

## MICRO BUSINESS PARTICIPATION IN GOVERNMENT PROCUREMENT: PROZORRO EXPERIENCE

**Purpose.** Analysis of the dynamics of micro businesses participation in public procurement in Ukraine in 2017–2018 made via Ukrainian online public procurement system ProZorro.

**Methodology.** The results are obtained by applying general scientific and specialized research methods (comparison, generalization, typology, abstraction, correlation analysis) as well as systematic and logical approaches related to implementation of public procurement theory to practice.

**Findings.** It was found that private entrepreneurs are full-fledged participants of public procurement system in Ukraine in the context of considerable increase in the average sum of tenders in which they have participated. The government procurement, in which private entrepreneurs took part, had a higher level of competition compared to the public procurement system in general. In terms of value, private entrepreneurs' participation in competitive negotiation procedures for defense needs has increased considerably. The analysis of territorial localization of private entrepreneurs' activities did not reveal any significant dependence of activity of private entrepreneurs registered in a particular region in the main procurement procedures on the factors of economic and demographic development of regions-organizers of the procedures. The participation of private entrepreneurs in procurement procedures organized at their local (regional) level has significantly decreased for most regions of Ukraine.

**Originality.** This research provides empirical evidence of the level of participation of micro businesses in public procurement on the base of the ProZorro professional analytics module, which is an online instrument for aggregation, sorting and other processing of machine-readable data on public procurement in Ukraine.

**Practical value.** Research results can be used by government authorities for developing the strategy for engagement of private entrepreneurs to public procurement as well as for adjusting the practice of using the public procurement system for their effective participation.

**Keywords:** *government procurement, electronic public procurement system ProZorro, private entrepreneurs, micro businesses, open tenders*

**Introduction.** Public procurement is a complex and responsible government activity. Public authorities spend a lot of money to carry out their profile activities, perform relevant functions and provide quality services. Public procurement represents approximately 12 % of gross domestic product and 29 % of total government expenditures in OECD countries. That makes governments some of the biggest purchasers of goods, services and works and emphasizes their role in harnessing economic leverage of public procurement to support sustainable and inclusive growth [1].

Now, Governments internationally recognize that they can use the leverage of public procurement to support a wide range of policies, typically economic, social and environmental ones. Thus, public procurement policies can be adapted to pursue the transparency of budget spending; to prevent the corruption; to support and encourage diversity and minority businesses; to develop specific industries and regions; to protect environment; to support national producers, etc.

Among various policy goals governments address through public procurement, support for small and medium-sized enterprises (SMEs) has been increasingly becoming another key area. Governments have developed a host of policies, initiatives and measures to facilitate their access to public procurement markets, and, in some cases they indeed support SME development through the economic leverage of public procurement [1].

Ukraine does not have a separate strategy for SMEs participation in public procurement, but they are mentioned in the adopted Strategy for Public Procurement Reform ("roadmap"), which encourages division into lots in order to create better conditions for the participation of small and medium-sized businesses in public procurement [2].

All public procurement in Ukraine is carried out in accordance with the Law on Public Procurement adopted in 2016 [3]. The public procurement reform in Ukraine is considered as one of the most successful in our country, although now it requires some legislative changes caused by the need to update the practice that has developed since the implementation of

the Law. During 2018, these developments were offered to the Presidential Administration, and then submitted by the President to the Verkhovna Rada of Ukraine. One of the objectives of these improvements was to create a competitive environment in the field of public procurement which is capable of establishing the improved opportunities for SME participation in public procurement in Ukraine. However, the draft law was not supported by people's deputies of Ukraine [4].

The main competitive advantage of SMEs in Ukraine, particularly in public procurement markets, is the relatively low prices they can offer because of low taxation. SMEs typically pay a flat income tax (at a fixed rate of 5 % on income, or 10 % on income depending on the kind of activity and the volume of business) and lower social security tax [1].

**Literature review.** The issue of involving SMEs in public procurement is very popular with researchers. The concern with SME access to public procurement, especially the policy instruments that can be implemented in this field, is the most widely represented topic of scientific studies. For example, Kim Loader from University of York, the United Kingdom, focuses her research on the supply relationships between public sector purchasers and small firm suppliers. Thus, in [5] she concerned that public procurement processes place smaller firms at a disadvantage. She mentioned the most common barriers such as overly prescriptive qualification criteria, poorly written tender specifications and prohibitive resource requirements etc. To her mind, the need to supply via a third party is emerging as a new concern. Contract size, contract length and supplier rationalization did not feature as much as expected. In [6] she examines the public procurement policy towards SMEs adopted by the UK, determines the policy instruments that have been implemented and considers measurement and assessment of policy outcomes.

The paper of Japanese scientist Jun Nakabayashi addresses the issue of adoption of small business programs to provide them with preferable contract opportunities. The redistribution arising from such programs, however, can introduce significant additional costs to government procurement budgets. The study demonstrates that approximately 40 % of SMEs would exit the procurement market if these preferences were

removed. Surprisingly, the resulting lack of competition would increase government procurement costs more than it would offset the production cost inefficiency [7].

Anthony Flynn examines the extent to which SME-friendly procurement policy is being implemented in Ireland and the individual and organization factors that affect implementation. His findings reveal a gap between what government policy recommends public buyers and their organizations should do to facilitate SMEs versus what they are actually doing. Policy familiarity, procurement involvement, organization size and the maturity of the procurement function are shown to be positively associated with the implementation of the SME-friendly policy. His findings underline the need to invest in the human capital dimension of public procurement [8].

Since the implementation of the Ukrainian public procurement system ProZorro, a number of studies performed by Ukrainian scientists have been published. Thus, a study by scientists from the DonNU named after V. Stus is devoted to the formalization of bidding procedures. Based on a graphical model of qualifying participants in an open tender process, the authors propose to apply the clear participation rules for government authorities. According to the authors, such regulations can help to prevent problem situations and to eliminate causes that lead to disruptions within the procedures, as well as to increase their efficiency. The authors also propose to use an integrated assessment of participants' proposal at the first stage of the competitive dialogue procedure [9].

The study [10] is devoted to the typologization of corruption risks that are possible in public procurement, such as: the creation of the list of participants, which makes it possible to avoid bidding procedures and to apply more simplified procedures instead; development of technical conditions or technical tasks which prevent participation of wide variety of bidders; setting the discriminatory criteria for the bid evaluation; illegal use of "closed" tendering procedures (bidding with a limited number of participants, request for quotations or purchase from a single supplier, etc.); facilitating to the particular supplier; acceptance of the incorrect information or tender proposals; manipulation of the decision-making process within the tender committee activity.

Study [11] investigates the problematic aspects of government control for public procurement transactions and considers the most relevant cases of violation the public procurement regulation. A number of works by Ukrainian researchers are devoted to general issues of electronic public procurement system operating and analyses of its problems and ways of its solution [12–14].

Some of these studies mention the potential of public procurement as a strategic governance tool for promoting inclusive and sustainable growth, importance of engaging SMEs in public procurement, its pivotal role in achieving SMEs growth by participating in domestic and global value chain, etc. However, there is lack of detailed study and analysis of the participation of SMEs in public procurement, especially in Ukraine.

**Purpose.** Analyzing the activity of private entrepreneurs in public procurement system in Ukraine as typical representatives of micro businesses for two full consecutive years of ProZorro operation – 2017 and 2018.

**Methods.** The research methodology includes assessment of international and Ukrainian strategic documents and scientific research studies on the field of public procurement highlighting the support and activity of SMEs. The research methodology includes such methods as systematic analysis of the procurement related documents, statistical data comparative analysis, research analysis, critical analysis etc. To test the dependence between the private entrepreneurs' activity at ProZorro and *economic "power" of the region we applied the correlation analysis.*

Situation analysis is based on the data of ProZorro professional analytics module and State Statistics Service of Ukraine and the results of statistical calculations.

**Results.** Considering the activity of private entrepreneurs in terms of competitive procedures, we can state that non-competitive procedures are the most popular within private entrepreneurs (mainly contract reporting), however, from the point of view of its expected value these procedures are not predominant. This fact is quite obvious – contract reporting procedures are possible for relatively small amounts of money (for goods and services – up to UAH 20 thousand, works – up to UAH 1.5 million), therefore, the expected value of its greater number is less than the expected value of the procedures of open tenders, which are more complex and regulated.

It is important that the percentage of contract reporting procedures by the parameter of the number of tenders in 2018 increased significantly while its percentage by the parameter of expected value raised slightly, although its average value increased from 51 861 UAH in 2017 to 60 834 UAH in 2018 [15].

The same is for sub-threshold procurement – they are most popular among competitive procedures by the parameter of the number of tenders where private entrepreneurs were involved, but by the parameter of expected value are significantly lower compared to open tender's expected value. Moreover, in 2018 there was a significant decrease in private entrepreneurs' sub-threshold procurement in absolute value for both parameters.

Further, we can notice the relative stability of private entrepreneurs' participation in open tenders – its percentage slightly increased by the parameter of the number of tenders with nearly constant level of the expected value share. It is also necessary to note the growth of the average value of open tender procedures, where private entrepreneurs took part, in absolute value (from 616 233 UAH in 2017 to 663 077 UAH in 2018) [15].

Each of the remaining procurement procedures is less than 1 % of the total number of tenders where private entrepreneurs took part; however, by the parameter of expected value the numbers are higher. The dynamics of indicators for the negotiation procedure for defense needs strongly points out the importance of this procedure for the government needs – it is 0.07 % of the total number of tenders in 2018, but 8.92 % of the total expected value. For our mind, it is caused by the high contract volume (the average expected value for this type of

Table 1

Indicators of private entrepreneurs' activity on procurement made via ProZorro system depending on the competitiveness of procedures, 2017–2018 (calculated according to [15])

Procurement procedure	The percentage in the total number of procedures with private Entrepreneurs' participation, by indicators, %			
	number of tenders		expected value	
	2017	2018	2017	2018
<b>Competitive, incl.</b>	<b>39.34</b>	<b>31.27</b>	<b>66.66</b>	<b>64.53</b>
Sub-threshold procurements	32.69	23.60	16.02	10.70
Open tenders	6.46	7.52	39.91	39.77
Open tenders with English-language publication	0.09	0.08	6.80	5.14
Negotiation procedure for defense needs	0.10	0.07	3.93	8.92
<b>Non-competitive, incl.</b>	<b>60.66</b>	<b>68.73</b>	<b>33.34</b>	<b>35.47</b>
Contract reporting	60.04	67.93	31.19	32.94
Negotiation procedure	0.58	0.75	1.94	2.39
Negotiation procedure on urgent needs	0.04	0.04	0.21	0.14

the negotiation procedures is more than UAH 15 713 thousand, in comparison with the average expected value for open tenders is a bit higher than UAH 663 thousand). Moreover, the average volume for the negotiation procedures for defense needs increased in 2018 by more than 4 times compared to 2017 [15].

As a result, we can make a number of important conclusions about the dynamics of private entrepreneurs' activity in public procurement in Ukraine:

1. Contract reporting is the most frequently used procurement procedure by private entrepreneurs in Ukraine.
2. Popularity of sub-threshold procurement procedures decreased for private entrepreneurs during the last year.
3. Participation of private entrepreneurs in open tenders remains relatively stable.
4. Micro entrepreneurs rarely took part at the open tenders with English-language publication.
5. Private entrepreneurs increased their activity at the negotiation procedures for defense needs by the parameter of expected value.

Next, we analyze the private entrepreneurs' activity in public procurement for two full consecutive years of the ProZorro operation – 2017 and 2018 – that continue research [16].

Table 2 shows that generally for all procurement procedures the part of private entrepreneurs' activity among all ProZorro participants decreased, except for the parameter of expected value, which indicates a significant growth of the average sum of procurement procedures (more than 25 %) [15]. By absolute values, private entrepreneurs' activity in 2018 compared to 2017 increased by all aspects with the highest growth of the parameter of expected value, Table 3. Below is a detailed analysis in the context of specific procurement procedures.

For sub-threshold procurement, the percentage of private entrepreneurs in the activities of all ProZorro participants decreased by the parameters of expected value and savings with near constant level of the number of tenders; moreover, the dynamics of private entrepreneurs' indicators also decreased, except by the expected value parameter, Table 3. In other words, the data from Tables 2–3 confirm the previously stated tendency of reducing the popularity of sub-threshold procurement for micro entrepreneurs.

For the contract reporting procedures we can state the growth of the private entrepreneurs' activity in terms of its percentage among all ProZorro participants (Table 2) as well as in its absolute values (Table 3). Importantly, that percentage of private entrepreneurs in contract reporting procedures is comparable to the related indicators of open tenders, which are

competitive procurement procedures and more complex and responsible (compared to sub-threshold procurement and contract reporting).

In 2018, the percentage of private entrepreneurs' activity among all ProZorro participants of open tenders increased by the parameter of the number of tenders, remained almost constant by the parameter of expected value, and decreased by the parameter of savings (Table 2). In absolute values, we can notice the growth of private entrepreneurs' activity at the open tender procedures (Table 3).

The private entrepreneurs' share among all participants in open tenders with English-language publication and its absolute values increased in 2018; however, this procurement procedure has not yet gained high popularity among private entrepreneurs (generally for all ProZorro participants the open tenders with English-language publication are 0.45 % of the total number of tenders and 29.56 % of its expected value, but for private entrepreneurs – 0.08 and 5.14 % respectively) [15]. This situation is understandable – the publication of tender documentation requires a high level of English language proficiency, which can cause additional difficulties for small entrepreneurs who cannot have specific skills and / or time and possibilities to gain them. Also, the number of unique participants from the sector of private entrepreneurs who published the tender documentation in English in 2018 decreased (Table 3).

Negotiation procedures are represented by 2 types of non-competitive procedures (negotiation procedures and negotiation procedures on urgent needs) and one competitive procedure – negotiation procedures for defense needs. The share of private entrepreneurs in total number of ProZorro participants for negotiation procedures increased slightly, and also there is a positive trend of private entrepreneurs' activity for all parameters. Participation of private entrepreneurs in negotiation procedures on urgent need was very limited (less than 0.5 % by all parameters); moreover, private entrepreneurs' activity in such type of procurement procedure reduced in 2018.

Data on the number of negotiation procedures for defense needs show the decrease in the percentage of private entrepreneurs in the total number of ProZorro participants and negative dynamics compared to 2017 for this parameter. From point of view of expected value, its share increased and we can notice the great positive dynamics compared to 2017 (almost by 3.5 times). From the point of view of negotiation procedures for defense needs savings, we can see decline in this parameter for private entrepreneurs and more than 1.5-time growth in the absolute value. The number of unique participants of this procedure slightly decreased (Tables 2–3).

Table 2

Indicators of private entrepreneurs' activity on procurement made via ProZorro system depending on the types of procedures, 2017–2018 (calculated according to [15])

Procurement procedure	Percentage of private entrepreneurs in the activities of all participants of ProZorro, by indicators, %						Average number of participants			
	number of tenders		expected value		savings		all participants		private entrepreneurs	
	2017	2018	2017	2018	2017	2018	2017	2018	2017	2018
<b>All</b>	<b>28.39</b>	<b>27.75</b>	<b>4.80</b>	<b>5.80</b>	<b>8.13</b>	<b>8.07</b>	<b>1.39</b>	<b>1.31</b>	<b>1.66</b>	<b>1.52</b>
Sub-threshold procurements	43.58	43.71	9.80	5.65	12.65	7.35	2.10	2.06	2.56	2.52
Contract reporting	25.75	26.04	9.76	11.47	n/a	n/a	1.00	1.00	1.00	1.00
Open tenders	25.86	28.05	9.65	9.66	15.34	14.52	2.68	2.66	2.82	2.81
Open tenders with English-language publication	4.93	4.91	0.90	1.03	1.35	2.09	2.76	2.78	2.62	2.74
Negotiation procedure	6.14	8.49	1.02	1.28	n/a	n/a	1.00	1.00	1.00	1.00
Negotiation procedure on urgent needs	0.59	0.47	0.12	0.15	n/a	n/a	1.00	1.00	1.00	1.00
Negotiation procedure for defense needs	20.51	15.17	6.89	15.83	14.29	12.04	2.14	2.46	2.70	2.75

Table 3

Dynamics of indicators of private entrepreneurs' activity on procurement made via ProZorro system depending on the types of procedures, 2017–2018 (calculated according to [15])

Procurement procedure	Indicators ratio, 2018 vs 2017, %			
	number of tenders	expected value	savings	number of unique participants
All	121.58	152.79	114.71	112.30
Sub-threshold procurements	87.79	102.08	93.67	96.60
Contract reporting	137.57	161.37	n/a	116.23
Open tenders	141.49	152.25	120.73	128.45
Open tenders with English-language publication	108.22	115.47	132.82	91.45
Negotiation procedure	159.39	188.13	n/a	154.19
Negotiation procedure on urgent needs	100.00	99.37	n/a	89.90
Negotiation procedure for defense needs	82.63	346.94	156.90	96.20

Thus, the performed analysis led to a number of important conclusions about private entrepreneurs' activity in the public procurement in 2018 compared to 2017 (Tables 2–3):

1. The average value of procurement procedures with private entrepreneurs' participation increased.

2. Private entrepreneurs' activity in sub-threshold purchases decreased (compared to other procurement procedures).

3. Contract reporting procedures remain the most frequently used by private entrepreneurs.

4. The participation of private entrepreneurs in open tenders remains almost unchanged; however, they did not participate actively in open tenders with English-language publication.

5. Private entrepreneurs increased their activity in the negotiation procedures, infrequently participated in the negotiation procedures for urgent need, and significantly increased their participation in the negotiation procedures for defense needs by the parameter of expected value.

The competitiveness analysis gives the following results (Table 2):

1. The average number of participants in tenders where private entrepreneurs took part is higher than the average number for the whole system; however, the level of competitiveness in both cases decreased compared to 2017.

2. The same trend is for sub-threshold purchases and open tenders.

3. The level of competition in open tenders with English-language publication increased in 2018; however, for tenders with private entrepreneurs' participation, we can state the opposite trend – in tenders where private entrepreneurs took part competition is lower than within the system as a whole.

4. There is a positive trend in competitiveness indicators for the negotiation procedure for defense needs. In addition, the average number of bidders for tenders where private entrepreneurs took part is higher than for the whole system, which corresponds to the general trend.

As a result, we can conclude that for almost all types of competitive procedures the level of competitiveness for procedures with private entrepreneurs' participation is higher than for public procurement system ProZorro in general.

The next study aims to explore the territorial localization of private entrepreneurs' activities, namely, the dependence of participation of private entrepreneurs who registered at the specific region of Ukraine in certain procurement procedures

in this area on regional economic and demographic indicators. In order to increase the scope of the study we used both relative indicators of the regional development (share in the total population and gross domestic product) and absolute values (gross regional product per person).

The analysis for 2017 was carried out only for the main procurement procedures (sub-threshold, contract reporting, and open tenders) because other types of procedures are limited in terms of volume and territorial dissemination, so they can be ignored by this study.

For the purposes outlined above we made the following calculations. For example, for Odesa region we evaluated the participation of private entrepreneurs who are registered in this region at public procurement in ProZorro, and allocated the percentage of these purchases, which were organized by government authorities from the Odesa region. In order to make the data comparable, we used relative values, i.e. identified procedures in which private entrepreneurs registered in the target area took part, and determined part of them that took place in their "local" areas.

The assessment was carried out by the parameters of the number of tenders, expected value and savings.

Table 4

Indicators of regional statistics, 2017 (calculated according to [17])\*

Region	Percentage in the average population of Ukraine, %, X1	Percentage in the gross national product of Ukraine, %, X2	Gross regional product per one person, mln. UAH, X3
Cherkasy	2.88	2.45	59.7
Chernihiv	2.41	1.9	55.2
Chernivtsi	2.14	0.96	31.51
Dnipropetrovsk	7.62	10.52	97.14
Donetsk	9.91	5.58	39.41
Ivano-Frankivsk	3.25	2.14	46.31
Kharkiv	6.36	6.28	69.49
Kherson	2.47	1.6	45.53
Khmelnytskyi	3.01	2.14	49.92
Kyiv	11.06	28.7	182.61
Kirovohrad	2.26	1.78	55.18
Luhansk	5.11	1.01	13.88
Lviv	5.97	4.94	58.22
Mykolaiv	2.69	2.32	60.55
Odesa	5.62	5.01	62.7
Poltava	3.34	5.06	106.25
Rivne	2.74	1.64	42.04
Sumy	2.58	1.89	51.42
Ternopil	2.48	1.37	38.59
Vinnitsia	3.72	3.1	58.38
Volyn	2.45	1.74	49.99
Zakarpattia	2.97	1.44	34.2
Zaporizhzhia	4.07	4.37	75.31
Zhytomyr	2.9	2.06	49.74

\* Excluding data on the temporarily occupied territories of the Autonomous Republic of Crimea, the city of Sevastopol and part of the anti-terrorist operation zone

Indicators of private entrepreneurs' activity in sub-threshold procurements made via ProZorro system, 2017–2018 (calculated according to [15])

Region	Percentage of sub-threshold procurements organized in the target region among the same procedures where private entrepreneurs registered in this region took part, by indicators, %								
	number of tenders, Y1			expected value, Y2			savings, Y3		
	2017	2018	shift	2017	2018	shift	2017	2018	shift
Cherkasy	35.93	32.51	-3.42	38.65	37.74	-0.91	32.20	29.81	-2.39
Chernihiv	45.88	58.79	12.91	72.59	60.68	-11.91	71.79	45.90	-25.89
Chernivtsi	68.56	39.56	-29.00	67.06	57.09	-9.97	51.59	51.22	-0.37
Dnipropetrovsk	69.13	62.52	-6.61	70.73	61.91	-8.82	65.55	54.10	-11.45
Donetsk	79.97	82.27	2.30	88.32	84.93	-3.39	83.42	75.40	-8.02
Ivano-Frankivsk	56.59	43.42	-13.17	73.68	69.12	-4.56	57.78	57.91	0.13
Kharkiv	17.38	23.28	5.90	32.70	42.57	9.87	19.52	29.47	9.95
Kherson	24.18	15.50	-8.68	32.25	17.91	-14.34	36.82	22.49	-14.33
Khmelnitskyi	25.85	10.02	-15.83	28.94	14.07	-14.87	22.32	7.43	-14.89
Kyiv	55.83	60.14	4.31	62.43	63.21	0.78	58.59	58.67	0.08
Kirovohrad	31.11	14.60	-16.51	42.60	23.25	-19.35	36.78	16.68	-20.10
Luhansk	66.13	43.78	-22.35	57.55	43.64	-13.91	45.76	35.32	-10.44
Lviv	76.19	72.93	-3.26	83.06	79.02	-4.04	73.83	65.76	-8.07
Mykolaiv	56.43	49.23	-7.20	51.50	50.45	-1.05	55.18	51.31	-3.87
Odesa	55.22	60.70	5.48	63.76	76.60	12.84	58.66	72.79	14.13
Poltava	9.57	6.34	-3.23	32.50	28.20	-4.30	30.68	26.40	-4.28
Rivne	38.50	34.55	-3.95	39.90	28.70	-11.2	34.79	21.95	-12.84
Sumy	62.91	50.67	-12.24	65.27	45.19	-20.08	54.67	30.57	-24.10
Ternopil	69.87	61.15	-8.72	66.78	62.78	-4.00	57.38	43.90	-13.48
Vinnitsia	69.52	75.41	5.89	79.64	77.12	-2.52	69.35	66.23	-3.12
Volyn	65.66	68.78	3.12	59.93	67.27	7.34	55.67	58.93	3.26
Zakarpattia	50.31	32.85	-17.46	70.49	64.60	-5.89	65.15	63.71	-1.44
Zaporizhzhia	62.55	50.36	-12.19	71.62	64.94	-6.68	63.89	59.58	-4.31
Zhytomyr	65.89	73.43	7.54	60.06	64.15	4.09	55.16	57.86	2.70

As a result, in 2017 we did not find any dependence of private entrepreneurs' activity in their "native" region and regional indicators for the competitive procedures (sub-threshold purchases and open tenders); and negative correlation for a non-competitive contract reporting procedure by the parameter of regional domestic product. In other words, the closeness of private entrepreneurs to their local regional market in 2017 were found only for the simplest procurement procedures. On this basis, we concluded that private entrepreneurs were not limited by their local territory for participation in more complex and/or large purchases, but actively operate throughout Ukraine already in the 2<sup>nd</sup> year of ProZorro functioning.

In continuation of this study, we carried out the similar calculations for 2018, resulted in Tables 5, 7, 9. For this moment regional economic statistics are available up to 2017, so we use demographic statistics for the same period for the comparability reason (Table 4).

Table 5 presents data on the activity of private entrepreneurs in sub-threshold purchases.

The correlation analysis did not reveal any relationship between the private entrepreneurs' activity in sub-threshold procurement and the "capacity" of their region in 2018 (Table 6).

Analysis of the changes during 2018 showed that the activity of private entrepreneurs in their local regions for sub-threshold purchases decreased, especially by the parameter of expected value and savings (Table 5).

Data on the activity of private entrepreneurs in the procedures of contract reporting are given in Table 7. Since these procedures are not competitive, parameters of savings are not calculated for them.

The dependence between private entrepreneurs' activity in the contract reporting procedures and the level of development of their "native" region has significantly decreased compared to 2017 both by parameters of population and gross regional product (Table 8). Thus, the calculations for 2018 do not allow us to state any correlation between private entrepreneurs' activity in contract reporting and regional indicators unlike in 2017.

We can note a decrease in the level of localization of private entrepreneurs' activity in their "native" region also for contract reporting procedure as for sub-threshold procedures (Table 7).

Table 6

Correlation between the activity of private entrepreneurs in sub-threshold procurements and regional indicators, 2018

Y/X	X1	X2	X3
Y1	0.39	0.20	0.03
Y2	0.41	0.20	0.05
Y3	0.42	0.24	0.09

Indicators of private entrepreneurs' activity in contract reporting made via ProZorro system, 2017–2018 (calculated according to [15])

Region	Percentage of contract reporting organized in the target region among the same procedures where private entrepreneurs registered in this region took part, by indicators, %					
	number of tenders, Y1			expected value, Y2		
	2017	2018	shift	2017	2018	shift
Cherkasy	92.56	91.56	-1.00	83.12	84.07	0.95
Chernihiv	95.74	86.42	-9.32	90.28	78.92	-11.36
Chernivtsi	88.27	94.66	6.39	79.14	88.00	8.86
Dnipropetrovsk	86.80	89.81	3.01	82.72	87.50	4.78
Donetsk	97.03	95.50	-1.53	96.75	94.92	-1.83
Ivano-Frankivsk	89.34	87.00	-2.34	84.94	87.37	2.43
Kharkiv	77.40	82.83	5.43	83.73	85.21	1.48
Kherson	93.35	92.41	-0.94	90.15	85.49	-4.66
Khmelnytskyi	89.96	88.28	-1.68	85.30	85.90	0.60
Kyiv	73.71	78.94	5.23	61.27	73.97	12.70
Kirovohrad	92.68	92.93	0.25	87.43	83.72	-3.71
Luhansk	97.12	95.12	-2.00	96.06	90.83	-5.23
Lviv	85.31	82.06	-3.25	88.10	86.63	-1.47
Mykolaiv	88.21	84.00	-4.21	88.08	85.16	-2.92
Odesa	96.56	94.14	-2.42	96.22	98.83	2.61
Poltava	90.83	89.92	-0.91	90.66	88.78	-1.88
Rivne	96.79	94.19	-2.60	93.97	90.25	-3.72
Sumy	91.40	89.66	-1.74	91.21	90.05	-1.16
Ternopil	94.43	93.63	-0.80	93.05	89.64	-3.41
Vinnitsia	91.95	91.28	-0.67	90.83	91.58	0.75
Volyn	71.98	77.28	5.30	65.40	73.88	8.48
Zakarpattia	97.92	97.57	-0.35	98.13	97.57	-0.56
Zaporizhzhia	84.84	86.62	1.78	82.18	83.42	1.24
Zhytomyr	92.22	88.82	-3.40	85.92	82.62	-3.30

Table 9 presents data on the activity of private entrepreneurs in open tenders.

Correlation analysis did not indicate any dependence between the activity of private entrepreneurs in open tenders and the “power” of their region (Table 10).

In this case we also can notice a decrease in the level of localization of private entrepreneurs' activity in their “native” region (Table 9).

Thus, the results of this study indicate that Ukrainian private entrepreneurs are actively involved in public procurement via ProZorro regardless of the location of government authorities who conduct the procurement procedures. Moreover, we discover the tendency of decreasing the level of localization of private entrepreneurs' activity in their “native” region. To our mind, this is very positive shift that indicates the development of professional maturity and private entrepreneurs' confidence in public procurement.

Table 8

Correlation between the activity of private entrepreneurs in contract reporting and regional indicators, 2018

Y/X	X1	X2	X3
Y1	-0.21	-0.44	-0.53
Y2	0	-0.36	-0.45

**Conclusions.** This paper presents the study of Ukrainian E-procurement system ProZorro in terms of activity of private entrepreneurs in public procurement in Ukraine. During this study, we analyzed data obtained from professional analytics module to test the dynamics of their participation in public procurement for 2017–2018. It was revealed that private entrepreneurs are active participants of the ProZorro public procurement system, and the average number of tenders where private entrepreneurs took part has significantly increased. The most frequently used procurement procedures with private entrepreneurs' participation were traditionally non-competitive contract reporting procedures; private entrepreneurs reduced their activity in sub-threshold procedures with a relatively stable level of their participation in open tenders. The private entrepreneurs' participation in negotiation procedures for defense needs has undergone fundamental changes – the size of contracts has significantly increased. A positive fact is a higher level of competition in tenders with private entrepreneurs' participation compared to level of competition at the ProZorro system as a whole.

From the point of view of territorial localization of the private entrepreneurs' activities, in 2018 the dependence of private entrepreneurs' activity in main procurement procedures at the local (regional) level on the level of economic and demographic development of their “native” region was not detected. Moreover, the participation of private entrepreneurs in procurement procedures organized at their local (regional) level

Indicators of private entrepreneurs' activity in open tenders made via ProZorro system, 2017–2018 (calculated according to [15])

Region	Percentage of open tenders organized in the target region among the same procedures where private entrepreneurs registered in this region took part, by indicators, %								
	number of tenders, Y1			expected value, Y2			savings, Y3		
	2017	2018	shift, %	2017	2018	shift, %	2017	2018	shift, %
Cherkasy	55.97	56.44	0.47	54.31	46.42	-7.89	56.86	42.28	-14.58
Chernihiv	53.92	47.20	-6.72	68.32	54.21	-14.11	63.17	37.74	-25.43
Chernivtsi	72.36	65.82	-6.54	81.41	73.18	-8.23	77.88	79.87	1.99
Dnipropetrovsk	66.15	63.12	-3.03	67.55	68.86	1.31	58.44	60.12	1.68
Donetsk	83.85	83.63	-0.22	86.26	87.64	1.38	79.52	84.27	4.75
Ivano-Frankivsk	65.94	57.81	-8.13	67.59	55.88	-11.71	74.22	67.78	-6.44
Kharkiv	60.94	55.68	-5.26	64.47	59.24	-5.23	58.08	55.32	-2.76
Kherson	71.12	62.02	-9.10	63.11	66.74	3.63	64.88	67.82	2.94
Khmelnitskyi	61.34	54.42	-6.92	66.25	62.48	-3.77	60.20	57.47	-2.73
Kyiv	59.74	55.89	-3.85	66.51	61.25	-5.26	74.71	70.75	-3.96
Kirovohrad	60.16	54.41	-5.75	64.23	71.47	7.24	64.90	51.23	-13.67
Luhansk	71.33	72.44	1.11	69.55	69.26	-0.29	77.83	76.74	-1.09
Lviv	82.62	76.96	-5.66	87.45	83.05	-4.40	84.86	79.11	-5.75
Mykolaiv	72.94	65.82	-7.12	76.07	61.61	-14.46	83.01	54.70	-28.31
Odesa	72.56	67.37	-5.19	76.29	69.86	-6.43	76.63	76.87	0.24
Poltava	52.99	37.23	-15.76	53.07	37.76	-15.31	52.39	34.77	-17.62
Rivne	57.76	65.76	8.00	63.46	72.02	8.56	68.28	64.25	-4.03
Sumy	65.33	63.43	-1.90	70.53	67.77	-2.76	69.18	59.83	-9.35
Ternopil	61.09	52.90	-8.19	69.92	66.76	-3.16	57.74	68.37	10.63
Vinnitsia	61.01	62.53	1.52	77.32	76.74	-0.58	76.81	73.12	-3.69
Volyn	44.74	49.75	5.01	41.77	45.19	3.42	35.69	41.88	6.19
Zakarpattia	77.97	78.67	0.70	82.37	77.66	-4.71	81.43	79.15	-2.28
Zaporizhzhia	62.95	53.42	-9.53	65.91	51.43	-14.48	72.42	55.80	-16.62
Zhytomyr	61.72	52.58	-9.14	62.11	50.42	-11.69	60.98	49.11	-11.87

Table 10

Correlation between the activity of private entrepreneurs in open tenders and regional indicators, 2018

Y/X	X1	X2	X3
Y1	0.34	-0.06	-0.37
0Y2	0.31	0.02	-0.30
Y3	0.40	0.12	-0.21

significantly decreased in 2018 for most regions of Ukraine. In other words, private entrepreneurs are full participants of public procurement system in Ukraine, regardless of their territorial location and level of development of the region.

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## Участь мікробізнесу в державних закупівлях: досвід ProZorro

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**Мета.** Аналіз динаміки участі підприємств мікробізнесу в державних закупівлях в Україні за 2017–2018 роки за допомогою професійного модуля аналітики системи державних закупівель ProZorro.

**Методика.** Результати отримані шляхом застосування загальнонаукових і спеціалізованих методів дослідження (порівняння, узагальнення, типологія, абстракція, кореляційний аналіз), а також систематичних і логічних підходів, пов'язаних із впровадженням теорії державних закупівель у практичну діяльність підприємств.

**Результати.** Було виявлено, що приватні підприємці є повноцінними учасниками системи публічних закупівель в Україні при значному зростанні середньої суми тендерів, в яких вони брали участь. Державні закупівлі, в яких брали участь приватні підприємці, мали більш високий рівень конкуренції, ніж у цілому по системі державних закупівель. У вартісному виразі значно підвищилась участь приватних підприємців у конкурентних переговорних процедурах для потреб оборони. Дослідження територіальної локалізації не виявило залежності активності приватних підприємців, що зареєстровано в конкретному регіоні, в основних процедурах закупівлі від показників економічної та демографічної розвиненості регіонів-організаторів цих процедур. Участь приватних підприємців у процедурах закупівлі, що організовані на їх місцевому (регіональному) рівні, значно знизилась у більшості регіонів України.

**Наукова новизна.** Дане дослідження надає емпіричні дані щодо рівня участі мікропідприємств у державних закупівлях в Україні на основі модуля професійної аналітики ProZorro, що є онлайн-інструментом для агрегування, сортування та обробки даних про державні закупівлі в Україні.

**Практична значимість.** Результати дослідження можуть бути використані державними організаціями для

розробки стратегії активізації залучення приватних підприємців до публічних закупівель, а також для коригування практики використання системи державних закупівель з метою підвищення її ефективності.

**Ключові слова:** державні закупівлі, система електронних публічних закупівель ProZorro, приватні підприємці, мікропідприємства, відкриті торги

## Участие микробизнеса в государственных закупках: опыт ProZorro

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**Цель.** Анализ динамики участия предприятий микробизнеса в государственных закупках в Украине за 2017–2018 годы при помощи профессионального модуля аналитики системы публичных закупок ProZorro.

**Методика.** Результаты получены путем применения общенаучных и специализированных методов исследования (сравнение, обобщение, типология, абстракция, корреляционный анализ), а также систематических и логических подходов, связанных с внедрением теории государственных закупок в практическую деятельность предприятий.

**Результаты.** Было обнаружено, что частные предприниматели являются полноценными участниками системы публичных закупок в Украине при значительном росте средней суммы тендеров, в которых они принимали участие. Государственные закупки, в которых принимали участие частные предприниматели, имели более высокий уровень конкуренции, чем в целом по системе публичных закупок. В стоимостном выражении значительно возросло участие частных предпринимателей в конкурентных переговорных процедурах для нужд обороны. Исследование территориальной локализации деятельности частных предпринимателей не обнаружило зависимости активности частных предпринимателей, зарегистрированных в конкретном регионе, в основных процедурах закупки от показателей экономической и демографической развитости регионов-организаторов данных процедур. Участие частных предпринимателей в процедурах закупки, организованных на их местном (региональном) уровне, значительно снизилось в большинстве регионов Украины.

**Научная новизна.** Данное исследование предоставляет эмпирические данные об уровне участия микропредприятий в государственных закупках в Украине на основе модуля профессиональной аналитики ProZorro, который является онлайн-инструментом для агрегирования, сортировки и обработки данных о публичных закупках в Украине.

**Практическая значимость.** Результаты исследования могут быть использованы государственными организациями для разработки стратегии активизации привлечения частных предпринимателей к публичным закупкам, а также для корректировки практики использования системы государственных закупок с целью повышения ее эффективности.

**Ключевые слова:** государственные закупки, электронная система публичных закупок ProZorro, частные предприниматели, микропредприятия, открытые торги

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