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# The role of participation in the development of the smart city idea: frameworks, opportunities, mechanisms

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**Abstract.** The progressing urbanisation process and its visible effects are prompting local authorities to seek new solutions to contemporary development challenges, especially those identified in post-socialist cities, including in Poland. Nowadays, the smart city concept is becoming widely popular. This idea is grounded in the principles of sustainable development in all spheres of socio-economic life. However, in a comprehensive approach, it moves away from its strictly technological definition towards the social context and local conditions. Nowadays, there are more and more instruments supporting social and civic activity of the inhabitants of Polish cities. One extremely popular mechanism is the participatory budget. In order to trace its importance in the implementation of the smart city concept, an empirical analysis was undertaken in Bydgoszcz (a medium-sized city in Poland). According to the research, the participatory budget is asymmetrical, with infrastructure investments dominating. Support is needed for pro-social activities and those activating residents. Therefore, the diversification of projects in the budget, including setting aside a pool of funds for pro-social and cross-district projects, should be viewed in a positive light.

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## 1. Introduction

Nowadays, one of the key elements of governance is the inclusion of the population in decision-making processes (Geekiyange et al., 2020). This is particularly evident at the local level, including in cities, where civic activity takes diverse forms and is implemented in many areas. This process is taking place differently in different parts of the world, including Europe. The fundamental variables are historical-cultural and socio-economic. In the case of European countries, there is a clear division between Western Europe and Central and Eastern Europe. They differ in the scope, pace, and dimensions of public participation. In Central and Eastern Europe, and therefore also in Poland, a deficit of civic participation experiences is identified due to the post-socialist heritage. This stems from the fact that socialism was grounded in centralisation and considered the voice of society superfluous (Chodkowska-Miszczuk et al., 2021).

The political and economic transformations of the late 1980s and early 1990s brought a wind of change. Nevertheless, it will take time and effective support, including institutional support, for these emerging new trends to have a chance to become firmly established in the Polish public space (Żuk & Szulecki, 2020). An extremely important direction has been the building of self-governance. The fact that it is becoming embedded in Poland resonates in other spheres as well. It entails a growing civic awareness and the creation of proactive attitudes that point to the fundamental role of residents in shaping the space around them (Maj-Waśniowska, 2015). With the liberalisation and internationalisation of the Polish economy, and the subsequent intensification of these processes after Poland joined the structures of the European Union (EU), further development trends have gained in importance. The search for a comprehensive solution that eliminates unfavourable symptoms of urban development at its various levels has begun. A smart city is one such concept (Szymańska, Korolko, 2015).

The smart city concept redefining the directions of development of Polish cities in line with the guidelines of European policies has become almost universal. It has gained widespread recognition due to political appropriation, including by EU initiatives

to support ventures that combine increased innovation with strengthening social capital, reinvigorating civic participation, and building responsive governance (de Jong et al., 2015; Kola-Bezka et al., 2016; Fernandez-Anez et al., 2018; Lewandowska et al., 2020). Such a comprehensive view of the smart city concept sheds new light on the understanding of urban intelligence and moves away from its strictly technological definition towards the social context and local conditions (Masik et al., 2021).

The progressing urbanisation process and its visible effects are prompting local authorities to seek new solutions to contemporary development challenges, especially those identified in post-socialist cities, including in Poland. Nowadays, the smart city concept is becoming widely popular. This idea is grounded in the principles of sustainable development in all spheres of socio-economic life. However, in a comprehensive approach, it moves away from its strictly technological definition towards the social context and local conditions. Nowadays, there are more and more instruments supporting social and civic activity of the inhabitants of Polish cities. One extremely popular mechanism is the participatory budget. In order to trace its importance in the implementation of the smart city concept, an empirical analysis was undertaken in Bydgoszcz (a medium-sized city in Poland). According to the research, the participatory budget is asymmetrical, with infrastructure investments dominating. Support is needed for pro-social activities and those activating residents. Therefore, the diversification of projects in the budget, including setting aside a pool of funds for pro-social and cross-district projects, should be viewed in a positive light.

## 2. Theoretical background

### 2.1. Participation and the development of the smart city idea

The smart city idea is multicontextual and multifaceted and is being implemented in various cities around the world; it is used both during the construction of new cities and the regeneration and revitalization of the existing ones (Szymańska

& Korolko, 2015; Lewandowska et al., 2020). As with any development concept, the overriding aim is to ensure sustainable economic growth and care for the quality of life of the inhabitants. However, it is extremely important that the smart city concept is strongly linked to sustainable development. In addition to environmental considerations, actions that increase innovation in all areas of life and an inclusive approach to managing urban development are at the forefront of the smart city concept (Marsal-Llacuna et al., 2015; Środa-Murawska et al., 2017; Masik et al., 2021). It is also important to properly create the image of the city as a modern and functional place to live, since the creation of a city brand based on the smart city concept can contribute to an increase in interest, an influx of investors, tourists, new residents and, as a result, economic growth (Kola-Bezka et al., 2016).

In the Polish context, research on the idea of a smart city initially focused mainly on its economic aspects. In the following studies, particular attention was also paid to the evolutionary nature of the smart city concept (Lozynskyy et al., 2021). According to this perspective, the basic of smart development is the total satisfaction of all infrastructural needs of city-dwellers. We then see smart city at level 1.0. The next steps in the evolution of the smart city concept—towards 2.0—occur when we can observe that all urban stakeholders responsible for the development and implementation of innovative solutions become involved to improve the quality of life of the inhabitants. Level 3.0 manifests itself in a real and highest possible degree of social inclusion in decision-making processes (Kowalska-Jonek & Wolniak, 2021).

Regardless of the definitional approaches, the smart city concept is currently gaining in importance. It plays a particularly significant role in the political layer, primarily as a means to develop political agency (Masik et al., 2021). In Polish central-level policy, the first regards to idea of sustainable urban development, and the smart city, appeared about a decade ago. These assumptions are referred to the United Nations and the European Union documents (Lozynskyy et al., 2021). The next stage—implementation—is not as promising as the smart path taken might suggest (Sikora-Fernandez, 2018). The ability of cities to adapt to climate change, i.e., their resilience is invariably

characterised by a certain degree of uncertainty resulting from infrastructural deficiencies, limited resources, including financial ones, and inefficient governance processes (Sarzynski, 2015; Kowalska-Jonek & Wolniak, 2021). As evidenced by previous research (Wathne & Haarstad, 2020; Esposito et al., 2021), the stage of development and the level of engagement depend to a large extent on local circumstances and the socio-economic context in which cities operate. The smartest cities in the world are those with the best financial standing, which definitely does not guarantee equal development opportunities for all urbanised areas, nor does it positively influence the spread of sustainable development (Kowalska-Jonek & Wolniak, 2021, Esposito et al., 2021). Therefore, it is not surprising that the availability of funding, but also innovation and new infrastructure investments are seen as a panacea for contemporary urban problems and smart growth.

The smart city model, focused on popularising innovation and technology, dominates mainly in transition areas experiencing the transformation from industrial centres towards modern business centres (Kowalska-Jonek & Wolniak, 2021). This is particularly noticeable in underinvested and underfunded cities marked by a post-socialist legacy. During the nearly 50 years of centrally planned economy, delays in modern solutions, including pro-environmental ones improving the quality of life of inhabitants, were constantly growing (Sikora-Fernandez, 2018; Wathne & Haarstad, 2020; Lewandowska et al., 2020; Chodkowska-Miszczyk et al., 2021). At present, it is difficult to expect that these backlogs, including infrastructural ones, will be made up for in a relatively short period of time, given the other present challenges related to post-modernisation, deregulation, and globalisation processes. Additional barriers to smart city development include entrenched top-down governance patterns and deficiencies in central-level policy support (Geekiyana et al., 2020; Masik et al., 2021). At the same time, it should be stressed that even cities in highly developed countries with significant finances and resources are slowing down in taking proactive measures against climate change. This raises the question of other factors determining the appropriate responses of cities (Sarzynski, 2015). One of these is undoubtedly the increasing role of

local communities in urban governance, which is a vivid manifestation of the implementation of place-based policy currently gaining prominence in EU policy (Churski 2018; Arsova et al., 2021; Esposito et al., 2021). This is because residents are able to identify the current problems and needs of their immediate environment and, most importantly, propose appropriate directions for change. This need is particularly highlighted in the case of post-socialist countries, where there is a deficit in inclusive action. Although public consultations are popular, collecting opinions on projects or strategies being prepared, but these are narrow and limited forms of participation. Their relevance to the overall governance process is poorly verifiable (Sarzynski, 2015).

In an era of growing popularity of sustainable projects that mobilise all social groups and economic sectors, a key challenge is the democratisation of decision-making and the sustainable inclusion of the population in the management of urban development (De Crescenzo et al., 2021). A partnership approach is required here, treating equally the intentions of local institutions and the expectations of urban space users. In order to define public participation as an effective tool, it should meet several essential criteria. It must be a decentralised, autonomous, transparent, and accountable process characterised by inclusiveness, responsiveness, and flexibility. Its success also depends on the ability of residents to receive support in terms of knowledge, experience, and competence (Sarzynski, 2015). The creation of public-private partnerships, i.e., the promotion of cross-sectoral cooperation, is a desirable manifestation of participation in climate governance. However, its highest form is co-production in the field of climate change adaptation, involving participation not only in planning activities, but also in their implementation. Co-production requires all parties involved to contribute their own resources. An example is crowdfunding, which, in the face of increasing budgetary constraints of the public sector, but also of the growing environmental and socio-spatial needs of cities, has the potential to become an effective governance mechanism (De Crescenzo et al., 2021). Development in accordance with the evolutionary view of the smart city concept may not be achieved without deep and long-term participation and the creation of conditions

for inhabitants to decide about the directions of development of their environment and to build a sense of empowerment (Kowalska-Jonek & Wolniak, 2021). Most cities, including post-socialist centres, are at the beginning of this path, consolidating all resources on meeting infrastructure needs. And it is these cities that can be considered as lenses focusing contemporary developmental problems of urbanised areas, including those requiring the introduction of corrective pro-environmental measures. The opportunity to do so lies in appropriate instruments, such as various forms of the sharing economy or participatory budgeting. From the viewpoint of analyses on limitations and opportunities of implementing the smart city concept, also in post-socialist cities, one insufficiently explored area is the perspective of local communities, their role and scope of participation in this process (Lewandowska et al., 2020; Kowalska-Jonek & Wolniak, 2021). Hence the proposal for this study that is focused on analysing the role of public participation in the implementation of the smart city concept.

## **2.2. Participatory budgeting – an effective way for inclusion?**

Participatory budgeting is an extremely popular tool enabling residents to express their opinions, satisfy their current needs and participate in decision-making processes concerning their immediate environment. Its origins date back to the 1980s. In 1989, in Porto Alegre, Brazil, this form of participation was used for the first time (Kamrowska-Zaluska, 2016; Leśniewska-Napierała & Napierała, 2020). The key objective at the time was to reduce corruption, improve the flow of information between local authorities and residents, and develop mechanisms for social control of investments made by municipal authorities (Budżety obywatelskie..., 2020). In the following years, participatory budgeting also spread to other countries: American, European, African, and Asian (Laruelle, 2021). It first appeared on Polish soil in 2011 in Sopot (Pomorskie Voivodeship). Infrastructural projects predominated among the submitted proposals. There was an initiative to create a city-wide waste sorting system. The relatively

simple procedure, fast implementation, and easily verifiable effects contributed to the popularisation of the idea in other Polish cities. Interest was so high that it eventually became an integral part of social participation (Kamrowska-Zaluska, 2016) and is even considered by some researchers as a new participation paradigm (Gomez et al., 2013).

Despite widespread public knowledge of the tool, the definition of participatory budgeting is nothing but plain and simple (Saguin, 2018). This is because we are dealing with an approach based primarily on communication, possibly dialogue with residents, but also with budget variants that take into account greater involvement of the users of urban spaces, either at the decision-making stage or in participation in financing, implementation, monitoring of the investment, and evaluation of its results (Gomez et al., 2013). Just as the levels of involvement of residents in the projects included in the participatory budget vary, so do the objectives for implementing it. One of these may be the political motive of building community favour with local decision-makers. This was also the case in Poland, when the election period saw an increase in participatory budgeting activities (Budżety obywatelskie..., 2020). From the perspective of local authorities, other rationales for using participatory budgets may also include: the desire to improve city management and decision-making, integration of the public, or efforts to improve the transparency of public spending (Gomez et al., 2013; Laruelle, 2021). They are also identified as a way to promote and shape civic awareness (Kamrowska-Zaluska, 2016). Despite the lack of a clear definition of participatory budgeting, its framework is quite well-defined. Firstly, the implementation of the budget must be grounded in the question of how to make the best use of the available (limited) budget. Secondly, participatory budgeting requires the involvement of municipal institutions, local authorities. Thirdly, the continuity of the process is important, but so is its cyclical nature. Fourthly, the spending of these limited resources must be preceded by public debate. Fifthly, the implementing entities should bear in mind their responsibility for project implementation, monitoring, and evaluation (Gomez et al., 2013; Laruelle, 2021).

Nevertheless, one should also take into account certain difficulties related to the effective

implementation of a participatory budget, which in Polish conditions is called 'civic budget' (Budżety obywatelskie..., 2020). Responsibility for implementing projects and monitoring their effects is distributed asymmetrically, resting primarily with local authorities. In the Polish legal system, until 2018, there were no regulations and legal rules for functioning the civic budget. Only in the Act of 2018 (Ustawa z dnia 11 stycznia 2018) were the laws of the civic budget in local (including urban) government units defined and specified.

They also often initiate and/or prioritise projects submitted by residents and select them according to current needs. Public debate very often takes the form of casting a vote for a chosen project (Gomez et al., 2013; Laruelle, 2021). However, what is so important is not only the process of gaining votes, but also building a diversified representation, obtaining the opinions of different social groups, and taking care to make the debate more realistic and, in a broader context, to prevent social exclusion. Indeed, the problem remains of convincing people who feel socially marginalised that they are entitled to and should be participating and expressing their opinion on the tasks proposed for implementation within the budget (Augsberger et al., 2017; Saguin, 2018). In addition to the merits, the total number of projects and the unit cost also play an important role. This leads to optimisation measures, both in terms of the number of projects chosen and the total cost of the budget. The unit cost must not be too high, so as not to allow the budget to be dominated by one project and of course not to exceed its total allocated cost (Gomez et al., 2013; Laruelle, 2021). Being aware of certain limitations of this mechanism, but also of the incredible popularity of participatory budgeting, its significance for the comprehensive reconstruction of urban development paths in the spirit of the smart city concept is clear. This is all the more important as the foundation of any undertaking in the field of climate change adaptation, building resilience and, more broadly, promoting sustainable development lies in long-term, cross-sectoral management. In turn, participatory budgeting appears precisely as a real opportunity to democratise this process (Kamrowska-Zaluska, 2016).

### 3. Methodological approach

#### 3.1. Research design and case study description

The authors combined research methods from the social sciences to forge a deeper understanding of the functioning of one of the extremely popular participation mechanisms, namely the civic budget, and to learn about its specificity and importance in the development of post-socialist cities according to the smart city idea. The implementation of such research tasks required above all the use of the contextual approach and case study analyses. To this end, from an empirical point of view, the present study was conducted in Bydgoszcz. It is a medium-sized city in Poland (population: 344,000, LDB SP) with a diverse functional structure, and consequently a diverse social structure, being one of the two capital cities of the Kujawsko-Pomorskie Voivodeship (NUTS 2). Bydgoszcz was selected for the detailed case study research after a thorough analysis of Polish cities in the context of the functioning of participatory tools and progress in the implementation of the smart city concept. Our task was to find a medium-sized post-socialist city whose authorities emphasise smart approaches and proactive measures in local development.

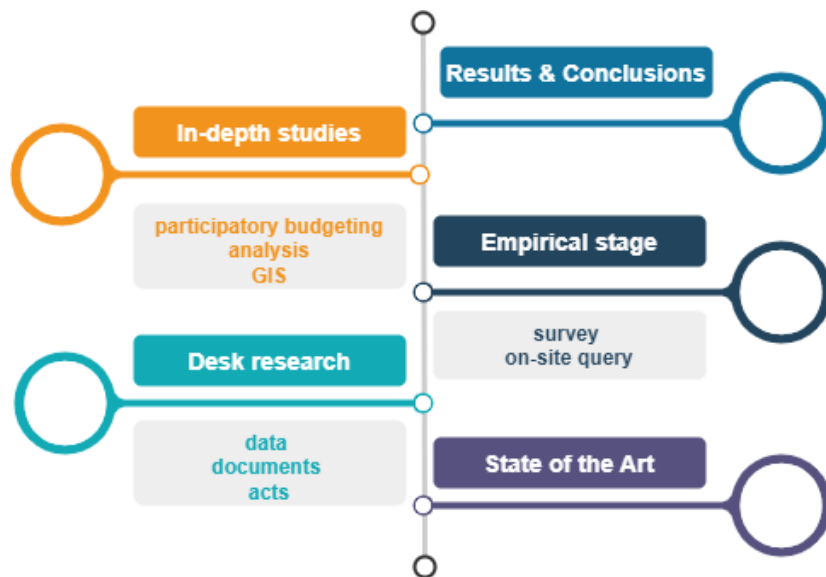
According to research, Bydgoszcz, as one of the first cities in Poland, began to employ the civic budget, also now has almost a decade of experience in the functioning of this participatory tool (<https://www.bdgbo.pl>). Moreover, the local authorities in Bydgoszcz have been trying to change the image of the city for years. In the past, the city had an industrial and socialist character, while nowadays the local authorities follow the 'smart' path of development. For example, Bydgoszcz is a member of the Association of Municipalities Polish Network "Energie Cités" (<http://www.pnec.org.pl/pl/stowarzyszenie/czlonkowie-zwyczajni>), an international organisation working to adapt cities to climate change, including supporting the development of the distributed generation system. The activities undertaken, also resulting from membership in international associations, give the city prestige and build its recognition. For over ten years, Bydgoszcz has been included in various

rankings of intelligent cities and has received international awards. It is worth mentioning that in 2007, Bydgoszcz, as one of five Polish cities, was included in a ranking of the 70 most intelligent medium-sized cities in Europe, taking 57<sup>th</sup> place (Smart cities: Ranking of European medium-sized cities, 2007). Furthermore, in 2013 the project to revitalise Mill Island (the most representative part of Bydgoszcz) was recognised internationally by winning a certificate in the prestigious RegioStars Awards (RegioStars Awards, 2013). And in 2020, the city won the international Eco-City 2020 competition in the energy efficiency category, as the jury appreciated the implementation of projects for the development of renewables in various public facilities (<https://www.eco-miasto.pl/ktore-miasta-dolaczyly-do-grona-zwyciezcow-konkursu-eco-miasto/>). The case study method allows for an in-depth, multifaceted analysis of the discussed issues. The selection of a medium-sized Polish city with a diversified functional structure enables the obtained results to be used as references in the context of the smart city development in the other post-industrial and post-socialist cities, not only in Poland but throughout all the Central European Region.

#### 3.2. Methodology and data

In light of the above, we would like to find out whether and to what extent the strong image of Bydgoszcz as an inclusive smart city is reflected in the real inclusion of citizens in the decision-making process and promotion of development in line with the smart city concept. In order to be able to trace these issues, a multi-stage research procedure was undertaken (Fig. 1.).

The first stage of the research involved literature studies on smart city issues and the role of citizens in shaping sustainable urban space. A particularly important element of the initial phase of the research was the analysis of municipal documents and data made available by the Bydgoszcz Municipal Office. The study of the Bydgoszcz Development Strategy (2020) and the legislation regulating the operation of the Bydgoszcz Civic Budget (BCB) participatory tool allowed us to learn how participatory tools are implemented in Bydgoszcz and what importance



**Fig. 1.** The methodological roadmap for the study

Source: own elaboration

they bear for the implementation of the smart city concept in the city. This is also pointed out by the city authorities, emphasising in the Bydgoszcz Development Strategy (2020) that civic awareness regarding participatory tools and activities of city authorities is an essential element of the functioning of a smart city (Development Strategy, 2020).

The next—empirical—stage of the research was therefore focused on finding out the inhabitants' opinion on the initiatives undertaken by the municipal authorities, which was obtained by means of a questionnaire survey. A total of 353 questionnaires were obtained. After verifying the responses, 350 questionnaires were used for further analysis. The aim was to collect a balanced sample that reflected local social characteristics. Thus, the majority of respondents were residents of Bydgoszcz, which allowed us to conclude that they were people who had frequent contact with the urban environment. They declared having mainly higher and secondary education, which is a typical characteristic of urban residents (Potencjał..., 2019). The survey was conducted in April and May 2021 using the Computer Assisted Web Interview (CAWI) method. The decision to conduct the survey in this way was dictated by both practical and pragmatic considerations. Questionnaires were sent to respondents via the Internet, namely emails and social media. This method of distribution was

dictated, among other things, by the epidemic situation in the country. In addition, the CAWI technique allowed us to collect a large number of responses in a relatively short time and to reach numerous respondents (Hołdakowski, 2006). The survey form was formulated based on approximately a dozen closed-ended survey questions, using a hybrid mode: multiple-choice answers were included next to nominal and dichotomous scales. The use of multiple-choice answers is highly appropriate in this case because respondents respond to these types of questions more easily, as they do not require too much time and attention, which allows for a satisfactory survey result and an acceptable level of saturation (Sato, 2004; Francis et al., 2010). The idea of the survey was to learn the awareness and attitudes of residents towards urban projects and to capture peculiarities in this regard in line with (van der Ploeg's, 2021) conclusion that referring to the empirical context of research does not necessarily mean using it as evidence in a study.

An in-depth study of the BCB and the initiatives implemented under it was undertaken in the subsequent research stage. The choice of this participatory tool for further research was dictated by the fact that the results of the surveys implied its great popularity among city residents. All necessary data was obtained from an open archive, which can be accessed via the official Bydgoszcz Civic Budget website (<https://www.bdgbo.pl/>). Both quantitative

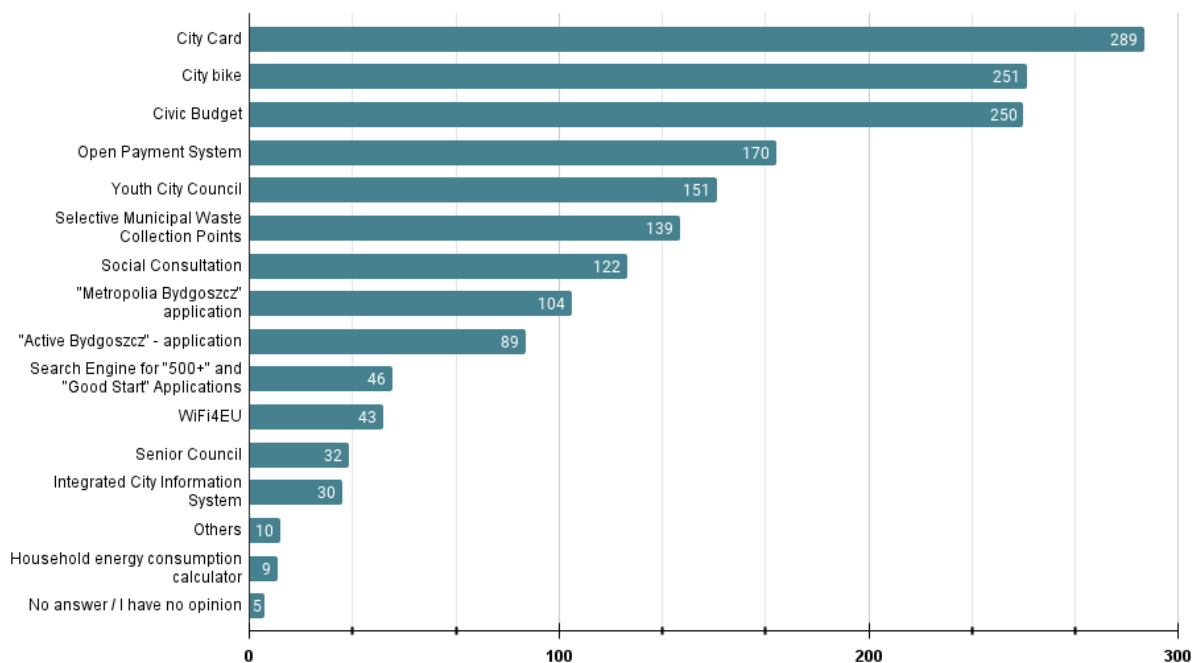
issues concerning the attendance, number of projects submitted and accepted for implementation, their costs, and qualitative issues covering the content and relating directly to the implemented projects were thoroughly analysed. This research was performed in the dynamic approach taking into account the entire period of BCB operation, i.e., the years 2012–2020, with a two-year time interval. By performing a qualitative analysis, BCB projects were structured, thus making up seven main types: (1) neighbourhood greenery, (2) sport and recreation, (3) transport infrastructure, (4) lighting and improving neighbourhood safety, (5) cultural and social initiatives, (6) health care, and (7) environmental action. This allowed us to extend the analysis to include the spatial context. By assigning the collected data on the number of submitted and completed projects, attendance, costs and type of projects to the functional units of the city (districts), we received a picture of the spatial distribution of residents' civic activity, but also of the challenges faced by the residents of the various parts of Bydgoszcz. The analyses were

based on a map of Bydgoszcz divided into districts available on the official website of the city (<https://www.bydgoszcz.pl/>). The city map was digitised in the CorelDraw graphic software, and then the appropriate class ranges and colours were selected to best present the aspects under study in relation to the spatial units.

#### 4. Research results

##### 4.1. Smart city idea in theory and in local practice

The smart city concept is quite strongly outlined in the local political perspective. It provides a basis for assessing the development of the city of Bydgoszcz, i.e., a medium-sized urban centre in Poland with a diversified functional structure, marked by a post-socialist heritage. It plays an important role in the construction of the development strategy of the city of Bydgoszcz until 2030, including the setting



**Fig. 2.** Structure of responses to the question: *Do you know about number of initiatives taken by the city authorities?*  
Source: own study, N=350.



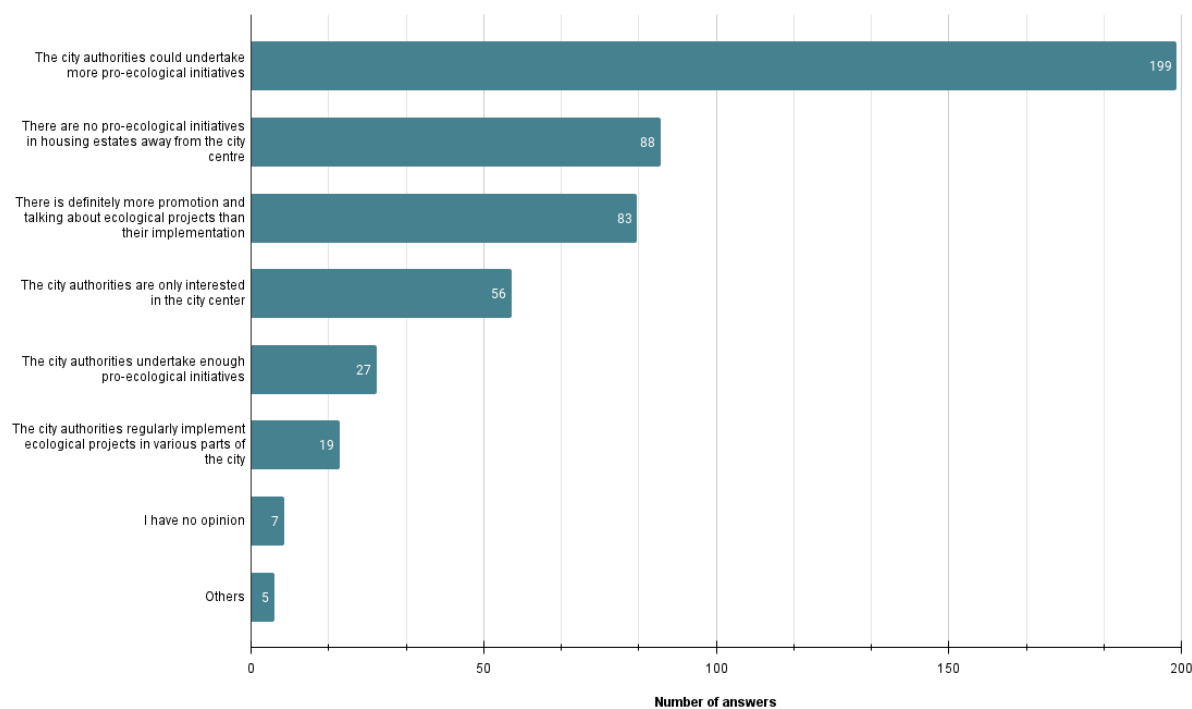
of multi-contextual goals according to the division into six key smart areas: I – efficient and effective city management (smart governance), II – active, open, and competent citizens (smart people), III – friendly living conditions (smart living), IV – healthy and safe environment (smart environment), V – modern transport and communication, VI – modern economy (smart economy) (Development Strategy, 2020). Each of these areas sets out desirable courses of action and the results achieved should, as intended by the city authorities, lead to a high level of smartness in the near future. Various initiatives undertaken by municipal authorities may provide an opportunity to implement these demands.

By verifying the inhabitants’ awareness of smart initiatives undertaken by the Bydgoszcz city authorities that serve to implement the Strategy, we obtained a prioritised structure of city projects (Fig. 2.). According to those surveyed, the most popular are: Bydgoszcz City Card (289 votes), followed by the Bydgoszcz Agglomeration Bicycle (251 votes), and the Bydgoszcz Civic Budget (250 votes). Other projects received fewer votes – less than 200. It is noteworthy that only five survey participants

did not give an answer or answered that they had no opinion regarding their knowledge of urban projects. On a positive note, respondents were also willing to point to other, often lesser-known projects, such as an application that allows people to report problems related to road infrastructure, greenery maintenance, pollution, or the aesthetics of specific places in urban space (<https://www.dbamy.bydgoszcz.pl/>).

The vast majority (92.5%) of those who responded to the question on city initiatives indicated that they had knowledge of more than one project of the city authorities. Among respondents who marked only one initiative (26 people), the majority lived outside of Bydgoszcz (65.5%), especially 18–25-year-olds living outside the city, and therefore had limited contact with the city authorities and were not direct addressees of the messages formulated by the local government to city residents. The least popular projects, e.g., the Household Energy Consumption Calculator or the City Information System, were mainly known to people with a university degree.

Apart from awareness, the opinion of residents on the pro-environmental initiatives undertaken



**Fig. 3.** Structure of responses to the question: *How do you assess the environmental initiatives undertaken in the city?*  
Source: own study, N=350.

by the authorities to bring Bydgoszcz closer to the smart idea is also valuable (Fig. 3). More than half the people (58.9%) who expressed an opinion said that the city authorities could take more pro-environmental initiatives. Analysing the answers, it can be noticed that negative opinions definitely predominated. A significant proportion of respondents emphasised that there was a lack of initiatives in housing estates away from the city centre (26.2%) and that the municipality was only interested in introducing such initiatives in the city centre (16.6%), which is the most representative part of the city. Moreover, the opinion was voiced that local government officials definitely talked more about environmental projects than they acted in terms of their implementation (24.2%). This sounds worrying, especially in the context of the growing popularity of hoax pro-environmental activities (greenwashing) that primarily serve to build a 'green' and responsible image (Cislak et al., 2021). When identifying shortcomings in this area, respondents highlighted challenges in maintaining cleanliness and tidiness in areas by the water (places of particular importance for the city's development), as well as faulty information boards at public transport stops.

According to the conducted research, the implementation of the smart city concept has shifted to focus on infrastructural projects connected mainly with the current transport needs of the inhabitants (smart 1.0, Kowalska-Jonek & Wolniak, 2021). Hence respondents are predominantly familiar with the city card used to pay for the use of public transport, or the development of a form of sharing economy – the bicycle-sharing system. The high awareness of residents in this area testifies to

the social relevance of issues related to movement in urban space. In addition to transport projects, one participatory tool, the civic budget, was also among the triad of the most popular smart urban initiatives. It is also significant that the respondents, while defining their attitude towards urban pro-environmental undertakings, formulated concrete postulates and articulated deficits in this scope, e.g., indicating the need for spatial diversification of smart urban solutions.

#### 4.2. Participatory budgeting – how does it work?

The civic budget is one of the most dynamically developing mechanisms of participation in Polish cities, so it comes as no surprise that also in Bydgoszcz it is a flagship pro-social and pro-environmental city project. The BCB initiative has been implemented since 2012. Projects are submitted to the programme by city residents, and are then verified, i.e., checked for feasibility, funding, and compliance with the spending plan of the local authorities, and finally approved by a specially established team within the local administration. These initiatives are then selected by popular vote to be implemented by the municipality (Fig. 4.). Every resident of Bydgoszcz who is at least 16 years old and lives in the city may take part in the vote. It is worth mentioning here that in 2021, the municipal authorities abolished the age criterion, so that all residents could take part in the vote regardless of their age (Uchwała nr XLI/913/21). There are two ways to cast a vote: analogue and digital. Analysing the period under study, changes in this respect are

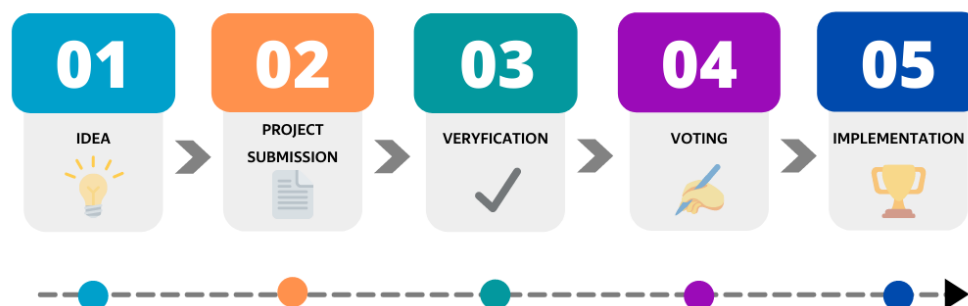


Fig. 4. The scheme of operation of the Civic Budget  
Source: own elaboration

evident. In 2016, the median share of electronic votes was 39.3%, while in 2018 it was already 71.2%. The social immobility associated with the pandemic situation has significantly intensified this process. It is also noteworthy that extremely active in this field are young people for whom the Internet is a natural environment (Wylon et al., 2018). In 2016 alone, for example, one in ten votes was cast by someone under 35, and voters aged 50 and over accounted for 6% of the total at the time. Most electronic votes were cast in districts with relatively young residents, and notably the ranking of districts with the highest share of electronic votes has remained almost unchanged. The same people have been voting in each instance.

Each of Bydgoszcz's districts is allocated a specific amount of money according to the number of residents. A voter can cast a maximum of three votes – one for a small community project, one for a district project, and one for a cross-district project. The projects that have gained the most support are then implemented. Responsibility for their implementation rests with the city authorities ([www.bydgoszcz.pl](http://www.bydgoszcz.pl); <https://www.bdgbo.pl>; Raport o stanie..., 2019).

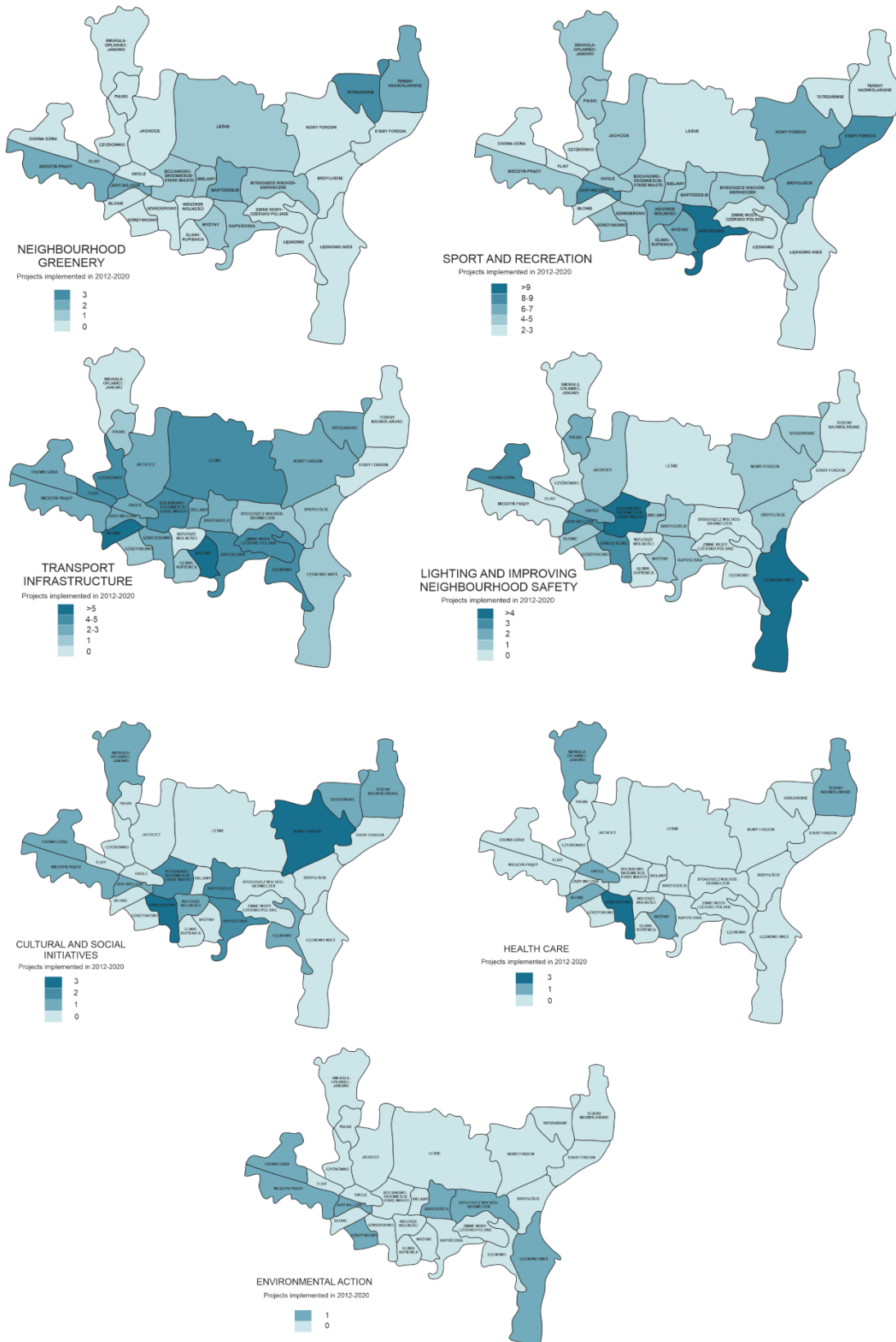
As in other cities in Poland (Raport o stanie..., 2019), Bydgoszcz is experiencing a growing popularity of this tool every year, as reflected in the number of votes cast or the total value of projects. The BCB is indicated by respondents as one of the three most popular urban smart initiatives (Fig. 2.). The extremum was set in the years 2018–2019, the time of local government elections in Poland. In recent years, a marked slowdown in growth has become apparent. On the one hand, this may indicate a certain degree of maturity of this participation mechanism, as well as the effects of legislative changes concerning the formalisation of the functioning of participatory budgets in Poland (Ustawa z dnia 11 stycznia 2018; Kociuba & Bielecka, 2021). On the other hand, the process of slowing down coincided with the COVID-19 pandemic situation, which generally contributed to a reduction in social activity and proactive measures funded by local authorities, which were facing increasing financial problems (<https://www.prawo.pl/samorzad/budzety-obywatelskie-z-mniejszymi-kwotami-przez-covid-i-slaba,503322.html>). A total of 323 different projects were carried out with

a total value of almost PLN 46 million (around EUR 10 million). Among district projects, i.e., the most popular ones, the average value in 2012 was almost PLN 900 thousand, in 2020 – PLN 1.8 million, and the highest was in 2018 – PLN 2.2 million. The average per capita values from the individual years of implementation of the civic budget show an increase in the funds allocated for this purpose. Nevertheless, compared to other Polish cities, Bydgoszcz is not among the leaders. In 2018, the BCB had a value of PLN 38 (€8.3) per capita and in 2020 PLN 46 (€10). For comparison, in some Polish cities this value exceeded PLN 100 (€22) per capita (Raport o stanie..., 2019).

### 4.3. Participatory budgeting and the smart city concept

In order to shed more light on the participatory budget as a potential tool to implement the smart city concept, we structured the projects in terms of their content. They were classified into one of the seven types that were identified in the course of the research. The identified groups of projects relate to issues such as: neighbourhood greenery, sport and recreation, transport infrastructure, lighting and improving neighbourhood safety, cultural and social initiatives, health care, and environmental action. A spatial analysis of the types of projects carried out in different parts of the city allowed us to identify which initiatives are most popular in Bydgoszcz's districts, but also which challenges their inhabitants are facing.

By far the most frequent group of projects in the surveyed years are those related to sport and recreation in the broad sense (135 projects). Initiatives that fall into this category are mainly related to the creation or modernisation of playgrounds or recreational spaces, such as outdoor gyms or sports fields. It is worth noting that at least two initiatives in the category of sport and recreation were implemented in each of Bydgoszcz's districts (Fig. 5.). Many projects of this type are located in districts with a relatively high number of inhabitants, such as the neighbouring Kapuściska, Wzgórze Wolności, or Wyżyny, as well as Nowy and Stary Fordon, which are slightly more distant from the centre. The most frequent projects there



**Fig. 5.** Initiatives implemented under the Civic Budget in Bydgoszcz's districts  
Source: own study

are those related to the creation or modernisation of playgrounds or sports spaces, which may indicate that these districts are inhabited by young people, who are more likely than older generations to show interest in such activities. In districts located on the outskirts of the city, such as Łęgnowo, Łęgnowo Wieś, Tatrzańskie, or Tereny Nadwiślańskie, there are far fewer projects in the sport and recreation category. This may be due to the fact that residents there continue to face challenges that prevent them from selecting projects related to ancillary activities and choose to vote for initiatives that will address more pressing needs, such as infrastructure deficiencies, transport, or safety issues.

Projects related to transport are the second most frequent project type in the Bydgoszcz Civic Budget. Over the years studied, 74 projects of this type were identified. The transport category includes initiatives mainly related to repairing or constructing a pavement, road, or car park. A spatial analysis of the number of projects of this type shows that they are implemented in almost all districts of Bydgoszcz, with the exception of three districts on the outskirts (Smukała-Opławiec-Janowo, Tereny Nadwiślańskie, Stary Fordon) and one in the city centre (Wzgórze Wolności) (Fig. 5.). This shows the gravity of Bydgoszcz residents' need for solving problems related to transport, the state of the roads, or pavements – they are willing to vote in large numbers for projects of this type. This proves that in many places there is still a high demand for solving transport problems and improving urban space to make it friendly for both pedestrians and people travelling by public and private transport.

Initiatives that aim to improve the safety of the city's inhabitants constitute an important type of projects, not only because of their popularity among residents (in the surveyed years these projects were ranked third in terms of number – there were 32 of them), but first and foremost because they relate to a very important issue. In this category, the most frequent projects concerned measures such as installing CCTV or lighting up pedestrian crossings, pavements, and roads. Looking at the map of Bydgoszcz showing the spatial distribution of initiatives improving safety, one can see that they were most popular in two very different districts (Fig. 5.). On the one hand, there is the centrally located Bocianowo-Śródmieście-Stare Miasto district and

the neighbouring districts, where projects relating to security focused mainly on extending the city's CCTV system. On the other hand, in Łęgnowo Wieś situated on the outskirts of Bydgoszcz, the priority was to illuminate streets and pedestrian crossings. This illustrates that in both centrally located and remote districts, residents are exposed to deficiencies in infrastructure which directly affect their sense of security in urban space.

The projects that did not enjoy particular popularity in the surveyed period were cultural and social initiatives (20 projects). The characteristics of district projects of this kind carried out as part of the Bydgoszcz Civic Budget are also specific. Most of these initiatives were related to the revitalisation of historical monuments or symbols, education, or the modernisation of facilities for cultural events. It is encouraging to see that over the years, more and more projects have promoted the arts and brought people together, namely initiatives such as open-air concerts and art galleries, or 24-hour libraries (book-o-mats). However, these are still isolated cases. As far as the spatial distribution of social and cultural projects is concerned, the largest number of projects (3) were carried out in the most populous district in Bydgoszcz, Nowy Fordon, and in the central, also quite numerous, Szwedkowo (Fig. 5.). It is worth noting that districts away from the central part of the city, located on the outskirts, also experience the mobilisation of residents for cultural and social initiatives.

Among the least popular projects were those concerning the development of green areas in the public spaces of cities and mitigating the effects of degradation of the natural environment, i.e., projects defining smart development in its most fundamental sense. Projects concerning neighbourhood greenery, relating to such activities as planting plants, revitalising parks and green areas, or creating new green areas, were carried out relatively rarely in the surveyed years. During the five editions of Bydgoszcz Civic Budget only 18 projects of this type were identified. Nevertheless, 'green' initiatives were the most popular in the 2020 vote, seven of them won. This may be linked to the pandemic situation in the country and around the world. For security reasons, many places such as cinemas and shopping malls were closed, depriving the city's residents of many ways to spend their leisure time.

City-dwellers had to start looking for other places to rest and be active outside their place of residence. Many of them could realise that greenery in their immediate surroundings gave them the chance to spend their free time safely and enjoyably. As noted by Noszczyk et al. (2022), green spaces provide people with countless intangible benefits, especially important during crises.

When analysing the spatial order of greenery projects in the city, it can be seen that they are distributed in a specific way (Fig. 5). Most initiatives of this type were located in the Tatrzańskie district, which is situated on the outskirts of the city. Two initiatives were carried out in the neighbouring Tereny Nadwiślańskie district. Both of them are far from the city centre. At the same time, they are adjacent to the forests surrounding Bydgoszcz and areas of valuable nature, including Natura 2000. The same is true of the Miedzyń-Prądy district, located at the opposite end of the city. Interestingly, in the mentioned districts away from the centre, projects related to neighbourhood greenery mainly considered the creation of new green spaces. Projects that developed new parks or adapted previously undeveloped forest areas, meadows, and wastelands in order to better adapt them to the needs of the residents were the most popular option among greenery projects. Thus, we may conclude that the inhabitants of these neighbourhoods perceived the problem of a shortage of well-planned green areas that met their needs and so they initiated actions to change this situation. The projects that were carried out in the central part of the city were of a slightly different nature. 'Green' initiatives there were mainly related to the revitalisation of already existing parks involving, for example, the planting of vegetation or the extension of park areas. This can be seen, for example, in the Bartodzieje district, where one of the best-known parks in Bydgoszcz is located by the artificial water reservoir Balaton, or in the Jary-Wilczak district, where the Moon Park and Canal Park were revitalised.

The smallest number of initiatives carried out in the surveyed period, apart from those related to health care (eight projects), were those aimed at caring for the environment (seven projects). Environmental projects included undertakings such as purchasing litter bins, dredging ponds, and installing malodorous gas detectors. Projects

of this type were mainly located in districts with environmental problems, such as the Łęgowo Wieś district (Fig. 5.), which is home to many industrial plants and until recently was an area housing entities particularly arduous for the environment and the inhabitants, the effects of which are still felt today.

## 5. Discussion

### 5.1. The best tool for smart city development?

The smart city concept is being implemented in an increasing number of cities around the world, also in Poland. It has gained international fame through proper promotion and political appropriation (Masik et al., 2021). What distinguishes the smart city idea is its holistic approach to the issue of urban development (Szymańska, Korolko, 2015). A city defined as smart should care for the environment, but at the same time introduce numerous innovations in the economy, transport, or city management, which, as a rule, should be based on the foundation of inclusiveness (Kowalska-Jonek & Wolniak, 2021; Masik et al., 2021; Ramos, 2021). The smart city concept has no single binding definition and is flexible enough to be successfully adapted to specific local conditions. Rather, it should be considered in the context of a mobile and networked local development strategy aimed at transforming local contexts and mobilising local resources (Wathne & Haarstad, 2020).

The considerations carried out in this study with reference to Bydgoszcz—a post-socialist and post-industrial city—show that the focus in the implementation of the smart city concept in cities of this type has now definitely shifted to infrastructural projects (smart 1.0.). Among these, the most important issues requiring an appropriate response from local authorities are the transport needs of residents (Ribeiro et al., 2021). However, this does not mean that other expectations should be overlooked or moved to the background. Planning the future of the city in accordance with the principles of sustainable development or the smart city idea, as defined by the Bydgoszcz city authorities (Development Strategy, 2020), requires attention to all dimensions of this concept. Otherwise, the smart city concept will be seen primarily as a tool

for political agility (Masik et al., 2021). Particular deficits in this respect in post-socialist cities can be seen at the stage of engaging citizens in the decision-making process (Chodkowska-Miszczuk et al., 2021).

One extremely popular tool for involving residents in city management (and as this research shows, this is also the opinion of the users of urban spaces) is the participatory budget, called the civic budget in Poland. Nevertheless, its popularity does not translate so clearly into its effectiveness in urban space management. As Kamrowska-Zaluska (2016) notes, the impact of projects implemented through participatory budgeting is limited. At the root are primarily the funds allocated for this purpose, which in Poland reach values ranging from PLN 10 (€2.2) to over PLN 100 (€22) per capita (Raport o stanie..., 2019). In the case of the analysed BCB, this value is PLN 50 (€11). While being aware of the weaknesses of the civic budget, its indisputable advantages should also be pointed out. Apart from the real possibility to finance the most urgent projects articulated by the inhabitants in a relatively short period of time, its essential role is reflected in the promotion of social activity, support of communication between the municipal authorities and the inhabitants and building trust in local government. It is not only the increasing number of projects and the total amount allocated to the civic budget each year that should be viewed in a positive light, but also the diversification of projects. In the period under review, we saw an increase in the number of larger-scale, cross-district projects, dedicated to all the inhabitants of the city, as well as projects for social and integration purposes. Therefore, the civic budget has a real chance not only to contribute to increasing the transparency of public finance management, but also to become an effective tool for democratising planning decisions (Kamrowska-Zaluska, 2016; De Crescenzo et al., 2021; Kassen, 2021), which is the most anticipated manifestation of the smart city idea (3.0) (Kowalska-Jonek & Wolniak, 2021)

## 5.2. Participatory budgeting in the face of contemporary challenges

In order to ensure the proper functioning of participatory budgeting in the face of contemporary challenges, including those related to the implementation of the smart city concept, the local authorities should consider several fundamental issues. The first one is the need to diversify those who vote for projects to be implemented under the budget. As the results of the research show, the number of voters is increasing every year, but the structure of this group still seems to be too homogeneous. This process involves socially active people. It is difficult to convince others with a rather passive attitude, which, according to Augsburg et al. (2017) and Sagun (2018) may lead to socially unbalanced participation in the budget. In the case of Bydgoszcz, an opportunity may lie in the abolition of the age criterion for people taking part in the vote. Although, as noted by S. Zeldin et al., (2007), inviting minors to participate in the decision-making process means at most confirming the decisions made by adults. The cultural distinction between childhood and adulthood is too strong in society to allow young people to actually express their own opinions.

Support in efforts to diversify those involved in the budgeting process should be sought from institutions that are widely trusted, including NGOs or, for example, parishes and other church institutions. Compared to other entities, they are characterised by greater local embeddedness and a strong relationship with place (Hughes, 2019), which certainly builds their credibility as potential sites for information transfer, civic awareness formation, and—more broadly—social capital building (Chodkowska-Miszczuk, 2016; Geekiyanage et al., 2020). Their inclusion would allow the local authorities to reach a wider audience, including senior citizens. And according to the principle that creating broad cross-sectoral partnerships is the starting point for effective participation (Kamrowska-Zaluska, 2016; Leśniewska-Napierała, Napierała, 2020), religious institutions can become important actors in this process, especially in Poland, which is a country with strong religious

traditions and presence of religion in the public sphere (Pabich, 2020).

New allies in the development of participatory budgeting (Geekiyana et al., 2020), including ecclesiastical entities, cannot be engaged without education on the subject (Hilburn & Maguth, 2015) focused on shaping active attitudes and civic awareness. This process should follow the principle of place-based education (Chodkowska-Miszczuk, 2021), using local experiences embedded in specific local contexts and conditions. Every group in society should be subject to the promotion of civic activities and their benefits (Geekiyana et al., 2020). Nevertheless, the situation of young people as creators of urban spaces requires special attention. Indeed, properly tailored civic education helps to learn about the inner workings of the local community and increase positive associations with civic life (Augsberger et al., 2017). With the fruits of civilisational progress and technological development at our disposal, researchers recommend boldly using the opportunities offered by social media and the Internet for this purpose (Moreno-Ibarra & Tomez-Ruiz, 2019). The progressive process of digitalisation is also visible, for example, in the increasing proportion of votes cast electronically. At this point, it is also important to stress the fact that the democratisation of municipal decisions must not only focus on recruiting the right group of voters. This is because inclusive development applies to each developmental stage and includes society's responsibility during the implementation of investments and the evaluation of the results of projects funded by participatory budgets.

The directions of spending the funds from the participatory budget should also be considered. As the results of this study show, the largest pool of funds is allocated to infrastructure needs, including those related to recreation (making leisure activities more attractive for residents), but above all transport projects and those increasing safety in the city. Environmental protection, social inclusion, and urban green space management initiatives are addressed only marginally. At the same time, it is worth emphasising here that the circumstances resulting from the pandemic situation, i.e., social isolation and spatial immobility, induce citizens to pay more attention to the benefits of access to green areas in their immediate surroundings (Noszczyk

et al., 2022). Such strongly defined areas of activity of the participatory budget, almost invariable over time, are an expression of the current needs of the inhabitants on the one hand, and reflect the fundamental premise of the development of Polish cities based on 'hard' infrastructural investments on the other (Masik et al., 2021). This identified asymmetry in the objectives of spending funds from the participatory budget undoubtedly does not contribute to making the smart city concept more realistic, but rather it reinforces the facade character of this participatory tool. Some researchers mentioned that the participatory budget is still much more a result of development processes than a tool for achieving the goals (Leśniewska-Napierała, Napierała, 2020). Nevertheless, infrastructural and technological advances promise to solve many of today's challenges, especially in a highly competitive environment. A diversified approach is a crucial point, in both quantitative and qualitative terms, and should be the basis for any action. This is because a contextualisation of smart development considers it legitimate to design and implement projects in line with the socio-economic needs of all users of urban spaces, not just selected groups acting as decision-makers (Wathane & Haarstad, 2020).

## 6. Conclusion

The progressing urbanisation process and its visible effects are prompting local authorities to seek new solutions to contemporary development challenges. Nowadays, the smart city concept is becoming widely popular. It represents an extremely flexible approach to desired development directions, responding to local circumstances. This idea is grounded in the principles of sustainable development in all spheres of socio-economic life. This notion is so popular that in some cities it is the axis of local development strategies, as for example in the case of Bydgoszcz (a post-industrial medium-sized city located in Poland), which is considered in this study.

In the light of the results of our analyses, the popularity of the participatory budget as one of the tools of the city development management process becomes evident. This mechanism is gaining in importance every year, which is reflected, for example, in the increasing number of votes cast for



projects to be implemented under the budget, or in the number of initiatives taken. The participatory budget is undoubtedly a reflection of the current infrastructural needs of the inhabitants resulting from the socio-economic and spatial development of the city, among other things. Given the fact that effective implementation of the 'smart' concept requires a comprehensive approach, we can identify a need for greater attention to the issues of social inclusion, and expansion of forms of social dialogue, as well as inclusion of the public in the city management process. Therefore, the diversification of projects in the budget, including setting aside a pool of funds for pro-social and cross-district projects, should be viewed in a positive light.

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