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Małgorzata Krajewska[1], Kinga Szopińska[2], Ewa Siemińska[3], Ivo Kostov[4]

REVITALIZATION AS AN ACTION IN SPACE – CASE STUDY OF LARGE CITIES IN POLAND AND BULGARIA

Abstract: The main goal of revitalization is to improve the spatial condition of the city, which improves its image and increases the value of space. Any revitalization process requires the acquisition of geolocation data. This data can help visualize the spatial changes that were the goal of revitalization efforts. Acquiring such data is not always easy and requires the use of multiple sources of GIS information. The purpose of this paper is a spatial presentation of the analyzed areas with their identification before and after the revitalization process using spatial data made available in an open resource on Google Maps map application. Data is presented for two cities: Bydgoszcz (Poland), Varna (Bulgaria), characterized by a similar population. The paper uses current and archival orthophotos of the revitalized areas, Street View panoramic views from street level and own photographic documentation. The results of the analysis show that regardless of the stage of revitalization, the use of spatial data is essential in the designation of a degraded area, as well as later in its design, monitoring and management.

Keywords: revitalization, public space, open-source data, Poland, Bulgaria

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[1] Bydgoszcz University of Science and Technology, Faculty of Civil and Environmental Engineering and Architecture, Department of Geodesy, Spatial Management and Real Estate, Bydgoszcz, Poland, ORCID ID: https://orcid.org/0000-0002-8541-2295, email: m.krajewska@pbs.edu.pl

[2] Bydgoszcz University of Science and Technology, Faculty of Civil and Environmental Engineering and Architecture, Department of Geodesy, Spatial Management and Real Estate, Bydgoszcz, Poland, ORCID ID: https://orcid.org/0000-0002-2702-936X, email: k.szopinska@pbs.edu.pl, corresponding author

[3] Nicolaus Copernicus University in Toruń, Faculty of Economic Sciences and Management, Department of Investment and Real Estate, Toruń, Poland, ORCID ID: https://orcid.org/0000-0002-8885-0338, email: ewahsiem@umk.pl

[4] University of Economics – Varna, Faculty of Economics, Department of Business, Investment, Real Estate, Varna, Bulgaria, ORCID ID: https://orcid.org/0000-0001-5623-471X, email: i.kostov@ue-varna.bg

Introduction

Revitalization is an interdisciplinary concept, the definition of which has been undertaken by many researchers, including (Belniak, 2009; Bryx, 2012; Leary & McCarty, 2013; Bieda, 2017; Palicki, 2020; Palicki & Rącka 2016). In addition, legal regulations on revitalization can be found in the Law on Revitalization of October 9, 2015, defining revitalization as "the process of bringing degraded areas out of crisis, carried out in a comprehensive manner, through integrated actions for the benefit of the local community, space and economy, concentrated territorially, carried out by revitalization stakeholders on the basis of a municipal revitalization program".

The comprehensive and integrated nature of revitalization influences the renewal of degraded areas in various aspects of the city, including social, spatial and environmental (Kobylarczyk et al., 2020). These areas not infrequently have great development potential through their great historical or architectural value or convenient location. Revitalization is an opportunity to revitalize these places and restore them to their former functions or adapt them to perform new ones. Nowadays, when human interference with the environment is increasing, e.g. through massive cutting down of trees for the sake of new developments, the revitalization process is even more important. It influences an increase in the quality of existing urban space, resulting in an increase in the urban and aesthetic qualities of the city. Revitalization is mainly associated with the implementation of brownfield projects, i.e. using already existing real estate resources, whose utility functions are adapted to the current needs of various groups of urban space stakeholders. Thus, the concept of revitalization in urban space is in line with the current policy of the European Union regarding the need to implement the idea of urban ecology and sustainable development. It is important that such projects directly affect not only the improvement of environmental quality, but also promote the improvement of the quality of life of the community (European Green Deal, 2019). In addition, the city becomes more attractive to investors and tourists and helps maintain social balance (Bieda, 2017).

Revitalization thus has several goals, as described by Domański (2000) and Palicki (2020), among others. One is economic, related to revitalizing the economy by promoting entrepreneurship, investing in tourism and commercialization. Another is social, related to increasing the quality of life of residents and developing public services. Revitalization, moreover, promotes the reduction of divisions among the population, the prevention of pathologies, and stimulates in the community a sense of belonging and a feeling of security. The environmental goal of revitalization is related to the elimination of the negative effects of former industrial sites and increasing the amount of green areas in the city. These activities contribute to improving the environment as a result of reducing air and noise emissions (Kwiecień & Szopińska, 2013). As indicated by Jaszczak et al. (2021) the cultural and historical sphere is given the least importance in revitalization. Undoubtedly, however, the overriding goal of revitalization is to improve the spatial condition of the city, influencing the proper shaping of the urban fabric and reducing degraded areas, which improves the image of the city and increases the value of space (Bieda, 2017). The realization of the above goals involves urban-architectural and

technical measures, as noted by Lorens (2006). All of the above goals are interrelated and have an integral effect on the positive outcome of the revitalization process. Thus, in order to restore the development capacity of a degraded area or region, it is necessary to carry out revitalization in various spheres (Kopeć, 2011). The success of the revitalization process is also associated with the undertaking of comprehensive planning and design (defining the structure of the project, developing an action plan and strategy), organizational and financial (defining the organizational structure of the project and providing financial resources), and promotional and informational (defining the needs and goals through cooperation with the local community). Entities influencing the development of the revitalization program should be guided by the needs of the local community (Palicki, 2020). In addition, their task is to interest the largest possible group of people outside the revitalized area as well. Agglomeration renewal is not only an enrichment of the urban fabric, but also actively influences economic development (Bryx, 2012; Hajduga, 2020).

What's more, revitalization influences the current and future life of the local community, which ultimately increases the competitiveness of the city. A perfect example of the above phenomenon is Bydgoszcz (a city in the northern part of Poland), where numerous revitalization projects have been undertaken in recent years (Kufel, 2022) and Varna (a city in the eastern part of Bulgaria, located on the Black Sea) – cities with a similar population. Therefore, the purpose of this work is a spatial presentation of the analyzed areas with their identification before and after the revitalization process using spatial data made available in an open resource on Google Maps map application. All revitalization processes involve activities in space and their management requires the acquisition of geolocation data. This data can help visualize the spatial changes that were the target of revitalization activities. Acquiring such data is not always easy and requires the use of many sources of GIS information, which are successively made available to the public on Internet portals. The study used geospatial data for the city of Bydgoszcz and Varna in the open resource, current and archival orthophotos of revitalized areas, Street View panoramic views from street level and own photographic documentation. In addition, Geomedia Professional software was used for data visualization.

Revitalization process model

The basis for effective management of revitalization processes is the revitalization model (Palicki, 2020). It is a general scheme of conduct and a set of tools dedicated to authorized persons. It helps to identify the participants and strategies for action. It provides an opportunity to look at activities at each phase of the revitalization process and provides an important underpinning for the development of revitalization programs. The success of revitalization requires solving many difficulties on legal, organizational and financial grounds (Janas & Jarczewski, 2010).

In the literature, revitalization has been divided into several major stages. Ptaszycka-Jackowska (2000) distinguishes between six key stages of proceeding through the revitalization process, including: designating a degraded area, preparing a development

vision, creating an action plan, securing sources of funding, implementing a project, and operating, monitoring and evaluating the program. According to Janas and Jarczewski (2010), the revitalization process should be divided into five stages (initiating stage, scoping stage, planning stage, implementation stage and finalization stage).

Regardless of the methodological approach, in the first stage of revitalization, the problem of urban degradation and deprivation is noticed, which is the main need for revitalization of the area. The originator of this process can be the city government, local associations, media and private companies, as well as residents. Residents are the first to notice the need to repair certain areas that they interact with on a daily basis. The final verification and assessment of needs rests with the city government, which can use a number of research tools. In this regard, an urban audit performed in multiple iterations works well, which, by analyzing social and urban problems, will indicate directions for possible changes in a given area. In revitalization, survey research can be successfully used, as confirmed by Palicki (2020), among others, in his research. A very important element of the revitalization process is the coherence of the project obtained, among other things, through agreement among all stakeholders on the desire to achieve benefits and a common goal. Before the revitalization area is selected, residents should be informed about the planned activities. The media, the Public Information Bulletin and other means of communication serve this purpose. City authorities must also communicate with councilors and local government officials, who have a decision-making voice in connection with the adoption of a resolution to proceed with revitalization. This is a formal document that concludes the initiating phase of the revitalization process. The draft resolution is drawn up by the mayor and includes, among other things, the identification of crisis areas, a description of the reasons for undertaking revitalization activities, the scope and timing of revitalization program activities, the scope of community participation in decision-making, the method of appointing a social revitalization council and the rules for organizing activities by the project team, including the appointment of a revitalization operator.

The second stage of the revitalization process is to determine the scope of revitalization, i.e. the areas that will be covered by the revitalization program. After the resolution is adopted, a project team is appointed to identify the area and prepare the revitalization program. It acts as a revitalization operator who oversees the entire process. The operator can act within the office or through an external company. The project team should be composed of people holding different positions, representing different fields (i.e.: planners, architects, landscape architects, economists, builders, surveyors, scientists specializing in revitalization). The first task of the project team is to identify conditions and opportunities for revitalization programs. Due to financial constraints, the team must decide which areas will be included in the revitalization process first. Next, the possibilities of the crisis areas are identified, as well as the identified barriers and possible risks occurring during project implementation. The results of surveys of residents' attitudes and expectations will be helpful in assessing revitalization opportunities and conditions. All this information, along with the rationale, should be included in one document, which is submitted for pricing. After the comments

are submitted, the project team makes the appropriate corrections. The final decision on the selection and order of the areas to be subjected to the revitalization program rests with the mayor. The selection of areas for revitalization is followed by work on refreshing the stage of conditions and directions of spatial development and local development plans, which are part of the revitalization area.

Stage three (the planning stage) includes a complex of activities that are to result in a local revitalization program. The first activity is a detailed analysis of the causes of degradation and characterization of crisis phenomena. The next activity is the identification of partners and stakeholders. After conducting an urban audit, identifying the causes of degradation, while having the result of a survey of attitudes and expectations of residents, it is possible to formulate revitalization goals and priorities. At this time, the project team again activates the local community enabling them to submit a project proposal. During these activities it is necessary to identify sources of funding for the project. The next step is the establishment of a community council, representing the citizens of the city, taking an active role in advising the project team. Then the evaluation, prioritization and selection of projects from among the proposals takes place. During the evaluation, the following are taken into account: the existing barriers to the implementation of the projects, their compatibility with the goals set earlier, the financial and organizational possibilities and the originality of the procedure. Once the projects are selected, it remains to combine them and create a methodical program, i.e. a document that contains a hierarchical list of tasks and projects with accepted goals grouped in such a way that their implementation carries the lowest possible cost. In addition, the program must identify various options for action and alternatives.

The penultimate stage of the revitalization process is program implementation. At this stage, work is also underway on a system for monitoring the progress of the adopted revitalization program. Once the financial capital is in place, work of a preparatory nature begins (including tenders, obtaining permits, concluding contracts, preparing land and developing infrastructure for a given investment project). In the finalization stage, the settlement of obligations between partners and the collection of documentation of the revitalization program takes place. This stage should also consider measures to sustain the current state of the revitalized areas. The final activity is the enactment of the completion of the revitalization program.

Study area

Revitalization projects are presented for two large cities, located in Poland and Bulgaria. Cities with similar populations in 2021 were adopted for analysis. The first is the city of Bydgoszcz, located in the northern part of Poland with a population of over 340,000, and the second is Varna, located in the eastern part of Bulgaria with a population of over 390,000.

Bydgoszcz is the capital of the Kuyavian-Pomeranian region. It is one of the largest cities in Poland. It is an industrial and commercial and service center. On the outskirts of the city there is one of the largest industrial and technological parks in Poland. The city's

economic development is also influenced by its favorable location with access to road (expressways S5, S10), rail and water transport. The city is located on two rivers. On the eastern side is a bend of the Vistula River, while the Brda cuts through Bydgoszcz along its entire length from the east, through the entire center, to the western areas. The Brda River significantly influences the development of the city, especially in the area of Bydgoszcz's Old Town, including Młyńska Island (Fig. 1a). For years, the riverfront areas have been revitalized, which has a direct impact on the good image of the city and its attractiveness. Riparian areas are used not only for recreation, but also for cultural events (e.g. the Bydgoszcz Water Festival "Ster na Bydgoszcz", the summer concert series "Rzeka Muzyki") and sports (e.g. the Bydgoszcz Thriathlon). The city also has other watercourses and artificial lagoons, i.e. Regatta Course, Smukalski Lagoon, Bydgoszcz Canal. The architecture of Bydgoszcz mainly represents 18th and 19th century buildings. The city is an important cultural and musical center, attracting tourists not only from Poland, but also from outside the country. The city is surrounded by forests on all sides. It also has numerous green areas (parks, squares and greens). Bydgoszcz is among the top cities in Poland with the largest number and area of parks. The size is estimated at 874 hectares. Among the largest areas is the Forest Park of Culture and Recreation called Myślęcinek. Besides it, there are 30 other parks, municipal and state forests.

Fig. 1. Location of the analyzed areas: a) Bydgoszcz, b) Varna
Source: own work

Varna – The First Civilization in Europe and the Oldest Gold in the World. Varna is the third-largest city in Bulgaria and the largest city and seaside resort on the Bulgarian Black Sea Coast and in the Northern Bulgaria Region (Fig. 1b). Situated strategically in the Gulf of Varna. Varna is an important centre for business, transportation, education, tourism, culture, entertainment and healthcare. Varna has some of the finest and oldest museums in Bulgaria. The city it developed as a festival centre of international standing. Varna is the administrative centre for Varna District. The city is referred to as the maritime capital of Bulgaria and has the headquarters of the Bulgarian Navy and merchant marine. In 2008,

Varna was designated as the seat of the Black Sea Euroregion by the Council of Europe. In 2014, Varna was awarded the title of European Youth Capital 2017. The city occupies 238 km2. The city has been surrounded by vineyards, orchards, and forests. Commercial shipping facilities are being relocated inland into the lakes and canals, while the bay remains a recreation area. All the waterfront of Varna is parkland. The urban area has in excess of 20 km of sand beaches and abounds in thermal mineral water sources. The city lies 470 km north-east of Sofia. Varna attracts 2 to 3 million tourists a year, as the holidaymakers may reach over 200,000 daily during the high season. Thus, there are about 600,000 people in the city in summer, and sometimes at peak moments in July and August, even around 1,000,000 people.

Research methodology and data

When conducting any activity in space, an important aspect is the use of GIS data. Places of interest are cartographically mapped in geographic space and are clearly related to various aspects of human life. According to (Liu et al., 2020; Wu et al., 2021; Milias & Psyllidis, 2021), Points of Interest (POI) are available from several online sources, for example, OpenStreetMap and Google Maps (map applications). The geographic application of GIS tools and POIs has also been extensively discussed by (Bełej, 2021; Lu et al., 2020; Yu & Ai, 2014), while Bieda et al. (2020) pointed out the validity of conducting 3D analysis in spatial planning based on data obtained from Airborne Laser Scanning (ALS). Spatial data are also being successfully used in the revitalization process. They are used at the initial stage in defining the revitalization area and its characteristics. Specialists analyze various spatial resources in order to recognize relationships between objects or identify areas that may generate spatial conflicts arising at the interface of areas with different functions. Another valuable resource is archival data (orthophotos, panoramic street images conducted as part of Street View, etc.), which can be used to visualize spatial changes over time. Which is very important in rationalizing the needs and creating revitalization goals for the area. As can be seen, regardless of the stage of revitalization, the use of spatial data is indispensable in the designation of a degraded area, as well as later in its design, monitoring and management.

The study used geospatial data for the city of Bydgoszcz and Varna, current and archival orthophotos of the analyzed areas made available in the open resource www.geoportal.gov.pl (Bydgoszcz), and panoramic views from street level (Street View function) made available at Google Maps (Bydgoszcz and Varna). In Poland, access to open geospatial data began in 2011 (Szopińska et al., 2022). Since then, the publicly available resource has been gradually expanded. Which makes it possible to widely use the data in the field of various scientific research. One of the most recent updates (July 31, 2020) involved the discontinuation of fees for sharing data on, among other things, orthophotos. For Poland, Street View street-level images have been available since 2012. Not all areas have the resource until 2021. For areas that have not been archived by Street View, archival images from various web portals and the company's own photographic documentation taken in July 2022 were used. A similar situation applies to sites located

in Varna. Geomedia Professional software was used to visualize the data. The individual steps of the methodology are presented in Figure 2 in the form of a diagram.

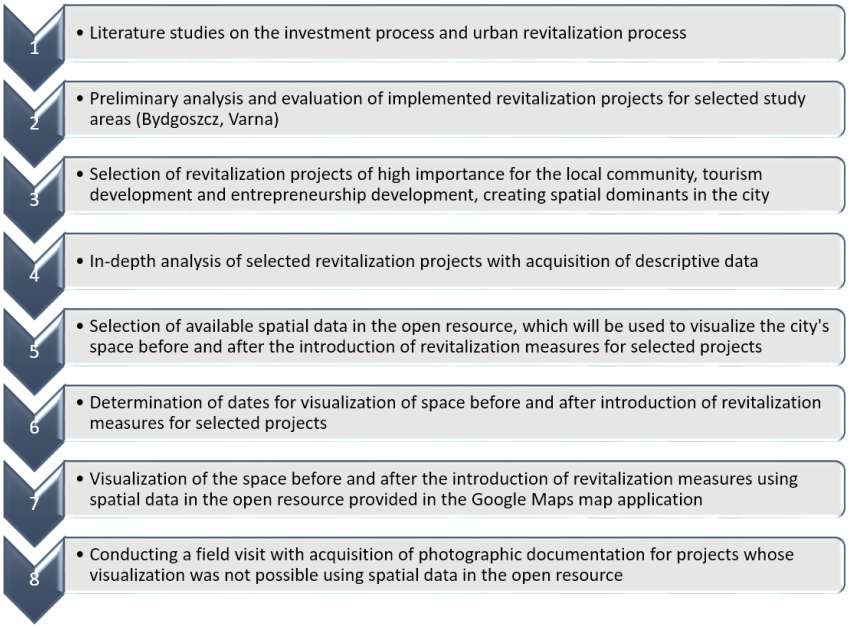

Fig. 2. The individual steps of the methodology
Source: own work

Examples of revitalization projects for the city of Bydgoszcz

The paper presents examples of completed revitalization projects for areas forming spatial dominants of great importance to the local community, tourism development and business development. All projects were implemented in the downtown zone (29 cadastral precincts with a total area of 542 hectares) (Fig. 3). Downtown is the central old-town district of Bydgoszcz. It is the historically shaped central part of the city, with compact buildings and a significant share of historically valuable buildings. It is an area of concentration of service and administrative functions of urban and regional importance (Rącka et al., 2017). Downtown Bydgoszcz (Śródmieście) is mostly formed by buildings from the second half of the 19th and early 20th centuries. The zone includes the Old Town area located along the Brda River, which has a medieval layout and many historic buildings. The second area is the New Town, which is commonly referred to as Śródmieście. All the buildings in this area were erected between 1865 and 1915, and relate in architecture to classicism and modernism. Many townhouses were built in the Art Nouveau style. Hence the area is called "Bydgoszcz Art Nouveau". The paper describes and spatially visualizes four revitalization projects, including: Młyńska Island, the Astoria swimming pool, the Focus shopping center and the Bydgoszcz Główna railroad station (Fig. 3).

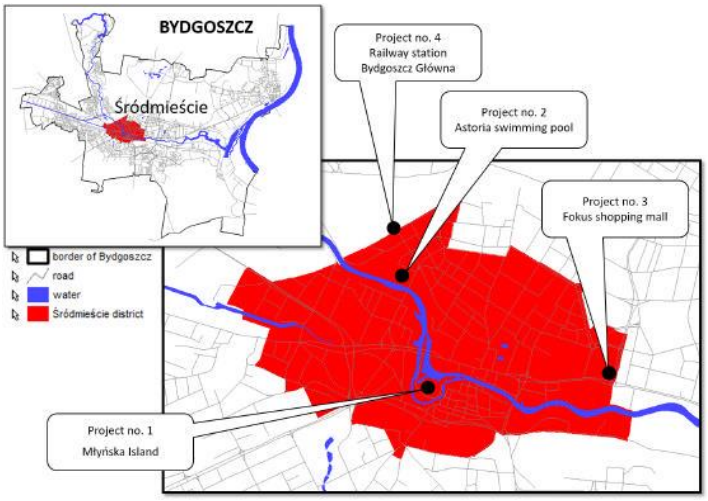

Fig. 3. Analyzed revitalization projects against the background of the city of Bydgoszcz and the Downtown area
Source: own work

Project No. 1 Młyńska Island. The Młyńska Island is an area of 6.5 hectares, located a few dozen meters from the Old Market Square. To the north it is surrounded by the Brda River, while to the south it is surrounded by the Brda Młyńska River, known as the "Młynówka", which is home to the picturesque Venice of Bydgoszcz. The verdant area is home to historic residential and industrial buildings (Fig. 4). Although Młyńska Island was once a place that drove the city's economic development, over the years, including through World War II and fires, the area has been largely degraded, losing its former significance and original functions. In 2004, city authorities decided to comprehensively renovate the post-industrial area. The total value of the revitalization of Młyńska Island until 2012 was about PLN 80 million (Euro 17 million), of which PLN 35 million came from EU funds. The work included the creation of paths for pedestrians and cyclists, the construction of a complex of park pools and three footbridges, as well as the strengthening of quays. In addition, an amphitheater, a playground, lighting and benches were built, and the area was landscaped with many plantings. A green leisure space was created in the middle of the island (Fig. 4b). However, the most important element of the comprehensive revitalization of Młyńska Island was the renovation of the buildings and adaptation to serve new functions (Table 1). The "Marina Bydgoszcz" complex was built on the site of the former sports club building. It houses a hotel, a restaurant, a teaching room, a wellness studio and a sports sphere with an exercise room, water equipment storage and a rental shop. Next to it is a pier for walkers and for mooring yachts.

Fig. 4. Młyńska Island: a) orthophotomap 2009; b) orthophotomap 2022
Source: www.geoportal.gov.pl

Table 1. Historic buildings located on Młyńska Island included in the 2006–2012 revitalization program (Street View – 2019)

Building
The White Granary (Fig. 3, object no. 1). The building from the 2nd half of the 18th century served as a grain warehouse. It was built on the foundations of a 15th-century granary. Since 1979 it served the purposes of the city's Leon Wyczółkowski District Museum, after eighteen years becoming the property of the institution. Since the 1990s, the building housed a history department. During the revitalization of Młyńska Island, this, as well as several other buildings, underwent restoration as part of the second stage of the project entitled "Renovation of Cultural Heritage Objects on Młyńska Island in Bydgoszcz." The Museum of Archeology was opened in it.
The Red Granary (Fig. 3, object no. 2). The current building was built in the 2nd half of the 19th century and served as a steam mill. It was handed over to the museum in 1979. The building was in a very poor state of repair, so it was only seasonally used as a venue for contemporary art exhibitions. Because of its brick façade, it is now known as the "Red Granary" and, following the revitalization of the Island, has housed the Modern Art Gallery since 2008.
The Młyńska Tavern (Fig. 3, object no. 3). The 1873 building served as a grain granary and later as a carriage house. During the second stage of the comprehensive revitalization work, the building was adapted into a restaurant with old-Polish cuisine, which still operates today and is very popular.
The European Money Center (Fig. 3, object no. 4). The structure was built on the site of one of the former 17th-century buildings of the Bydgoszcz Mint, then rebuilt in the late 18th century, and later served as a residential house for mill officials until 1996. In 2009, after numerous restoration works, the building was handed over to the museum for use, and it still houses the European Money Center.
The Miller's House (Fig. 3, object no. 5). It was built in the 18th century and served residential purposes for mill workers. In the late 1980s the building was used by the museum and in 1997 it was transferred to the ownership of the entity. During the comprehensive revitalization of Młyńska Island, the facility houses the Museum Information Center.
The Labor and Entrepreneurship Center (Fig. 3, object no. 6). Built at the turn of the 18th and 19th centuries, the building served as a residential house for mill officials. As part of the first stage of the project on the comprehensive revitalization of the Island "Revitalization of the Młyńska Island in Bydgoszcz for the purpose of entrepreneurship development", the Labor and Entrepreneurship Center was opened in the facility.
Wyczółkowski House (Fig. 3, object no. 7). The structure was built in 1899. It is located opposite the Rothera Mills and served as a residential house for members of the facility's management. Over the years it retained its function. In 1994 it was handed over to the museum and in 2009 the building was transformed into the Leon Wyczółkowski House in an old-fashioned style. There are paintings, prints and the painter's workshop.

Source: Street View (Google Maps)

In the middle of 2018, adaptation work began on the Rothera Mills building complex (Fig. 4, object No. 8). The industrial building dates back to the mid-19th century. It includes a mill and two granaries. The huge facility on Młyńska Island stood abandoned for many years undergoing increasing deterioration. In 2013 it became the property of the city (Fig. 5a). The revitalization of the edifice is an investment of about PLN 100 million (about €21 million). The city received funding of PLN 25 million from EU funds. The duration of the project covered the years 2017–2022. Currently (mid-2022) the Rothera Mills is already open and possible to visit, but the final finishing works will be completed in 2023 (Fig. 5b). Eventually, the complex will house restaurants, small food stands, a florist, conference and educational rooms, along with a coworking area. On the roof of the building there is an observation deck from which one can admire the panorama of Bydgoszcz, while outside there is a terrace with a fountain for leisure purposes. The entire complex has been adapted for people with disabilities. The undertaking to revitalize Młyńska Island and now Rother's Mills are among the city's most spectacular investments in recent years. With work on the Rothera Mills underway, vehicle traffic on Młyńska Island was blocked and parking lots were eliminated in order to increase safety and greater freedom for walkers.

Fig. 5. Rothera Mills: a) view of the building before revitalization – Street View 2017;
b) view of the building after revitalization – photographic documentation 2022,
by Kinga Szopińska
Source: own work and Street View (Google Maps)

Project No. 2 Astoria swimming pool. The Astoria swimming pool located at Królowej Jadwigi Street is currently the largest pool in the region. The facility was built on the site of the former Astoria Hall, built in 1962, at which time the hall served as a sports and entertainment venue. From 1962 to 2002 Astoria was the main venue for various events in Bydgoszcz. Both league matches and cultural events were held here. It

also housed an indoor swimming pool and an open-air swimming pool complex (Fig. 6a, 6b). After 2002, Astoria became a less popular venue due to the construction of a new sports and entertainment hall "Łuczniczka" on the opposite side of Downtown. In 2017, the Astoria hall was demolished and revitalization efforts began over the complex. Astoria's new swimming pool is of Olympic dimensions. Thanks to the modern solutions used, the functionality of the swimming hall has been increased. A movable platform divides the swimming pool into two arbitrarily smaller pools. Meanwhile, the movable bottom allows the depth of the pool to vary between 2.1 and 6 meters. This creates a wide range of possibilities for organizing activities. The place is designed for leisure activities of children, teenagers as well as adults. An additional attraction for the youngest is, among other things, a water obstacle course. There is also a hangar for kayaks in the complex. The four-story facility was built with ecological and natural building materials. From the outside, the effect blends perfectly with Astoria's waterfront location (Fig. 6c, 6d).

It took 2 years to build the larger and more modern Astoria. The rationale of the project was confirmed by public consultations held earlier. The investment totaled PLN 110 million (about €23 million). It was financed through a loan and funds from the city's budget and the national Physical Culture Development Funds. The complex was finally put into operation in October 2020. During the first year, despite the fact that it was a COVID-19 pandemic period, the facility was visited by as many as 235,000 people, 90% of whom were residents of the city of Bydgoszcz. The revitalized Astoria swimming pool was nominated for the "Top Municipal Investments 2021" competition.

Fig. 6. Astoria swimming pool: a) orthophotomap 2014; b) view of the building before revitalization – Street View 2014; c) orthophotomap 2022; d) view of the building after revitalization – photographic documentation 2022, by Kinga Szopińska
Source: own work, www.geoportal.gov.pl, Street View (Google Maps)

Project No. 3 Focus shopping center. Focus Shopping Center is located in the city center, on Jagiellońska Street. The 90,000 m^2 property has retail, service and entertainment functions. Focus Shopping Center was established in 2006 and was the first such large shopping mall in the city. The history of the area dates back to the 1890s, where

the land in question was located on the border between the city and the village of Schrötterdorf. At that time, commercial slaughter was banned in the Prussian state. The only places allowed for this were municipal slaughterhouses. Therefore, a large-scale meat plant was erected in Bydgoszcz, which was under German annexation at the time. Inside were abattoirs, processing halls, cold stores, while outside was a yard with pens for animals. The front buildings housed the administrative headquarters, a residential building, a market and a restaurant. The entire complex of buildings architecturally presented a very high standard. After several reconstructions and after World War II, the facility was given the status of the State Meat Plant in Bydgoszcz in 1950. The Bydgoszcz Meat Works operated until 2006 (Fig. 7a, 7c). Four front brick buildings have survived to this day. They have been restored. In one of them, the former administrative headquarters of the meat plant, the Stanislaw Horno-Poplawski Bydgoszcz Art Center was established (Fig. 7b, 7d). The cost of the investment amounted to PLN 250 million (about €53 million). The facility was put into operation on April 23, 2008. Projekt nr 3 Centrum handlowe Fokus.

Fig. 7. Fokus shopping center: a) orthophotomap 2010; b) orthophotomap 2017; c) view of buildings before revitalization; d) view of buildings after revitalization – Street View 2017

Source: www.geoportal.gov.pl, www.bydgoszcz.wyborcza.pl, Street View (Google Maps)

Project No. 4 Bydgoszcz Central Railroad Station. The current railroad station, located on Zygmunt August Street, is one of the most recognizable and distinctive properties in Bydgoszcz. The original railroad station building was constructed in 1851. Over more than a century of use, the building was rebuilt and expanded several times. The most recent remodeling took place in 1965 (Fig. 8a, 8c). In 2014, the renovation of the Main Station began, consisting of the restoration of the old historic island station (inner, inter-track), the creation of a brand-new main building, and the renovation of platforms and underpasses. The total cost of the project was PLN 197 million (about €41 million). The grand opening of the new station took place on October 10, 2015. The new building

has a very interesting architectural form. Directly above the first floor is a characteristic indentation that allows a view of the historic island station building, which is located behind the modern and glazed building. On level -1 there is a waiting room for travelers and ticket offices, along with an underground passage to the various platforms. On the first floor there is an exit to an observation deck and premises with retail and food services (Fig 8b, 8d). The historic building from the 19th century is located exactly between the third and fourth platforms. During the works, its roof was rebuilt, and the original shape of the window openings and stucco was restored. The island station mainly serves as a waiting room and a passage to the underground tunnels. Both facilities are adapted for people with disabilities.

The construction of the new main building and the renovation of the historic inner station building is one of the largest investments of the Polish railroad modernization program. The station's innovative design, functionality, use of high-quality materials and accuracy of workmanship have led to the facility being noticed and appreciated. In 2016, PKP S.A. received the "Crystal of Public Tenders" award. And in 2017, the Bydgoszcz Central Railway Station became a winner in a competition organized by Baumit. "Facade of the Year" in the "Building after renovation" category.

Fig. 8. Bydgoszcz Central Railroad Station: a) orthophotomap 2013; b) orthophotomap 2017; c) view of the building before revitalization – Street View 2013; d) view of the building after revitalization – Street View 2017.
Source: www.geoportal.gov.pl, Street View (Google Maps)

Examples of revitalization projects for the city of Varna

As in the case of the Polish city, revitalization projects of areas forming spatial dominants of great importance to the local community, tourism development and business development were selected. The paper describes and spatially visualizes three revitalization projects (see: https://varna.bg/en), including the modernization of public areas of the central part of Varna city, the modernization of residential public space and the construction of the Karantinata fishing port (Fig. 9).

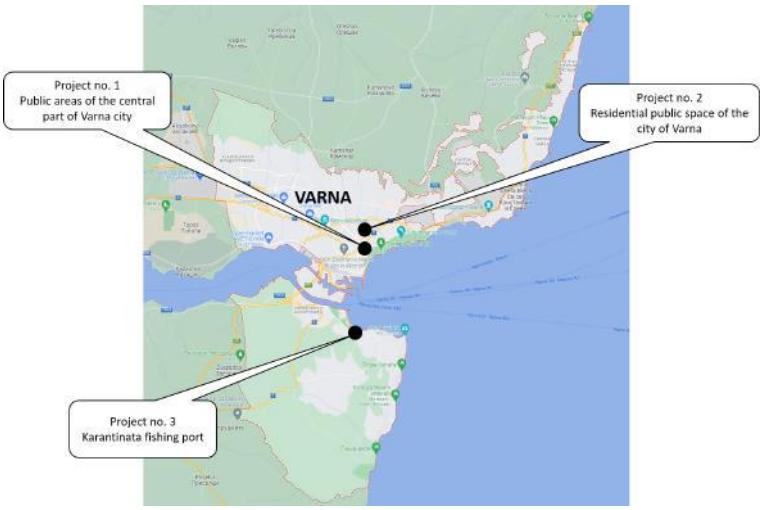

Fig. 9. Analyzed revitalization projects against the background of the city of Varna
Source: own work

Project No. 1 Public areas of the central part of the city of Varna. The overall objective of the revitalization project was to improve the quality of life in the urban center of Varna with the assurance of a sustainable and ecological urban environment and balanced socio-economic development. As part of the project, the aesthetics and modernization of the main pedestrian routes and public recreational areas in the central part of Varna were carried out. Accessibility to the city center was improved, including increased accessibility of the built environment for the disadvantaged. These activities influenced the integration of the Varna community and increased safety in the city. The project involved the complete reconstruction and modernization of pedestrian routes, including the design of sidewalks, bicycle paths or murals (Fig. 10d). In addition, elements of small architecture in the form of monuments or fountains were added (Fountain on Nezavisimost Square – Fig. 10b). The measures were guided by the idea of a green, sustainable city, so energy-efficient street lighting and a comprehensive irrigation system were designed. The revitalized area is located in the eastern part of the city, near the beach, and covers an area of about 10 hectares. Its scope includes Independence Square – "Knyaz Boris I" Blvd. – "Ruse" Sreet. The budget of the project was about BGN 11 million (about €6 million). Work began in May 2013 and was completed in mid-2016. The revitalized area is very popular with tourists and Varna residents. It has significantly improved the city's image and attractiveness.

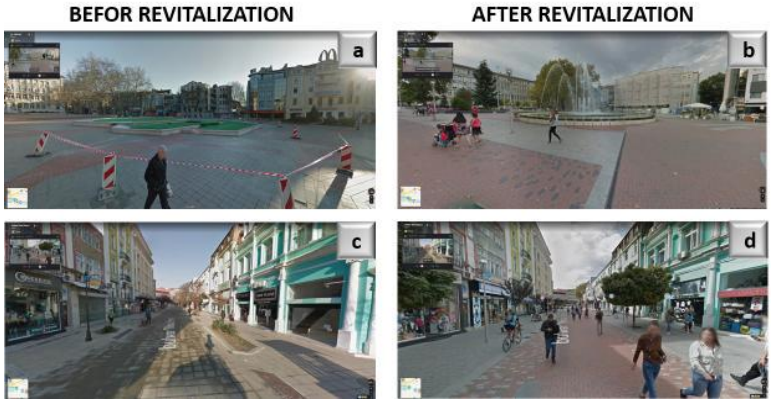

Fig. 10. Modernization of Varna city center (Street View): view of Fountain on Nezavisimost Square (2012 – a), (2019 – b); view of "Kniaz Boris I" Blvd. (2012 – c), (2019 – d)
Source: Street View (Google Maps)

Project No. 2 Settlement public spaces of the city of Varna. The main objective of the project was to improve living conditions in Varna through the construction and restoration of public recreational areas. This activity was aimed at improving the quality of life in the city and improving the environmental conditions of the settlement spaces by upgrading roads, building sports facilities and increasing the biodiversity of flora. As part of the project, part of the city's street network was repaired and reconstructed, including the reconstruction of the "General Kolev" Blvd. from "Chataldzha" Street to "Loza" Street, the reconstruction of the northern lane of "Tsarevets" Street – on the section from "Osmi Primorski Polk" Blvd. to "Vasil Levski" Blvd. and the improvement and development of the spaces between "Chataldzha" Street, "Tsar Asen", "Drava Cheh" Street, "General Kolev" Blvd. The target groups of the revitalization activities carried out were daily commuters along "General Kolev" Blvd. (pedestrians and drivers); daily users of the new parking spaces; and residents using the improved inter-block space, living in the immediate vicinity of the revitalized area. The project included the construction of three new sports fields, numerous playgrounds, climbing walls, and the planting of nearly 3,000 trees and shrubs (Fig. 11b).

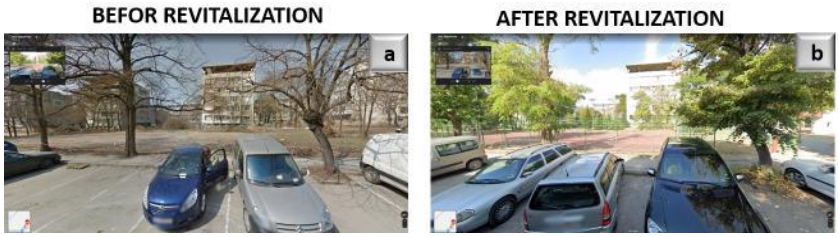

Fig. 11. Modernization of Varna's settlement space (Street View): a) 2012; b) 2019
Source: Street View (Google Maps)

The result of the work carried out was an improvement in urban traffic conditions with a reduction in automobile accidents involving pedestrians, as well as an improvement in

living conditions in the city, especially in neighborhood spaces. The project's budget was more than BGN 7 million (about €3.5 million). Work began in July 2010 and was completed after two years.

Project No. 3 Karantinata fishing port. Within the framework of the revitalization project, the fishing port located in the southern part of Varna (Karantinata Fishing Port, "Karantinata" Locality, "Asparuhovo" Area, City of Varna, Varna Municipality) was reconstructed and modernized. The main revitalization activities included the construction of hydrotechnical facilities with the necessary infrastructure and the construction of a modern and attractive mixed-use main building. The main objective of the project was to ensure the possibility of efficient, regulated, safe and hygienic unloading, storage, sale and forwarding of fish and aquatic fishing. The project is a classic solution for creating a shelter from waves, currents and marine sediment. The port has a bypass along the wharves with a width of 6 meters, which allows access and temporary stopping of sea transport. Pedestrian walkways of about 100 m in length have been provided along the facility's western quay. Two viewing platforms were also built as part of the project. The total capacity of the port is 116 watercraft (including 103 boats), 8 berths for vessels 18–24 m in length, and 5 berths for vessels over 24 m in length (Fig. 12b).

Fig. 12. Modernization of Karantinata fishing port: a) view of waterfront before revitalization – Street View 2012; b) view of waterfront after revitalization – Street View 2019; c) view of waterfront and building after revitalization 2022
Source: Street View (Google Maps) and https://varna.bg/en

The main building has a mixed function, with public, commercial and service spaces. The building consists of one underground and two above-ground floors. The most attractive part of the building is the roof. It is shaped like an amphitheater with a view of the sea and the city. A tower with a spiral staircase 18.26 meters high provides access to the restaurant, to the rooftop amphitheater and higher up to the viewing platform (Fig. 12c).

The project created a protected water area for safe mooring of fishing boats, which guarantees modern conditions for fishing. The project's budget was more than BGN 13 million (nearly €7 million). Work began in May 2018 and was completed in late 2020.

Conclusions

Revitalization is increasingly important in urban transformation. It is a complex process with a long time horizon, requiring detailed analysis and predictive planning. Its success is linked to the undertaking of comprehensive measures of a multidimensional and interdisciplinary nature, and it is necessary to cooperate and involve all stakeholders, both public and private sector entities. Undertaking appropriate projects fosters the concept of sustainable urban development, resulting in the rebalancing of degraded areas, equalizing existing disparities in the urban agglomeration. Thanks to EU funds, it is possible to undertake not only smaller revitalization projects such as comprehensive restoration of tenement houses, but also to implement larger innovative and unusual investments. Most often, degraded areas located in the central part of the city are monitored and revitalized. Then revitalization makes it possible to reduce the social problems that often occur in downtown districts, i.e. vandalism, unemployment or social marginalization, which are determined by the low level of education of the population living in these areas, the high density of people in the post-working age and their difficult financial situation.

Carrying out revitalization results in improving the quality of life and increasing the economic value of a given public space. As a result, the areas become attractive to investors. Based on analyses conducted by Bieda (2017), among others, it can be concluded that the value of land is related to urban revitalization. This is due to the fact that revitalization has a positive impact on such property characteristics as "standard," "environment" and "fashion." Research conducted by Rącka et al (2017) shows that downtown Bydgoszcz is very attractive to investors – nearly 25% of all secondary market transactions take place in this part of the city. In the wake of revitalization, there is also the phenomenon of gentrification, which is associated with the displacement of poorer segments of society from their former place of residence in favor of the settlement of these areas by middle- and upper-class people. The downtown location allows easy access to cultural and entertainment facilities and events, and has great architectural and natural advantages. Gentrification carries both positive and negative aspects. This process leads to an increase in the material value of a neighborhood through increased spatial qualities, but at the same time is associated with higher rental and maintenance costs. In addition, there is a turnover in the structure of the community and more people with higher education and higher social status appear. In addition, it is worth noting that many revitalization projects are associated with the application of the latest technological solutions for energy efficiency of buildings, in accordance with the concept of the European Green Deal (2019), (Gasiński et al., 2021).

The purpose of the work was the spatial presentation of the analyzed areas with their identification before and after the revitalization process using spatial data made available

in an open resource in the Google Maps map application. The purpose of the work was realized for two European cities, Bydgoszcz and Varna. For the selected projects, visualization and diagnosis were successfully carried out using the selected map application. The examples discussed show that many revitalization investments are successful. Fulfilling the assumptions about public participation has influenced the active participation of the public in creating the future appearance of the city (especially downtown areas). The participation of residents in the revitalization process has instilled a sense of pride and belonging to the place. The projects have significantly improved the quality of life of residents. The completely degraded space was restored to its former splendor, giving it a new socio-economic function. Historic buildings were adapted for museum purposes, which strengthened the historical value of the space (Gorgoń, 2016). Bydgoszcz and Varna, moreover, have gained a new tourist destination, which affects the higher attractiveness and competitiveness of these cities. In addition, Bydgoszcz has gained a new tourist destination, making the city more attractive and competitive. For example, the revitalized Mill Island in Bydgoszcz has become one of the most visited places by residents and tourists. It provides an opportunity to visit museums and has been used for years to organize events, concerts and community picnics. It is now a showcase of Bydgoszcz. In the city's development policy, it is important to use the potential of all natural resources, including water resources. The revitalization of waterfronts in Bydgoszcz, which has been going on for several years, contributes to the increased activity of residents and a desire to communicate by ecological means of transportation. A similar situation applies to Varna, a tourist city located on the Black Sea. The revitalization of the central part of the city and the construction of a modern fishing port, combining recreational and economic functions, has strongly improved the city's attractiveness. The revitalization of residential areas, which may contribute less to tourism, but greatly improve the quality of life in the city, is also very important for Varna authorities. As you can see, revitalization is a process that affects the economic, social, economic, environmental and cultural aspects of the city.

Current revitalization projects are a combination of the latest technologies with functionality, usability and originality. Due to their interdisciplinary nature, they require the involvement of various entities and specialists, using the latest developments in the IT sector, not excluding GIS technology and information. These technologies greatly facilitate research and project execution, while visualizations and study analyses can be useful for protecting the city skyline and revitalized areas, cleaning up the landscape, reducing visual chaos, and facilitating discussion and public participation in space planning. The examples presented from Bydgoszcz and Varna show that these spatial activities and GIS information processing capabilities do not depend on the location of revitalization activities and can be applied successfully in different European countries.

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