What is the current state of geoparticipation in Czech municipalities?

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Abstract

The active involvement of citizens in decision-making processes via geoparticipatory spatial tools is becoming a popular research field among geographers, GIScientists, environmental psychologists, political scientists and many others. This paper presents the idea of the Index of geoparticipation – an indicator-based index divided into three dimensions (communication, participation, transparency) that helps to evaluate the state of geoparticipation among Czech municipalities. It describes the current state of geoparticipation at the municipality level in Czechia. It aims to fill the research gap in finding which components of geoparticipation at the municipality level are being used, and how their use is affected by the size of municipalities and their membership of Local Agenda 21 networks. The paper builds upon an extensive dataset collected by the authors from all Czech municipalities (n=6 258) and presents various “shades” of geoparticipation in Czechia.

Keywords

Geoparticipation,
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Highlights for public administration, management and planning:

- The highest average values of the Index of geoparticipation were obtained from the regions' capital cities, followed by statutory cities, municipalities with extended powers, municipalities which are members of the Healthy Cities of the Czech Republic (HCCZ) network and cities.
- HCCZ member municipalities use geoparticipatory tools significantly more than the rest of the Czech municipalities
- The communication dimension is the most widely implemented pillar of the Index of geoparticipation
- There is no significant relationship between social exclusion and geoparticipation at the nationwide level

1 Introduction

Democratic innovations are being employed all over the world to encourage active citizenship and strengthen democracy. In particular, they are being used by local governments, with the expectation that greater participation by the citizens will benefit democracy (Pateman 1970, Putnam 2000). However, concerns have been raised about the rising inequality in levels of participation (Dalton 2017, Schlozman et al. 2013). This participation gap is usually studied within the context of individual data. We argue that opportunity structure may also be significant, and therefore we ask: Are there

differences in the spatial distribution of geoparticipation? If so, what are the main drivers of the inequalities?

This exploratory paper describes the current state of geoparticipation at the municipality level in Czechia. The post-communist societies have been slower in adopting democratic innovations and, as a result, they are understudied. Our research utilizes a unique dataset of all Czech municipalities (n=6 258) in order to fill the research gap in understanding what are the key components of geoparticipation at the municipality level and how are these components affected by the size of municipalities and their membership of Local Agenda 21 net-

works such as Healthy Cities of the Czech Republic (HCCZ).

The first section presents geoparticipation within a broader framework of citizens' participation. It prepares the ground for the methodological section, where the Index of geoparticipation is constructed. After a brief overview of the data, we explore the relationship between spatial factors and the Index of geoparticipation. The results also provide visual analysis of the Index of geoparticipation in the form of maps. We conclude by comparing the spatial differences in geoparticipation with the Index of Social Exclusion and discuss the implications for further research.

2 Geoparticipation and local governance

Ever since Californian social worker Sherry Arnstein (1969) introduced her "Ladder of Citizen Participation" there have been numerous attempts to order, rank and visualise the modes of active involvement of the public in local governance. Nevertheless, public involvement in urban planning precedes Arnstein's seminal work. Democratic movements involved the community in local planning and development decision-making as early as the 1930s (Guldi 2017). In the 1940s Demerath (1947) stressed that community participation was one of the six major problems of urban planning. In urban planning theory, the integration of citizen participation is widely discussed as democratic urban planning by Jacobs (1961). In 1964 the United States Economic Opportunity Act urged "*maximum feasible participation in state-funded urban and rural community programmes*" (Economic Opportunity Act 1964). In 1965 the Planning Advisory Group in the United Kingdom presented a directive calling for public participation in plans issued under the Town and Country Planning Act (Taylor 1998). Thus, Arnstein's work reflects the emancipatory movement in Western democracies in the 1960s. The Fair Housing Act, signed into effect in 1968, represents the culmination of the civil rights movement in the USA. In the same year, student's protests in Paris signalled a value change among the Western public (Inglehart 1971). Consequently, the initial focus of democratic theory in the 1940s and 1950s on electoral participation gradually shifted towards expanding modes of citizens' involvement. As a result, the 1960s and 1970s saw the rise of the participatory theory of democracy, which stressed the need for active participation beyond the electoral arena (Pateman 1970).

Participatory mapping was one of many types of non-electoral participation that subsequently attracted the attention of researchers. Participatory mapping projects in the 1970s and 1980s were used as tools for empowerment by poor and indigenous peoples in Asia, Africa, North and South America in order to advocate for their right to water, land and culture (Chambers 1994; Pánek 2016; Tulloch 2007). Thus, geoparticipatory techniques can be conceptually attached to the broader family of democratic innovations that are purportedly designed to tackle the problems of democratic backsliding, low citizen trust and lack of civic engagement (see Smith 2009; Geissel & Newton 2012; Elstub & Escobar 2019).

Arnstein's (1969) key insight into the participatory theory of democracy stressed empowerment as a crucial part of participation. It is best summarized by the preamble to her essay, where she argued "*participation without redistribution of power is just an empty and frustrating process for the powerless*" (p. 216). Thus, participation itself does not guarantee change if it is not supported and implemented by those in power. The opportunity structure is also important. Formal participation without representation was typical of the former Eastern Bloc. As a result, post-communist Europe does not share a history of public participation in urban planning and decision-making processes that is the case in other Western democracies. It was only after the end of the Cold War that citizens of the former Eastern Bloc were granted the opportunity to shape the shared places in which they lived. To this day, geoparticipation in post-communist Europe is an under-researched area that offers new insights.

GeoParticipation¹ is defined by Pánek (2016) as using spatial tools to involve citizens in community participation. He sees geoparticipation as a future development of Public Participation GIS, as it provides an easy-to-use environment and social engagement while creating the feeling of belonging to a certain social group or community (Pánek 2016). Alternatively, Kar et al. (2016) warned that "*new forms of geoparticipation can evoke a type of social Darwinism that prioritizes participants who can easily use the app. In this way, the geoweb acts as a disruptive transformation of participation, without learning the critical lessons of P/PGIS*". Zhang (2018) defines geoparticipation as "*geo-enabled practices related to public participation*", and he explored (2019) the usage and definitions of geoparticipation even further in his analyses of the 25 most cited articles.

In his classification typology [Zhang \(2019\)](#) then divides geoparticipation into three categories:

- Consultative Geo-Participation – PPGIS, PGIS, Facilitated VGI (f-VGI), Geo-questionnaire, Emotional maps, and Neogeographic mapping
- Transactional Geo-Participation – Civic issue tracker, Participatory open data, Open-StreetMap
- Passive Geo-Participation – Social sensing, Ambient VGI, Passive VGI

A slightly different definition is given by [Olszewski et al., \(2017\)](#) in connection with spatial planning and revitalization; they use the term social participation, which makes it possible to take into account residents' opinions when drawing up plans for a city's revitalization or planning its spatial development. This is also stressed by [Olszewski & Turek \(2018\)](#), who assert that social geoparticipation enables the development of spatial development plans. [Gnat et al. \(2016\)](#) elaborate on social geoparticipation even further, stating that urban agglomerations that aspire to become smart cities need to include appropriate geoinformation technologies which will enable social (geo)participation. However, this requires not only the use of sophisticated high-tech tools, but also their widespread use by local communities.

3 Methods

There have been several frameworks aimed at institutionalising access to public participation, including various ladders ([Arnstein 1969](#); [Hurlbert & Gupta 2015](#); [Rocha 1997](#)), spectrums ([International Association of Public Participation 2018](#)) and cubes ([Fung 2006](#); [Poplin et al. 2013](#); [Thoneick 2021](#)). As ladders and spectrums are usually two-dimensional, they cannot be used to visualise the multidimensionality of public participation. Whereas various forms of democracy/participation cubes offer more complex answers to the crucial questions: *Who partic-*

ipates? How do they communicate and make decisions? What is the connection between their conclusions and public policy? In effect, the cubes integrate three different ladders or spectrums into one framework. The original *Democracy Cube* created by [Fung \(2006\)](#) offered three-axes: Participants Selection Methods (exclusivity), Modes of Communication and Decision (intensity), and Extent of Authority and Power (authoritativeness). The space created by these three dimensions enables us to locate various forms of citizen participation, and their connections and relations.

[Thoneick \(2021\)](#) amended Fung's cube by aligning the axes differently from the lowest intensity of the feature to the highest, and by renaming it *Participation Cube*. This newer version allows the three-dimensional space created within the cube to grow as more characteristics are completed. The third three-dimensional model is the *Participatory Cube* developed by [Poplin et al. \(2013\)](#), where the three-axes are: interactive communication, access to space of participation, and decision (power). The Poplin's cube mainly focuses on online participatory platforms as tools of digital democracy, and five degrees of popular participation via the Internet, as described by ([Gomes 2008, 2011](#)).

In our work we used the "Cubed" frameworks (see [Table 1](#)) to build the Index of geoparticipation. The three dimensions used in the Index of geoparticipation (Participation, Communication, Transparency) were inspired by the work of [Lysek \(2016\)](#) and [Hurtíková & Soukop \(2019\)](#), who analysed 205 municipalities with extended powers (ORP in Czech). Unlike [Lysek \(2016\)](#) and [Hurtíková & Soukop \(2019\)](#), we analysed the lower level of administrative hierarchy, i.e. all Czech municipalities (n=6258). The Index of geoparticipation combines the cubed frameworks (theory) with empirical/measurable indicators.

The data presented in this paper were collected from the websites of all municipalities in Czechia (n=6248) during 2019. In total, 24 indicators measuring how the municipalities communicate with their citizens were collected.

Table 1 Comparison of "Cubed" frameworks with Index of geoparticipation

Democracy Cube (Fung)	Participatory Cube (Poplin)	Participation Cube (Thoneick)	Index of geoparticipation
Participation Selection Methods	Access to Space of Participation	Participants	Participation
Modes of Communication and Decision	Interactive communication	Communication and Decision Mode	Communication
Extent of Authority and Power	Decision Power	Authority and Power	Transparency*

* Transparency is a key element of accountability. It represents a check on the authority and power exercised by local governments. As such, this dimension enables researchers to better distinguish the differences among units with similar de jure powers.

In order to assess the quality of the collected data, a random sample was generated ($n=77$ – one randomly selected municipality for each LAU1 unit ('okres' in Czech). For this random sample, the data regarding the communication and interaction with citizens, as well as the usage of participatory measures/tools, was re-collected by five independent people. As the data collected from the municipalities' publicly available web pages are subjective/perceptual, depending on the user's ability to find the requested information on the municipality webpage, we decided to involve five people in the data quality evaluation, in order to triangulate the resulting data. This process allowed us to: (1) assess the quality of the collected data; (2) understand the nature of the collected data (how users experience and use the municipality webpages); and (3) cluster the collected information based on the multiple check of the data's quality. The complete set of collected indicators is available at OpenData Portal of the Department of Geoinformatics in a range of GIS formats (<https://gislib.upol.cz/portál/apps/sites//opendata>).

Based on the research by Lysek (2016), Hurtíková & Soukop (2019), 12 indicators were identified and divided into three dimensions of the Index of geoparticipation (see Table 2). Although we have collected more detailed answers, e.g. on which social networks is the municipality active, or what information is shared about council members (names? emails? political party?, etc.), for the purpose of the Index of geoparticipation we decided to use only binary values of 0/1. Using the example above, we simplified the answer into "yes, the municipality uses social networks (regardless of which one)" with the value of 1, or "no, no social network is used" with the value of 0. This was decided mainly because of some inconsistencies in data collection on the finer level.

We used a choropleth mapping (Fig. 2, 3 and 5) method to capture and describe the spatial pattern for the Index of geoparticipation. Furthermore, a typology of municipalities based on their performance in the Index of geoparticipation was created. The typology is a scientific inductive and generalising method that classifies selected phenomena according to similar features or characteristics based on a specific criterion (Voženilek & Kaňok 2011). The typology of geoparticipation was created from the Index's individual dimensions, i.e. Communication, Participation, and Transparency (see individual dimensions' inputs in Table 2). Since the inputs for individual dimensions are binary numbers, the scores were calculated for each LAU 2 unit (municipality) in the respective dimension.

Therefore, each received 0 to 4 points in a given dimension. In order to create a typology with a reasonable number of resulting types, the input values (0 to 4) were only categorised in two possible states. For each geoparticipation dimension, a municipality was given „-“ (minus sign) if it received 0 or 1 points in a given dimension. Otherwise, if the municipality received two or more points, it was labelled as „+“ (plus sign). Thus, we assigned each municipality to one of eight types (eight is the maximum number of combinations from three dimensions and two values, based on the fundamental rules of enumerative combinatorics. The distribution of municipalities into eight types is shown in Table 6. For map visualisation (Fig. 6), these eight types were further grouped into four major types, as it would not be readable if all eight types were displayed in the given map scale. The four types were expertly labelled according to composition signs: 1) full positive (+++), 2) positive (++-, +-+, -++), 3) negative (+- -, +- -, - -+), and 4) full negative (- - -). It must be mentioned that such typology does not refer to the overall intensity of geoparticipation (in terms of scoring), but rather it describes geoparticipation as the balance between the three dimensions.

To better understand the impact on citizens' lives of variations in geoparticipation, we compared our results from the Index of geoparticipation with the Index of Social Exclusion, as we expected there to be an inverse link between the two indexes. The Index of Social Exclusion (as calculated in Czechia) is built from five indicators - Beneficiaries of subsistence allowance (data from the Ministry of Labour and Social Affairs); Recipients of the housing allowance (data from the Ministry of Labour and Social Affairs); Persons in dis-traints (data from the Distraints Officers Chamber); Long-term unemployed people (data from the Employment Agency of the Czech Republic); Early departures from the education system (data from the Ministry of Education, Youth and Sport of the Czech Republic).

4 Results

In order to analyse the state of geoparticipation among Czech municipalities, the Index of geoparticipation was calculated. This paper presents the first version of the index, which uses only binary (0/1) values from the collected data. All sub-indicators have the same weight, so each municipality can gain up to 12 points (0-4 in each dimension).

Table 2 Index of geoparticipation indicators

Indicators/Questions	Dimension
Is the municipality website mobile friendly?	Communication
Does the municipality have a mobile app for communicating with citizens?	Communication
Does the municipality have a tool/app/measure to report problems/issues online?	Communication
Does the municipality have a profile on Social Network(s)?	Communication
Does the municipality use external participatory apps - ZmapujTo, MobilniRozhlas, PocitoveMapy.cz, etc.?	Participation
Does the municipality have participatory budgeting?	Participation
Does the municipality use participatory techniques - participatory planning, rounds tables, etc.?	Participation
Does the municipality use opinion polls on a municipality web?	Participation
Does the municipality share information about the council members?	Transparency
Does the municipality share protocols from council meetings?	Transparency
Does the municipality have a publicly open detailed budget online?	Transparency
Does the municipality have transparent accounting?	Transparency

Table 3 Basic statistical description of the index dimensions

	Communi- cation	Partici- pation	Transparency	Index of geopartici- pation
Scale	0-4	0-4	0-4	0-12
Mean	1.71	0.74	1.01	3.46
Median	2	1	1	3
Standard Deviation	1.03	0.84	0.92	1.97
Total	10 683	4 612	6 351	21 646

As described in Table 3, the overall performance in the Participation dimension of the index was the weakest in all statistical indicators – mean, median as well as the total amount of points awarded. In contrast, the Communication dimension results were the highest. We expect the difference to be caused by the fact that for the municipalities the communication is often less demanding than participation and can be in the form of one-way interaction. The differences among the dimensions reflect the situation among Czech municipalities, where participation is still not common (Hurtiková & Soukop 2019). On the other hand, Communication and Transparency seem to be easier aspects for Czech municipalities to fulfil. Both dimensions are more of a one-way process, which is easier to implement and control. These findings are in line with the Czech results in the UN Department of Economic and Social Affairs' Index which was focused on the online presence of all 193 United Nations Member States. It assesses national websites and how e-governmental policies and strategies are applied, in general and in specific sectors, in order to deliver essential services. Two indexes have been measured for all Member States since 2003 – the E-Government Development Index (EGDI) and the E-Participation Index (EPI).

Table 4 Basic statistical description of the index dimensions

Municipality status	Index of geoparticipation			Communication Participation Transparency		
	Avg	Min	Max	Avg	Avg	Avg
all municipalities	3.5	0	12	1.7	0.7	1
municipalities (except cities and market towns)	3.2	0	10	1.6	0.6	0.9
market towns (městys)	3.9	0	10	1.8	0.9	1.2
cities	5.7	1	12	2.5	1.5	1.7
HCCZ municipalities	6.4	1	12	2.7	1.8	2
municipalities with extended power (ORP)	7.1	2	12	2.9	2	2.2
statutory cities	8.4	5	11	3.1	2.4	2.8
regional capitals	9.2	6	11	3.2	2.9	3.1
Municipalities by population						
less than 999	3	0	10	1.5	0.6	0.9
1 000 - 1 999	4.2	0	10	2	1	1.2
2 000 - 4 999	5.1	1	11	2.3	1.3	1.5
5 000 - 9 999	6.1	2	11	2.6	1.7	1.8
10 000 - 19 999	6.9	1	10	2.7	2	2.2
20 000 - 49 999	7.6	4	12	3.1	2.2	2.3
50 000 - 99 999	8.8	5	11	3.2	2.3	3.3
100 000 and more	9.7	8	11	3.3	3.7	2.7

Czechia is below the regional (European) average in both indexes with a much worse performance in the E-Participation index. Furthermore, EGD I can be divided into three sub-components – Online Services, Telecommunication Infrastructure and Human Capital. Of these three, Czechia is weakest in the first, which measures the scope and quality of online services. Unfortunately, we cannot see any relevant long-term improvement

Fig. 1 Ranking of the Czech Republic in the E-Government Development Index and E-Participation Index out of 193 UN Member states. (Data: UN E-Government Knowledgebase))

in either of the two indexes in Czechia, as visualised in Fig. 1.

Based on the statistics in Table 4, a significant dependency on municipality status and population size is visible regarding their performance in the Index of geoparticipation. The highest average values were obtained by the regional capitals, followed by statutory cities, municipalities with extended powers, Healthy Cities of the Czech Republic network (HCCZ) municipalities and cities (municipalities with more than 3 000 inhabitants). Similarly, higher values were obtained by municipalities with larger populations. This is because the classification of Czech municipalities is mostly based on population size (classification was done according to standard categories used by the Czech statistical office). However, a larger population is not only associated with the status of the city, but also with its budget and the range of services it provides. This can also result in higher participation in activities. On the other hand, Fig. 2 shows that the use of aggregate statistics only can be misleading because not all major cities (regional capitals, municipalities with extended powers and cities) obtained high values in the Index of geoparticipation. It is also possible that smaller municipalities may use different tools/approaches for geoparticipation, such as non-digital tools (public meetings, local information boards, non-formal discussions, etc.).

Nevertheless, we collected data which show that even smaller municipalities (villages) have started using mobile platforms/apps for communication with citizens, especially due to the covid-19 situation. As this is/maybe a long-term behavioural change, we plan to investigate the impact of Covid-19 on how municipalities communicate in another paper.

When the results of the Index of geoparticipation are visualised as a choropleth map (Fig. 2), we can see that larger cities often acquire higher values in the index than smaller municipalities. This could be explained by the fact that larger urban municipalities have more financial resources and organisational capacity to invest in participatory tools that are costly (Geissel & Newton 2012). The functional utility of geoparticipation seems to be low in the smallest municipalities, but this does not mean that the opportunity for public engagement is limited, as there are other more informal ways to participate in small municipalities (Dahl & Tufte 1973).

Furthermore, there is a distinctive difference between the index dimensions. The Communication dimension (as also shown in Table 3 and Fig. 3) presents higher values, while the Participation dimension provides lower values.

The post-communist economic transition, combined with the growing globalization, has left some regions on the national periphery (Bernard & Šimon

Fig. 2 Index of geoparticipation.

2017). Moreover, the disparities are also intraregional. It seems that local authorities in structurally disadvantaged regions are using geoparticipation as a tool, both for legitimation and for their citizens' empowerment. This enables transparent decision-making, better communication and direct influence by citizens; aspects which are necessary for regions facing the need for transition and revitalization accompanied by large-scale projects.

When the results from the Index of geoparticipation are analysed via the optics of political affiliation, municipalities with better performance ($n=16$) in the Index (11 or 12 points) are, in nine cases, parliamentary parties, and the remaining seven cases are either local/independent mayors, or the information about the political affiliation of the mayor is unavailable. On the other hand, municipalities with low performance ($n=932$) in the Index (0 or 1 point) often do not even share such basic information as to which leading political party is represented by the mayor (59% cases). In 37% of cases, the mayors are either from a local party or they are independent/without a political party, leaving only 4% of mayors in these low-performing municipalities belonging to the parliamentary parties.

Furthermore, we compared our results with the closest available index for Czechia - Index of Participation calculated by the Institute for Democracy 21 (currently known as Institute H21) in 2017 with data from 2015-2016 (see Table 5). The Index of Participation was calculated from the 101 largest cities in Czechia and 50 city districts with populations over 10 000. The Index is calculated as a cumulative value of 21 criteria in six categories (transparency, communication, participation, inclusion, implementation, evaluation). For our example, we selected municipalities that scored 11 or 12 points in the Index of geoparticipation ($n=16$) and compared their performance in the Index of Participation.

This comparison has some drawbacks: five years of difference between the indexes; different scales (whole cities vs. city districts); different criteria used in the indexes. Nevertheless, the comparison shows that municipalities with a high value in the index of geoparticipation often score highly in the Index of Participation. Furthermore, both indexes show the prominent/dominant role of the Healthy Cities of the Czech Republic network (HCCZ) in the area of promoting participation and Local Agenda 21.

Fig. 3 Index of geoparticipation and its dimensions - Communication, Participation and Transparency.

Fig. 4 Scatterplot diagrams for the Index of geoparticipation dimensions – Communication, Participation and Transparency.

Table 5 Top Index of geoparticipation municipalities and their performance in the Index of Participation

Municipality	Index of geoparticipation value	Index of Participation ranking
Kopřivnice (HCCZ)	12	12th
Vitkov (HCCZ)	11	N/A
Mladá Boleslav (HCCZ)	11	40th-45th
Praha (HCCZ)	11	1st, 3rd, 5th, 10th, etc.
Ústí nad Labem (HCCZ)	11	32nd-33rd 17th-21st., 46th-48th, 107th-110th, 121st-125th
Ostrava (HCCZ)	11	17th-21st
Třebíč (HCCZ)	11	28th-31st
Znojmo (HCCZ)	11	N/A
Mnichovo Hradiště	11	N/A
Milevsko	11	81st-85th
Plzeň	11	37th-39th
Pardubice	11	N/A
Semily	11	60th-64th
Zlín	11	17th-21st
Orlová	11	N/A
Štramberk	11	N/A

In the Index of geoparticipation, 50% of the municipalities that scored 11 or 12 points are members of HCCZ (in the whole of Czechia HCCZ municipalities make up only 1.6%). In the Index of Participation, the success of HCCZ members was similar; of the first 50 municipalities, 64% are members of HCCZ.

4.1 Geographical distribution of geoparticipation in Czechia

In order to analyse the relationship between the dimensions of the Index of geoparticipation, scatterplots and correlation coefficients were calculated to measure the strength of the relationship. The results (Fig. 4) support the findings already partly presented in Fig. 3, and Tables 3 and 4, which show that the dimensions are independent of each other and if a municipality is strong in one dimension, that gives very little indication as to whether it will also be strong in another dimension. This is further explored in the typology of geoparticipation of the Czech municipalities (Fig. 6 and Table 6), where it is clear that only a small amount (6.49%) of municipalities are strong (full positive) in all three dimensions of the Index of geoparticipation.

Fig. 5 Index of geoparticipation, Index of Social Exclusion, Index of Social Exclusion subtracted from Index of geoparticipation.

When the results are compared/combined (Fig. 5) with the Index of Social Exclusion calculated by the Agency for Social Inclusion of the Ministry of Regional Development ([Agentura pro sociální začleňování 2021](#)) we can find practically no relationship ($r^2=0.03$) and only a few municipalities have higher social exclusion values than geoparticipation values. For the purpose of this comparison, the Index of Social Exclusion was standardised to the range 0-12, and the results of the indexes were subtracted from each other, so the final values range from 12 (high level of social exclusion with no geoparticipation) to -12 (high level of geoparticipation with no social exclusion). One interesting group of municipalities is those that have very high scores in both indexes, e.g. a high level of social exclusion, and at the same time, a high level of geoparticipation. There are eight municipalities (about 1% of 6 528) with this “special” combination. All of them are either in the Moravian-Silesian region (Ostrava, Havířov, and Orlová) or the Ústí nad Labem region (Ústí nad Labem, Jirkov, Žatec, Most, and Litvínov). Both these regions are considered “structurally disadvantaged” by the Regional Development Strategy of the Czech Republic 2021+ (Ministry of Regional Development 2021).

4.2 Typology of geoparticipation in the Czech municipalities

The typology of geoparticipation (Fig. 6) helps to reflect the commonalities shared by the municipalities. It has allowed us to categorise individual units based on their three dimensions of geoparticipation. Geographically, the full positive type of municipality is dispersed throughout the country. More than 1/4 of the “full positive” municipalities have more than 5 000 inhabitants, which indicates that they can be seen to be representative of towns or cities in the Czech context. Most regional capital cities, except three (Karlovy Vary, Jihlava and Hradec Králové), are included in the full positive type. When we focus on the positive type of municipalities as a whole, they collocate with the major regional and subregional towns or cities, which is especially visible in the Prague metropolitan area and in the surroundings of Olomouc, Brno and Ostrava. The latter lies in a highly populated area which has several bigger towns or cities, and which might positively spill over the overall balance of geoparticipation in the region. In contrast, the hilly area east of Zlín is almost the exact opposite, with a rather low-density of population distribution. Somewhat surprisingly, the municipalities on the fringes in the borderland regions (also with hilly landscapes) north of Hradec

Králové and southwest of Ústí nad Labem, form a spatially coherent cluster of the positive type. The full negative type of municipalities is generally located on the inner peripheries of the regional borders (e.g. east of Karlovy Vary, west of Olomouc, southwest of Brno). These locations at the junction of two (or more) regions have a typically rural character (see, e.g. (Pászto et al. 2016)). Spatially, the most continuous areas of negative types of municipalities can be seen between Karlovy Vary and Plzeň, Olomouc and Ostrava, and Brno and Olomouc. In summary, there is no distinct geographical pattern that can be seen from the visual analysis of the typology at the national level. However, regionally, the municipalities tend to influence their closest surroundings to be either active in geoparticipation or not to be.

Table 6 Distribution of LAU 2 units and HCCZ members into geoparticipation types.

Type (CPT)*	HCCZ		LAU 2 (municipalities)		HCCZ
	non-member	member	total count	[%]	
---	1936	8	1944	31.06	7.77
+--	1945	18	1963	31.37	17.48
-+-	160	1	161	2.57	0.97
--+	546	1	547	8.74	0.97
++-	336	12	348	5.56	11.65
+ - +	785	21	806	12.88	20.39
- + +	80	3	83	1.33	2.91
+ + +	367	39	406	6.49	37.86
Total	6155	103	6258	100	100

* signs are ordered as C – Communication, P – Participation, T – Transparency

If we focus on the overall (non-spatial) distribution of municipalities into eight types for the whole of Czechia (Table 6), we can observe that almost 74% ($n=4615$) of all municipalities fall into one of the „negative” types (i.e. having no or one plus sign). The remaining 26% ($n=1643$) of municipalities belong to the „positive” type, with only 6.5% ($n=406$) being full positive types. If we only consider municipalities that are HCCZ members, the ratio is almost perfectly reversed. Almost 73% ($n=75$) of HCCZ members are „positive” types, with approximately 38% ($n=39$) in the full positive category. Only 8% ($n=8$) of HCCZ members were ranked as full negative, and those who were partially negative is 27% of members (including all negative types). This fact is indeed interesting; however, it not surprising when one considers the purpose of HCCZ. Focusing further on HCCZ and their di-

Fig. 6 Typology of geoparticipation in the Czech municipalities.

mension of geoparticipation, starting with the negative ones, the majority ($n=18$) still have at least a positive evaluation in the Communication dimension. The Communication dimension seems to be elemental for building a municipality's geoparticipation, because only three municipalities out of 75 positive types lack a positive evaluation in the dimension. The Participation indicators are the most neglected in the positive group, with 21 municipalities achieving a minus sign in this dimension.

5 Discussion and Conclusions

The presented Index of geoparticipation builds upon already existing knowledge in several areas – political science, community development, online participation; but it also sheds new light on the spatial distribution of geoparticipation in Czechia. The predominance of the Healthy Cities of the Czech Republic network members was expected and this was confirmed by the data. On the other hand, it was expected that typical socially excluded locations, especially the former border of the Sudetenland, where a German minority lived before their expulsion after the Second World War, would perform much worse. Those areas were re-populated during the former

Communist regime, and the inhabitants are often described as citizens with a lost identity (Bernard & Šimon 2017). Moreover, nowadays the situation is intensified by the movement of young and educated people from those regions to the richer/larger cities. The situation on the peripheries of individual regions, which have poor transport accessibility to large cities and regional centres, is similar. The regions that have low social capital, high unemployment and high support for populist parties, as analysed in (Lysek et al. 2020), do not generally perform too negatively, as the Index of geoparticipation measures merely the opportunity (how cities offer participation to the public) and not its utilisation/exploitation by the public.

The results also identified the fact that it is rare to find municipalities that perform well in all dimensions of the index. Only 6.49% of all municipalities scored “full positive”, meaning they had more than two points in each dimension. The differences between the dimensions reflected the international literature, where communication is considered an easier form of participation – in the Ladder of Citizen Participation (Arnstein, 1969) it is called Tokenism. We also observed the impact of covid-19 on how municipalities communicate with their citizens. The three largest providers of mobile applications for direct communication between municipalities

and the citizens in Czechia (MobilníRozhlas.cz, HlaseníRozhlasu.cz and V Obraze) reported cumulative 294% increase in 2020 compared to 2019 in the number of municipalities using their services. This gives a strong indication as to how serious and necessary online communication, and the possibility of online participation, became for the municipalities due to the covid-19 pandemic. Therefore we expect the number of municipalities utilizing / scoring positive in the dimension of communication to grow.

One limitation in the research could be the fact that although we focus on geoparticipation, only some questions in our index are (in)directly linked to the spatial aspects of geoparticipation and municipal services. Those questions we consider to be spatial are the following:

- Does the municipality have a mobile app for communicating with citizens?
- Does the municipality have a tool/app/measure to report problems/issues online?
- Does the municipality use participatory external participatory apps - ZmapujTo, MobilníRozhlas, PocityMapy.cz, etc.?
- Does the municipality have participatory budgeting?
- Does the municipality use participatory techniques - participatory planning, round tables, etc.?

When considering the questions mentioned above, together with others related to GIS/geoinformation (such as; does the municipality have a web map application, an open geodata portal, a mobile app with geoinformation features? etc.), it is worth further exploring and classifying municipalities in terms of the development of an open geoinformation society.

The results can be interpreted positively; the municipalities, although being in the structurally disadvantaged regions, play an active role in involving the public. The questions nevertheless remain: Is the offer of participation (which we have measured by the Index) accepted/acknowledged by the citizens? Who is participating, and are the socially disadvantaged groups and minorities part of this process? In order to analyse these questions in more depth, qualitative research would be needed, including Interviews with representatives of the municipalities as well as the citizens. Furthermore, future research can focus on an outlier analysis which would provide the answers to; why do some municipalities perform very differently to their neighbours,

what is the key factor in change and can we replicate it in other municipalities?

Future research may focus on exploring the links between other social, economic and environmental indicators such as unemployment rate, distains, the financial conditions of municipalities, the distribution of public services such as libraries, the concentration of NGOs, the rurality of municipalities, and the “quality of life”, and the Index of geoparticipation. We aim to explore the spatial patterns and relationships among such indicators, and this will help us to capture wider geographical contexts of geoparticipation.

Footnotes

¹ Different authors use different spelling and wording for geoparticipation. In this paper, we use always the original name used by the respective authors, if it differs from the term “geoparticipation” in spelling and in the placing of brackets.

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