

IMPLEMENTATION OF SMART CITY PROJECTS ON THE EXAMPLE OF ACTIVITIES PREPARED BY THE LOCAL GOVERNMENT AND SUBORDINATE UNITS

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Purpose: In order to determine the level of implementation of smart city projects, an inventory of such activities carried out in Zabrze was carried out. Taking the example of Zabrze it can also be seen that the smart city concept should be based on a sustainable development policy, assuming the rational management of city resources and taking into account the requirements of environmental protection while taking actions, with care for the next generations.

Design/methodology/approach: Development projects included in the city's development strategy from the Smart City sphere were subject to approval. The material scope of the project, implementation time, division into stages and sources of financing were analyzed.

Findings: It is worth paying attention to the fact that the local government acquires funds from external sources to finance activities in the smart city sphere. On the basis of the cited data it can be said that some of such projects were financed entirely from funds that did not burden the city budget, and most to a large extent. Maintaining a high level of co-financing means the need for the commune to find funds for its own contribution, but at the same time it provides access to extra-budgetary funds that allow the implementation of modern solutions in the area of smart city.

Originality/value: The analysis of projects from the Smart City sphere has a significant application significance. They go well beyond the provision of public services reserved to the administration. They enable optimization of the city's functioning in its many dimensions, from improving the quality of education, through improving economic and social life, to increasing the level of social participation in exercising local authority.

Keywords: Smart City, sustainable development, cyberspace potential, local government.

1. Smart city in technological, management and social aspects

The challenge for modern cities is to undertake innovative development activities. In disseminating the smart city concept it is crucial to use the potential of cyberspace. The virtual world with the marketing of things is an area that still needs to be developed for the

creation of smart cities. On a global scale it is sufficient to say that in 2020 nearly 30 billion devices were connected to the Internet network in the world, which gives about 4 devices per capita, which make it possible to stay in constant contact and send information to other users in a fraction of a second (Bitkowska, Łabędzki, 2021, p. 9). Of course, the technological aspect is important, but only one of the components of the entire chain of economic, social and political ties that allow the implementation of the smart city concept. What matters is the use of various information solutions or innovative ideas to connect and integrate city systems and services, improve resource efficiency, optimize city management and improve the quality of life of citizens (Choińska, Szpilko, 2021, p. 130). In the context of city management and its development it is also necessary to point out the great importance of the involvement of local communities (Winkowska, 2021, p. 103). Much depends on the degree of activation and integration of residents around the city and the level of their participation in management.

After the vision of a smart city inspired by ICT tools (intelligent information-and-communication techniques), the emphasis in the analysis was placed on the role of public administration managing the infrastructure to then create a 3.0 solution based on the creative involvement of residents, where members of the local community play the main role as not only the recipients of the introduced changes and modern technology, but also as the creators of urban space (Szarek-Iwaniek, Senetra, 2020, p. 1). Thus, a smart city requires an interdisciplinary approach and involvement of all stakeholders to cooperate in creating the city (Hajduk, 2020, p. 124; Kuzior, A., Kuzior, P., 2020; Kuzior, 2020). So far the solutions implemented in practice in Poland are not of a comprehensive nature. They are rather single improvements that do not significantly affect the quality of life of residents, the natural environment and the reduction of public spending. Therefore, it seems that the more local management should be focused on systemic solutions in the field of communication, energy, waste management or social services (Czupich, Kola-Bezka, Ignasiak-Szulc, 2016, p. 233). The basic principle of a smart city is to use urban resources more and more effectively, i.e. in a creative and intelligent way (Kuzior, Sobotka, 2019, p. 41). This paper reviews the smart city activities planned and implemented in Zabrze – a Polish post-industrial city that has undergone a process of restructuring, and in fact liquidation of heavy industry.

2. Characteristics of the research field – a post-industrial city after industrial restructuring

The case study method was used in the presented studies. When characterizing the research field, it should be noted that Zabrze, which covers an area of 80.4 km², is located in southern Poland, in the vicinity of two main highways (A4 and A1 roads), and within a radius of approximately 90 km it is adjacent to three international airports (Balice, Ostrava, Pyrzowice).

Having the status of a city with district status, i.e. one of the 66 largest in the country, Zabrze has approximately 170 thousand inhabitants (Central Statistical Office, 2019), which gives a population density of approximately 2144 people per km². Together with 41 municipalities it is part of the first metropolitan area in Poland Metropolis GZM, established on July 1, 2017 by the Act of March 9, 2017 *on the metropolitan union in the Silesian voivodeship*, and operating from January 1, 2018 (a total of over 2.2 million inhabitants). In 2021 the unemployment in the city was at the level of 6.6% (Central Statistical Office, 2021). The budget of the city government exceeds 1 billion PLN (at the end of 2021 it was 154.9 million PLN on the revenue side, and 1 125.9 million PLN on the expenditure side).

The restructuring of the industry at the end of the 20th century brought extremely difficult consequences for cities described as coal and steel monocultures. Zabrze was one of them, where mining determined the development of the town from the turn of the 18th and 19th centuries. The documented beginnings of mining date back to November 24, 1790, when Solomon Isaac found a 1 meter thick coal seam near Pawłów, which, as the experiments carried out showed, was perfectly suitable for the production of coke (Frużyński, 2012, p. 39). In the following decades several more mines were started in Zabrze to finally symbolically end the production of coal on December 30, 2016 with the closure of the last large mining plant owned by the State Treasury, i.e. “Makoszowy” Colliery (Polish Press Agency, 2016). After this period only the private SILTECH Mining Plant Ltd., established in 2002, operated in the city.

In this way, mining Zabrze was practically deprived of the coal industry, which was reflected in numerous social (e.g. structural unemployment), economic (e.g. the need to create a new profile of the city), demographic (e.g. depopulation) or ecological (e.g. the need for reclamation of contaminated land) problems.

The problems of restructuring of post-industrial cities are focused on the example of Zabrze. Thanks to the development and consistent implementation of the new development strategy it was possible to create a city based on science (e.g. supporting the universities), modern economy (e.g. acquiring of investors), medicine (e.g. cooperation with specialist hospitals) or post-industrial heritage tourism (e.g. revitalization of post-industrial facilities and making them available to visitors) (Kuzior et al., 2021, 2022). As a result, after several years, it turned out that the post-industrial city can be resident-friendly, attractive in terms of investments and open to strengthening its potential. Nevertheless, the popular idea of building smart cities requires consistency and responsibility from the local government (Krawczyk, 2020, p. 335). The role of municipal authorities is even greater as they manage a number of local matters, from education and health protection, through thermal energy, water supply and sewage collection, waste management, ecology to the construction of road infrastructure, housing and social care. To effectively manage such a complex system, it is necessary to apply (implement or develop) smart-city solutions and at the same time adapt management tools in local administration unit (Kinelski, 2022, p. 128). Modern management requires not only new tools,

but also a different approach to the sphere of planning, organizing, implementing and evaluating the activities of local authorities aimed at making the smart city idea come true.

The level of advancement of the implementation of smart city solutions analysed in Zabrze concerned the current state as of July 1, 2022, which was also the date of completion of the research studies.

3. Placement of the smart city concept in planning documents

The “City Development Strategy – Zabrze 2030”, in force at the time of the research studies, was adopted by the City Council on August 27, 2018. The document updating the Strategy for the Development of the City of Zabrze for 2008-2020 was prepared by scientists from the University of Economics in Katowice. The authors of the document adopted four development priorities: “P1. Active urban society” – along with the challenge “To actively participate in social development”, “P2. Development and innovation of the economy” with the challenge “To strengthen the economic competitiveness of the city”, “P3. The friendliness of the city space” with the challenge “Domestication of space in the city” and “P4. A significant metropolitan position” with the challenge “To stand out in the Metropolis GZM”.

The “City Development Strategy – Zabrze 2030” at the same time set out – still mainly based on local government investments – a new specialization of the city defined as: introducing technological innovations into the reality of public management. The horizontal objective was to shape the conditions for the development of smart city (CH 2.), and the direction of development in this regard was smart city solutions in the spheres of the city's municipal economy (KH 2.).

Moreover, the strategy specified specific undertakings that fit into the designated direction. These include ten activities ranging from planning activities to the implementation of specific tasks. The list is opened by: updating and implementing the actions resulting from the “e-Zabrze. The strategy for building an information society for the city of Zabrze until 2020+” (PRH 2.1.). It also includes the development and implementation of the *Sustainable urban mobility program* (PRH 2.2.), the development and implementation of an *Energy plan with smart components* (PRH 2.3.) or the development and implementation of the *Security plan using smart solutions, including the security of residents on the Internet* (educational-and-promotional activities targeted at various age groups (PRH 2.4.). Other challenges described in the “City Development Strategy – Zabrze 2030” are the development and implementation of the *Waste management concept using smart solutions* (PRH 2.5.), updating and developing the *Municipal Spatial Information System* – the city's geodetic database and real estate information (PRH 2.6.) and development and implementation of the *Urban model of investment implementation with the smart component* (PRH 2.7.). The list of projects described in the

document is completed by the development and implementation of the *Open data sharing model* (PRH 2.8.), development and implementation of solutions for the integration of resident settlement systems with municipal entities (PRH 2.9.), as well as the implementation of projects for the development of ICT infrastructure (PRH 2.10.). The goal specified in the “City Development Strategy - Zabrze 2030” as shaping the conditions for the development of smart city is consistent with the task areas described in planning documents with a national and regional range.

In the area of smart city in Zabrze there is also the “e-Zabrze. Strategy for building an Information Society for the city of Zabrze until 2020+” adopted by the resolution of the City Council of January 18, 2016. It contains a continuation of the provisions introduced by the document “e-Zabrze Program for Building an Information Society of the City of Zabrze” of December 14, 2009. During the preparation of this paper, work was still underway on the creation of the strategic document “Smart Zabrze Strategy 2030”, which is to cover the scope described in the previous documents, along with the updating of action projects resulting from new technological opportunities, and at the same time being a response to organizational challenges and social expectations.

4. Research on prepared, implemented and functioning solutions in the field of smart city

For the purposes of this paper an inventory of solutions related to the smart city concept implemented in 2022 or prepared for implementation in the city hall, cultural, sports and recreation units, as well as municipal companies was carried out. As a result of the query conducted as of July 1, 2022, a total of 78 such services, solutions, applications or devices were identified. The vast majority, because 75% of the analysed projects has been implemented. 9% was at the implementation stage, and another 9% was in the planning phase. It is worth noting that another 4% of tasks covered both the implementation phase as well as plans for further expansion or update, and the last 3% covered the phase of partial functioning and implementation of subsequent stages.

Table 1.

Number, scope and entities responsible for planning, implementation and operation of smart city projects in Zabrze. As of July 1, 2022.

Number of smart projects	Material scope of the projects	Operator (municipal institution or department of the city hall)
17	ecology, revitalization of post-industrial facilities, city services, digitization of tourism and recreation services	Coal Mining Museum
11	city services, economy, society	Zabrze Centre for the Development of Entrepreneurship
8	improving the functioning of schools	Education Department
7	ecology, transport, digitization	Zabrze Water and Sewerage Company
4	digitization, e-government	City Hall Development Department
3	city services, spatial order	Management of Residential Buildings - Society of Social Building
3	digitization, city services	Municipal Public Library in Zabrze and Silesian Library in Katowice
2	industrial automation and ecology	Zabrze Thermal Energy Company
2	digitization, infrastructure	Zabrze Investment Implementation Agency
2	improving access to public information	Property Management Department and Real Estate Management Unit
2	computerization of waste management (eco-schedule and e-declaration)	Waste Management Department
2	the "SprintMap" application for the preparation of extracts and charts from local spatial development plans and a study of the conditions and directions of spatial development and participation in the e-Budownictwo platform	Building Department
1	system for electronic viewer service	Nowy Theatre in Zabrze
1	expansion of city television	Cultural Information Centre
1	digital service of the Creative Zabrze photo competition via e-forms	Municipal Cultural Centre
1	expansion of the city monitoring system	Crisis Management and Civil Protection Department
1	digitization of civic budget procedures	Budget and Financial Analysis Department
1	system of e-services in the field of public (geodetic) registers	Geodesy Department
1	social networks and the website of the City Museum	Department of Culture and Heritage
1	central budget management system	Accounting and City Budget Department
1	city acoustic map	Ecology Department
1	mobile application "Zabrze in the heart of Silesia"	Department of Promotion, Tourism and Sport
1	computerization of city services (GZM Data Store Project – GZM Open Data portal)	Department of Computer Science and Information Society Development
1	smart control of street lighting	Department of Municipal Infrastructure
1	digital management of spatial order	Department of Computer Science and Information Society Development and Spatial Planning Office
1	implementation of the Digital City Services for Entrepreneurs project	Department of Taxes and Department of Computer Science and Information Society Development
1	digitization of city services (Area Information System)	Department of Computer Science and Information Society Development as well as Department of Geodesy and Spatial Planning Office

4.1. Description of examples of activities in the sphere of smart city

The status of resident-friendly city management is determined, among others, by introducing solutions that allow efficient use of public services provided by local government administration, focusing on ensuring access to proven and reliable news or extending the range of educational, medical, cultural, sports, recreational, etc., offer. The concept of a smart city is already taking on a specific dimension also in such areas as, for example, efficient communication, effective operation of municipal services, care for the natural environment and safety of residents, involving non-governmental organizations in improving the quality of residents' life.

4.2. Projects prepared or being implemented, taking into account the sources of financing

Among the completed – as of July 1, 2022 – projects under the “e-Zabrze. The Strategy for Building the Information Society of the City of Zabrze until 2020+”, it should be indicated, among others, the expansion of the IT infrastructure in order to ensure the use of broadband Internet access by educational units and other municipal units. As a result of the implementation of the project entitled: “Zabrze Broadband Fibre Optic and Wireless Network”, a 100 km of fibre-optic network was created, to which 216 institutions, schools and other facilities were connected, including city monitoring cameras, as well as a police station. According to the documentation analysed for the purposes of this paper, the cost of the task was 29 397 084.62 PLN, and the value of the co-financing obtained by Zabrze officials from external sources – 20 301 162.25 PLN, i.e. 69.06% of investment costs.

Another project implemented in the field of providing public services by local administration was the “Comprehensive Document Circulation System”. It consisted in providing customers with electronic forms through the nationwide ePUAP platform (electronic platform for public administration services) and the regional SEKAP platform (electronic communication system of public administration in the Silesian voivodeship launched in 2008 and expired at the end of 2021). In this way 24/7 access to some public services and matters handled by the office, as well as municipal organizational units, was obtained for residents. At the same time the circulation of paper letters and documents in the city hall was limited. The cost of the project is 4 063 396.65 PLN, and the co-financing value: 3 260 301.98 PLN, which means that funds will be obtained at the level of 80.24% of eligible costs.

An interesting project, the first stage of which was carried out at the time of the study, is the Zabrze “Acoustic Map”, which gives the possibility of a comprehensive assessment of the noise hazard level in the city. Among its functionalities, it provides an estimate of the number of people exposed to noise or the identification of areas exposed to noise hazard. It allows to plan the location of future residential and investment areas in such a way as to minimize noise nuisance. The first stage of creating an acoustic map cost 694 212.64 PLN.

The local government obtained co-financing in the amount of 510 582.25 PLN, i.e. in the amount of 73.55%. While the paper is being prepared, work is underway on the second stage of the project, including updating the map and extending the functionality.

Post-industrial heritage tourism has become one of the areas to generate economic development in Zabrze. Thanks to the preservation, adaptation and making available for visiting historic post-industrial buildings, it was possible to annually bring about 200 thousand tourists to the city in a dozen or so years – according to the data of the Coal Mining Museum for 2019, preceding the Covid-19 pandemic. The historic “Guido” Coal Mine with three levels of educational and recreational routes, as well as an underground restaurant or banquet halls are visited by tourists from all over the world, and the Queen Louise Adit with underground water routes allowing tourists to travel by boats under the city – was among the winners of the “Europa Nostra 2019” European Heritage Awards.

Therefore, it was natural to have an idea to implement intelligent solutions in the field of tourism organization, the realization of which was the implementation of the “Integrated support system for the management of post-industrial facilities”. The aim was to shorten the duration of internal procedures by implementing a comprehensive document circulation system, reduce the administrative costs of the institution, effective control of the implementation of tasks, as well as shortening the time of customer service by providing on-line service. At the cost of 2 241 814.04 PLN the work of the institution that manages facilities located in 6 different parts of the city was improved. The co-financing value was 1 903 926.93 PLN, i.e. 84.92% of project costs.

Access to information on open competitions for offers for non-governmental organizations and on public tasks carried out is provided by the “e-Cooperation – Platform for Contracting Social Services”. The platform also gives the opportunity to consult draft acts of local law. The cost of the implementation was 767 715 PLN, and the subsidy was 100% of project value.

The co-financing also covered the entire costs of another project, the aim of which was to improve the service of clients of the District Labour Office, especially the clients of the Customer Service Department.

Providing information on the spatial development of the city, roads, bicycle routes, infrastructure, monuments or geodetic data through cyberspace resources is the purpose of launching the “Land Information System”. In addition to the interactive city plan providing tourists with interesting and useful news, the system presents data contained in GIS systems through several separate web portals on revitalization, security, investments, and ecology. At the time of the study, the project was carried out in the scope of the first stage (creation of the first portals), and work was still being done on the second stage, i.e. updating and extending the functionality of the system and creating additional portals. The cost of the completed first stage was: 1 559 221 PLN, and the amount of co-financing was 1 262 026.41 PLN, i.e. 80.94% of the value of the carried out actions.

In addition to the described examples of projects, which constitute separate ventures from the field of smart city, actions were also taken, the individual components of which fit into this area. Striving to effectively inform residents, entrepreneurs and tourists about projects and events organized by the City Hall and its subordinate units, as well as to improve customer service by modernizing the municipality's website and adapting it to the needs of people with disabilities can, among others, be indicated. On the other hand, the authors of the project entitled "Electronic Customer Service Office" were responsible for creating conditions for standardizing data collection, increasing the efficiency of public administration work with the use of electronic tools and state-of-the-art technologies, and improving the quality of customer service, especially entrepreneurs. "SMS server" is the name of the text message notification system that enables the residents of Zabrze to receive information about current events, difficulties and breakdowns, as well as cultural and sports events, activities undertaken for entrepreneurs or emergency situations (e.g. the coronavirus pandemic). The mobile application "Zabrze in the heart of Silesia" is a free guide intended for both tourists and residents of all ages looking for information about Zabrze, in particular about its tourist, cultural, sports offer, interesting places and interesting events.

The "Make an appointment" application allows to book a visit to the city hall on a selected date and time using a dedicated website, launched on the phone, tablet and computer. After registration the system automatically sends notifications by e-mail confirming the visit and generates an access code (virtual ticket). At the time of the study the application made it possible to book a visit to the Communication Department (e.g. car registration), the Registry Office (e.g. giving birth to a child) and the Civil Affairs Department (e.g. issuing an ID card).

4.3. Projects implemented and prepared for implementation

When characterizing activities aiming at the implementation of intelligent solutions in the practice of public management it is also worth presenting some projects that were just introduced at the time of the study.

The "e-Journal" will serve to improve the level of computerization of schools and improve the relationship between educational institutions and students' parents, and it will also improve the direct transfer of information about grades, attendance and behaviour of children and planned tests.

On the other hand, comprehensive documentation of the course of settling and resolving cases is to be ensured by the documentation electronic management "EZD – PUW". One of its functions is the use of artificial intelligence to manage the correspondence distribution mechanism in a local government unit.

In turn, increasing the level of safety of residents through the use of IT techniques by expanding the crisis management system and extending the range and functionality of 24-hour city monitoring are the goals of the projects entitled "Crisis Management Centre" and "Availability of resources for crisis management". They include, among others, supervision

over the functioning of the system for detection and alerting as well as early warning of the population about threats.

On the other hand, the “Municipal Waste Management System” is aimed at comprehensive and at the same time integrated management of municipal wastes. The implemented solutions are to improve the cooperation between the city hall and the company responsible for collecting municipal wastes. Moreover, it was assumed that the system will collect as much data as possible on waste management in the commune and optimize the management of this data.

In the analysed period the project “Digital Shared Services for Residents”, assuming increasing the efficiency of public administration with the use of modern technologies, in particular the integration of systems and improvement of data exchange by individual organizational units and the creation of a public e-services system aimed at improving services for residents and entrepreneurs, was also in progress. The project was submitted for co-financing from the Regional Operational Programme of the Silesian Voivodeship.

The aim of the next program is to increase the attractiveness and quality of teaching in individual educational institutions in the city. The “Computerization Program for Kindergartens and Schools” is to modernize the didactic base of educational institutions.

“Support for Management Processes” is the name of a project that was in the implementation phase in the analysed period, which was to allow for more effective acquisition of external funds for the development of the city, optimize the quality of implementation of these projects by the city hall and municipal organizational units, as well as support the management of the city hall in the field of project management in the city. The system will also improve the effectiveness of monitoring and assessment of projects implemented in the city, especially with the use of external funds.

The creation of a central book resource along with making it available on the Internet is the aim of the planned “Catalogue of Zabrze Book Resources”, which will allow to increase the effectiveness of services provided by the City Public Library, disseminate information on the book collections in Zabrze, and, consequently, contribute to shaping IT awareness and culture of residents and the ability to use modern technologies in practice.

“Intelligent Street Lighting Control” will enable, among others, visualization of points of light in map services, reducing electricity consumption by street lighting, and also reducing carbon dioxide emissions thanks to improving traffic flow. A street lighting failure notification system will be a component of the project.

The “Road, Network and IT Infrastructure Management System” aims to create a common hardware and software platform for managing the infrastructure of Zabrze: road, network and IT by building intelligent control systems.

The planned project was also the “Virtual City” assuming that a common hardware, internet and transaction platform will be created, which will allow all systems and e-services to be made available in one place to residents and other stakeholders or interested persons (e.g. tourists, students, seniors, etc.).

5. Possibilities of developing activities in the field of smart city

The potential for the development of activities related to smart city is illustrated by the fact that in 2021 90.4% of households in Poland had access to the Internet (Central Statistical Office, 2021). Programs for the dissemination of intelligent solutions must, however, take into account such parameters as, for example, the level of digital exclusion, inhabitants' habits, reluctance to take innovative initiatives, etc. Not only educational programs, but also extraordinary situations can be a catalyst for qualitative changes (Kuzior et al., 2022). However, they may cause a radical change in the habits related to direct service in the city hall, which is documented by an increase of up to 228% the number of cases handled remotely, revealed during the study on the use of the ePUAP platform during a pandemic. Interesting – not only in theoretical terms – is also the residents' desire to use tools facilitating access to public services (Mańka-Szulik, Krawczyk, 2022, p. 198).

The fact that it is easiest to implement innovations in large and rich cities with a larger population is evidenced by the results of a survey of employees of the Silesian University of Technology conducted in 2021 in 41 municipalities making up the Metropolis GZM, i.e. the first metropolitan area in Poland formalized by the Act of March 9, 2017 *on the metropolitan union in the Silesian voivodeship*. The subject of the analysis was the number of public services provided using the ePUAP digital platform in 2020 compared to the level before the pandemic in 2019. It turned out that the average increase was of approximately 170%. At the same time, larger urban areas recorded a higher scale of growth, as 228%, while in smaller municipalities an increase of only 141% was recorded. The increase in the number of e-services was also directly proportional to the income generated by municipalities per number of inhabitants. In the group of communes with the lowest income it oscillated around 150%, and in the richest it reached up to 200% (Kuzior, Mańka-Szulik, Krawczyk, 2021, p. 261). This indicates that the popularization of smart city solutions may not be evenly distributed throughout the country. Metropolitan areas (where the city covered by the study is located) have a chance to play an important role in this process, contributing to the implementation of modern solutions not only improving the provision of public services or access to the city offer, but also comprehensively facilitating social and economic life.

6. Summary

It is worth paying attention to the fact that the local government acquires funds from external sources to finance activities in the smart city sphere. On the basis of the cited data it can be said that some of such projects were financed entirely from funds that did not burden the city budget,

and most to a large extent. Maintaining a high level of co-financing means the need for the commune to find funds for its own contribution, but at the same time it provides access to extra-budgetary funds that allow the implementation of modern solutions in the area of smart city.

Taking the example of Zabrze it can also be seen that the smart city concept should be based on a sustainable development policy, assuming the rational management of city resources and taking into account the requirements of environmental protection while taking actions, with care for the next generations. The sphere of ecology is a unique challenge for local authorities in Polish cities in areas degraded by decades of exploitation of natural resource deposits and the functioning of heavy industry. Nature protection was not a strong point of the economy of the Polish People's Republic. The period of the political transformation after 1989 set new goals in the field of ecology, changing the economic foundations of economic activity at the same time. The initiation of the process of pro-ecological activities (including the use of legal and technological systems of air, water and soil protection) was accompanied by a reduction in the number of workplaces in particularly ecologically burdensome industries, such as coal mining, coke production, production of metallurgical products, etc. This meant the emergence of numerous social problems (e.g. structural unemployment) and challenges in the field of revitalization of areas contaminated by heavy industry (e.g. implementation of programs such as "Reclamation of land in the vicinity of Bytomka River", where the nature values were restored to 183 ha that were degraded and devastated by industrial activity, and at the same time – as reported at the City Council session on November 18, 2019 – among other: 8000 tons of wastes were removed, including 500 tons of tar and pitch, 100 000 m³ of land contaminated mainly with aromatic and aliphatic hydrocarbons were remediated, and 1800 trees and 29 000 bushes were planted). Activation, educational and investment programs (such as e.g. the development of Zabrze part of Katowice Special Economic Zone at the cost of 65 million PLN with 85% co-financing from the EU funds, which resulted in the purchase of real estate by 33 economic entities that invested over 1 billion PLN creating 1.5 thousand new workplaces). Currently, however, among the many activities defined in the "City Development Strategy - Zabrze 2030", smart city projects play an important role. They go far beyond the provision of public services reserved for administration. They make it possible to optimize the functioning of the city in its many dimensions, from increasing the quality of education, through improving economic and social life, to increasing the level of social participation in exercising local authority.

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