The Diffusion of Electronic Voting for Participatory Budgeting Projects: Evidence from Ukraine

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Abstract. Electronic voting for participatory budgeting projects in Ukraine it is understudied. Therefore, the paper aims to investigate the patterns of diffusion of e-voting for participatory budgeting projects in Ukraine. This quantitative inquiry scrutinized data about 175 Ukrainian communities that have practiced e-participatory budgeting during 2017-2020 utilizing descriptive and inferential statistics, as well as ANOVA analysis of variance, bivariate and partial correlation analysis. It became evident that participatory budgeting e-voting diffusion vary greatly across Ukrainian communities. Overall, there are some indications of an ongoing digitalization of participatory budgeting voting, which cannot be stated with absolute certainty. The one definitely confirmed pattern of participatory budgeting e-voting diffusion in Ukrainian communities is that longer duration of participatory budgeting is associated with higher e-voting rates.

Keywords: Electronic Voting, Internet Voting, Participatory Budgeting.

1 E-Voting in Participatory Budgeting

According to the classic definition, participatory budgeting (further–'PB') is the process when ordinary citizens are mobilized into local meetings, where they learn about municipal budget, propose, and deliberate over policy projects, and vote on projects to be included in the yearly budget [1]. Its critical point is when locals vote for community development projects thereby exercising direct democracy. In the original model of PB such popular vote (in contrast to advisory consultations) is mandatory for authorities to implement. Thereby the authority over part of municipal budget is taken back from public officials to ordinary citizens empowering the latter. Electronic form of such voting (either in polling stations or via internet, labelled as 'e-voting' here) for PB projects was aimed to enhance digital transformation, decision-making processes, engagement of citizens, and public servants in the context of e-democracy [2]. Due to the similarities of digital uptake the patterns of e-voting for PB projects and for persons in elections may be similar. In Estonia, the wide diffusion of internet voting among the population required over three e-electoral cycles [3]. It is reasonable to surmise that in other countries and formats the pace of e-voting may be similar.

2 Patterns of Participatory Budgeting E-voting in Ukraine

The advance of PB e-voting in Ukraine is understudied. PB in the country is mostly viewed from the viewpoint of scale: funding amounts, submission rates, voter turnout etc. The Index of local democracy ranks major cities according to the performance of their e-participation instruments, including e-PB [4]. Deeper analysis of PB in Ukraine is usually limited to case studies [5]. The most comprehensive research of PB in Ukraine relies on data about 141 communities as of July 2019 [6]. That inquiry discovered the trend of digitalization of voting for PB projects. Yet, a more detailed and recent analysis of the PB e-voting scope and dynamics is missing. This paper aims to investigate the patterns of diffusion of e-voting for PB projects in Ukraine.

2.1 Questions and hypotheses

This inquiry aimed to find out answers to several open questions. What was the share of votes cast electronically of the total number of votes (e-voting share)? What was the dynamics of e-voting share change over time (e-voting share change)? What were the parameters linked with e-voting share and e-voting share change? No statistically significant association between independent and dependent variables was the null hypothesis. In Ukraine, settlements (unified administrative-territorial units) had rather dense population, while agglomerations (uniting several smaller villages or towns) had rather loose population. It was assumed that, due to the distance between constituent villages or towns, agglomerations were more inclined to use e-voting than settlements (hypothesis 1). As for bigger municipalities it was more feasible to engage voters online than offline it was assumed that the larger the population, the higher the percentage of e-voting (hypothesis 2). As digital uptake takes time, it was assumed that the longer the e-PB duration (the number of years of e-voting on an e-platform) the higher the e-voting share (hypothesis 3). Since bigger municipalities had more resources to launch PB e-voting earlier it was assumed that the bigger the settlement the longer the e-PB duration (hypothesis 4). It was reasonable to expect that e-voting share change was linked to population size and the e-PB duration. It was assumed that the bigger the population the higher the e-voting share increase (hypothesis 5) as well as the longer the e-PB duration the higher the e-voting share increase (hypothesis 6).

2.2 Research methodology

The study employed quantitative methods of data collection and analysis. The most vast and reliable PB voting data was available on the two most used e-PB platforms–e-DEM and Hromadskyi Project. The data was provided by organizations managing the e-platforms–EGAP and SocialBoost respectively. Data collection lasted during 2 June–2 July 2021. Population statistics was obtained from two sources–the national statistical yearbook for cities and the decentralization website for agglomerations. Data of up to 20 variables on the total of 175 communities was collected. For most communities, data was available for 2018-2020, therefore this timeframe was used for the study. Methods of analysis included the examination of descriptive and inferential statistics, ANOVA analysis of variance, bivariate and partial correlation analysis.

2.3 Empirical Findings

It was found that e-voting shares and e-voting share changes vary greatly. For 2018, the data was available for 88 communities with the sample error 4.83%, while for 2020– for 114 communities with the sample error 3.67%. Percentages range from 0.65% to 100% (with the median of 61.48%) in 2018 and from 0.22% to 100% (with the median of 85.6%) in 2020. 100% e-voting usually reflected the municipal policy that the voting for PB projects was allowed only in digital format.

To eliminate composition effect, statistics was calculated within the same communities over the 2018–2020-year period (by dividing the 2020 values by the 2018 values community-by-community). Data was available for 39 communities generating the sample error of 0.39. It was found that the minimal e-voting change over the three-year period was 0.18 (meaning that e-voting share decreased), the maximum e-voting change was 8.26 (meaning an over eight-fold increase), and the median e-voting change was 1.4 (indicating some increase on the margin of sample error).

To distinguish the change of e-voting before and after the pandemic, for communities with relevant data e-voting change during 2018–2019 was analyzed (by dividing the 2019 values by the 2018 values community-by-community). Data was available for 72 communities generating the sample error of 1.4. The results demonstrated that the minimal e-voting change over the two-year period was 0.28 (meaning that e-voting share decreased), the maximum e-voting change was 66.38 (meaning an over sixty-six-fold increase), and the median e-voting change was 1.04. The median e-voting change before the pandemic was unclear because of the high sample error.

Variance and correlation analyses found regularities refuting the null hypothesis.

The average share of e-voting in settlements was statistically significantly (at the level of 0.01) higher than in agglomerations–with the mean of 82% versus 54%, respectively and Eta equal to 0.410. However, settlements were on average more statistically significantly (at the level of 0.01) populated than agglomerations–with the mean of 134,429.33 versus 21,516.17, respectively and Eta equal to 0.217. Thereby, the higher e-voting share in settlements than in agglomerations may be due not to a denser, but rather to a bigger, or to a more technologically savvy urban population. Because of this, the hypothesis 1 cannot be neither refuted nor confirmed.

The share of e-voting in 2020 was positively connected with the population size in 2020–Pearson two-tailed correlation coefficient +0.212 statistically significant at the 0.05 level. However, if controlled for e-voting duration, this link disappeared (two-tailed partial correlation statistically insignificant at 0.05 level). This finding refutes the hypothesis 2.

E-voting share in 2020 was statistically significantly correlated with e-voting duration even if controlled for the population size in 2020 (two-tailed partial correlation +0.211 statistically significant at 0.05 level). This indicated that what really mattered for high e-voting share was longer history of e-PB. This confirmed the hypothesis 3.

Also, there was found no statistically significant association between the population size of settlements in 2018 and e-voting duration (two-tailed partial correlation statistically insignificant at 0.05 level). This means that not always bigger cities introduce PB e-voting earlier than smaller towns. This refuted hypothesis 4.

Finally, there was found no statistically significant association between the population size in 2018, e-voting duration, and e-voting share change (two-tailed partial correlations statistically insignificant at 0.05 level). Either 3 years of measurement for the sample of 39 settlements were insufficient to descry the possible regularity or such connection did not exist. In any case, these findings refute the hypotheses 5 and 6.

3 Conclusions on Participatory Budgeting E-Voting in Ukraine

The inquiry showed that PB e-voting diffusion vary considerably across Ukrainian communities–from 1% to 100% of e-voting. Both before and during the pandemic the median e-voting change was overall positive indicating the digitalization of PB voting. However, due to the high sample error this trend is not certain. The hypothesis 1 cannot be neither refuted nor confirmed–the revealed higher e-voting rates in settlements than in agglomerations may be explained either by a denser, or by a bigger, or by a more technologically savvy urban population. The hypothesis 2 about the link between e-voting share and population size was refuted–not always they were positively correlated. The hypothesis 3 was confirmed–the longer the e-PB duration the higher the e-voting share. The hypothesis 4 was refuted–not always bigger cities introduce PB e-voting earlier than smaller towns. The hypotheses 5 and 6 were refuted–neither bigger population nor longer the e-PB duration did not always predispose higher e-voting share increase. The principal definite pattern of PB e-voting diffusion in Ukraine is that longer duration of PB is associated with higher e-voting rates.

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References

1. Wampler, B.: Participation, representation, and social justice: Using participatory governance to transform representative democracy. Polity 44(4), 666–682 (2012), DOI: 10.1057/pol.2012.21.
2. Mærøe, A.R., Norta, A., Tsap, V., Pappel, I.: Increasing citizen participation in e-participatory budgeting processes. Journal of Information Technology & Politics, 18(2), 125-147, DOI: 10.1080/19331681.2020.1821421.
3. Vassil, K., Solvak, M., Vinkel, P., Trechsel, A.H., Alvarez, R.M.: The diffusion of internet voting. Usage patterns of internet voting in Estonia between 2005 and 2015. Government Information Quarterly, 33(3), 453–459, DOI: 10.1016/j.giq.2016.06.007.
4. CID: Index of local electronic democracy, https://cid.center/edemindex/.
5. PAUCI: Participatory budgeting on its way to openness: The results of support in ten communities during 2016–2018. Kyiv, Ukraine, (2019), https://cutt.ly/pKVD2od.
6. Khutkyy, D., Avramchenko, K.: Impact evaluation of participatory budgeting in Ukraine. Kyiv, Ukraine (2019), https://cutt.ly/vKVFiC2.