x-minute city or not depends on its capabilities and willingness.

Looking at the concept of the x-minute city from a tourist's perspective and their needs can serve as a starting point for creating and developing tourist cities, especially considering that significant service infrastructure related to tourism largely overlaps with the essential infrastructure associated with the concept of 15-minute cities. Actions taken to improve the accessibility of services in one group would contribute to improving the accessibility of services in the other group.

Based on the conducted analysis, new research areas have also been identified. Undoubtedly, managers in the tourism industry would find it interesting to conduct an analysis of the surroundings of tourist attractions and examine what tourist services are available within the x-minute range from the object. Research on the walkability of the area could also play a significant role. As mentioned earlier, the availability of a service within walking distance does not guarantee that pedestrians will choose to walk. Identifying weaknesses and opportunities could certainly influence the improvement of walkability and bring the city closer to the principles of x-minute cities.

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